

CONTENTS

ORDERING INFO

- 2 Payment, Terms, Exchange
- 3 Special Services
- 4 Shipping Info
- 5 Delivery Methods & Costs
- 6 Delivery Days
- 7 C&R LOO Full Sheet UPS Box

TECHNICAL INFO

- 8 Rod Weight
- 8 Frit Sizes
- 27 Sample Sets
- 9 Compatibility
- 9 Compatibility Tests
- 10 Expansion Tables

OVERLAY COLORS

- 11 Q-Colors
- 17 Kugler
- 23 Wiesenthal
- 26 CR-Colors
- 26 FA-Powders
- 27 Rod & Frit Color Kits

FLOAT GLASS

- 28 Float Glass Fusing Colors

ENAMELS

- 30 Thompson Enamels

SOFT GLASS CANE

- 32 Effetre
- 40 Murano
- 42 Mother of Pearl Cane
- 42 Satake
- 44 Lauscha

SOFT GLASS TUBING

- 47 Lauscha

BOROSILICATE GLASS

RODS & TUBES

- 48 Northstar
- 49 Glass Alchemy
- 50 Schott Duran
- 52 Reduction & Non-Reduction Frits & Powders for Lampworking, Glassblowing & Fusing

SHEET GLASS

Antique Glass

- 57 A.C. Fischer
- 57 Nachtmann

Machine Antique Glass

- 69 GNA Glass, Mirror, Hand Rolled

Uroboros

- 70 Sheet Glass
- 73 Frits & Powders
- 74 Stringers & Noodles
- 74 EZ-Round Pre-Cut Circles
- 74 Billets
- 75 Glass Kits

Bullseye

- 76 Sheet Glass
- 79 Confetti
- 83 Frits & Powders for Fusing
- 84 Frits & Powders for Beadmaking
- 85 Round Rods
- 86 Stringers
- 87 Dichroic Stringer
- 87 Sample Sets
- 88 Glass Packs

Machine Rolled Opalescent & Cathedral

- 89 Machine Rolled Colored 90
- 90 Spectrum Glass
- 93 Spectrum Fusible 96 Glass
- 95 Spectrum Frits 96 Glass

Dichroic

- 96 CBS Dichroic Glass
- 97 Dichro Magic Glass
- 99 Moretti Compatible Thin & Textured Dichroic Glass
- 101 Textured Glass

JEWELS

- 102 German Hand Polished Jewels

RONDELS

- 122 Fischer Rondels
- 123 Hand Spun Rondels

COPPER FOIL

- 124 Edco Copper Foil

LEAD & ZINC

- 125 Cascade Lead & Zinc

BRASS

- 126 European Brass Crowned Lead Came

SOLDER

- 126 Canfield Solder
- 126 Hirsch Solder

GLASS BATCH

- 127 Glasma Batch
- 132 Spruce Pine Batch

CULLET & CASTING GLASS

- 132 Uroboros 90 Cullet
- 133 Spectrum 96 Cullet

SANDBLASTING & ETCHING RESIST

- 133 EDCO Resist

FUSING KILNS

- 134 Arrow Spring Kilns
- 138 Jen Ken Kilns
- 141 Skutt Kilns

BURNERS & ACCESSORIES

- 145 Ilmenau Burners
- 146 Nortel Burners
- 148 National Torches
- 150 Carlisle Torches
- 150 Arnold Torches

BLOWING, BEAD & FUSING HAND TOOLS & SUPPLIES

- 151 Torch Accessories
- 154 Beadmaking Kits
- 156 Glassworking Tools

- 178 Essemce Pipes
- 187 Glass Cutters
- 178 Essemce Shears
- 181 Essemce Pipe Rollers
- 183 Palmer Pipes & Jacks
- 186 Ilmenau Shapers
- 191 Lead Knives
- 192 Knipex Pliers
- 193 UV Lights

MACHINES

- 194 Gemini Band Saw
- 195 Glastar Sandblasting
- 198 Glastar Grinders & Polishers
- 201 Grinder Accessories

EYE WEAR

- 205 AV 2000
- 206 Didymium
- 206 Flip Downs

FUSING & GLASSWORKING SUPPLIES

- 203 Gloves, Mitts & Sleeves
- 207 Dragon Slumping Molds
- 214 Slumping Molds
- 219 Drill Bits
- 219 Kiln Shelves & Posts
- 221 Mandrel Release
- 222 Kiln Wash
- 222 Mold Mixes
- 222 Bees Wax
- 223 Fiber Rope, Paper, Board
- 224 Fiber Board
- 224 Metal Leaf & Foil
- 225 Hake Brushes
- 225 Overglaze Spray
- 225 Diamond Drill Bits
- 226 Mother of Pearl Powder

BOOKS & VIDEOS

- 227 Books
- 233 Videos

DIRECTIONS

- 240 Directions



ORDERING INFORMATION

HOW TO ORDER

We offer BOTH Toll Free Phone & Toll Free FAX Order lines to save you even more money. Call us at (800) 227-1780 or FAX us Toll Free at (800) 932-7810. You can also contact us by E-Mail at: SALES@CRLOO.COM. When you order, please tell us the part number of the item you wish, then the quantity you want. Also, please, tell us the quantity in the same units that we sell in. I.e. if you want 1 sheet of regular Bullseye, please order 7.5 lbs., 2 sheets, 15lbs., 4 sheets =30 lbs., 1 sheet of Uroboros regular glass, order 5 sq. ft. or if you want 1 rod of Kugler order 0.60 kg. This will let us process your order quicker and reduce the possibility of error due to converting the units you order in into the units we sell in.

CATALOG DOWNLOAD

Our catalog may be downloaded from our web site at crloo.com.

UPDATES - SPECIALS - SALES

Please see our web site for catalog updates, internet only specials, new products, color charts, and other items.

GLASS BLOWING MATERIALS

There is no minimum purchase for overlay glass rods and related products. For frits & powders, there is a 1/2 kg minimum. For other items, please see the appropriate section for more details.

PAYMENT METHODS

CHECK: We accept personal or company checks for purchases from existing customers. If you are a new customer, we accept cashier's checks, money orders or certified checks only. Some conditions may apply.

COD: Orders can be sent COD by UPS or Fed Ex. UPS COD is an extra \$7.00, Fed Ex \$6.00. For new customers, we accept the following for payment: cashier's check, money order or certified check only. For existing customers whose accounts are in good standing, we also accept personal and company checks for COD orders. UPS and Fed Ex no longer accept cash for COD shipments.

BANK CARDS: We accept VISA, MASTERCARD and DISCOVER. Please include card number & expiration date, signature and name of card holder with your order.

NET 30: We have NET 30 accounts available. If you would like to purchase on credit, please request a credit application.

DELIVERY

We are not liable to loss or damage to merchandise once it has left our warehouse. Once we ship an item, FedEx, UPS and /or the trucking company take over responsibility to deliver your packages to you. Any claim must be filed with them at once. When taking delivery, carefully check the package for any damage. If you are not sure of the condition of the goods, mark "SUSPECTED DAMAGE" on the delivery receipt. Any truck claim must be filed with the carrier at once. UPS/ FEDEX damages: please contact us at once so we can call the carrier and file a claim for you. Keep the box, packing materials, and merchandise for inspection by the carrier's claim adjuster.

EXCHANGES AND RETURNS

All exchanges & returns must be authorized by your sales representative. If defective or incorrect merchandise has been shipped to you through our error, exchanges will be made without additional shipping charges. Items must be unused, in their original container and accompanied by copies of all pages of the original invoice. Exchanges & returns must be made within 30 days of the invoice date. Orders returned for anything other than defective merchandise will be assessed a 15% restocking fee. NO RETURNS AFTER 60 DAYS. For defective merchandise, please include a written description stating the problem.



TERMS AND CONDITIONS

All merchandise remains the property of C&R Loo, Inc. until fully paid. Prices are subject to change without notice. All technical information is provided by the manufacturer or technologists in the glass industry. This information has been compiled to assist our customers with problems concerning compatibility. C&R Loo, Inc. and other contributors of technical information are not responsible for any damages to persons or property resulting from the use of any or all technical information and/or merchandise provided in this catalog.

RETURNED CHECKS

Checks returned for Non Sufficient Funds will be charged a \$20.00 fee and accrue a FINANCE CHARGE of 1.5% per month (after deducting all payments, credits and returns) on the outstanding balance. THIS IS AN ANNUAL PERCENTAGE RATE OF 18%. Accounts will be placed for collection and collection and/or court cost and/or attorney fees will be added.

All of the above terms are presumed read, understood and agreed to by our customers when we receive your first and subsequent orders.

Prices subject to change without notice. Technical specifications subject to change without notice.

SPECIAL SERVICES

CANE CUTTING

Long lampworking rods can be cut in $\frac{1}{3}$ lengths (Effetre, Murano, Lauscha). Less than 3 lbs. - no charge, orders of 3 lbs. or more will incur a \$0.50/lb cutting charge. Please let us know when ordering if you would like your rods cut in $\frac{1}{3}$. If you do not specify, we will cut <3 lb. orders into $\frac{1}{3}$'s and NOT cut rods on orders over 3 lbs. Cutting rods can save shipping costs for small orders.

SHEET GLASS CUTTING FEE INFORMATION

We can cut any glass to your specific sizes for a fee of \$10.00 per finished sheet. Tolerances are +/- $\frac{1}{8}$ ". Non-standard cuts can be made by special arrangement.

SPECIAL ORDERS

Any material can be specially ordered. All special orders must be pre-paid. Special orders cannot be canceled or returned for credit. Please contact your sales representative for details.

STUDENT DISCOUNTS AND SCHOOL PURCHASES

Instructors: if you provide us with a class list with the names and addresses of your hot glass students, we will give the students a 5% discount on orders under 25 kilos. For orders over 25 kilos, the regular discounts in the catalog apply.

STUDENT GROUP ORDERS

You can save money by placing group orders. When you place your order, first let us know who you are ordering for, then tell us the part number, size and quantity of the item you want. We'll take care of the rest and give you a sheet listing the sub-totals for each person you are ordering for.



SHIPPING INFORMATION

FREE SHIPPING

We offer FREE Ground shipping* on Q-Color, FA-Powder, Kugler, Wiesenthal, and Zimmermann-rod, frit and powder ** orders within the continental U.S. In addition, we are now able to offer you 5% discounts on 2nd DAY shipping and 15% discounts on Next Day shipping. We do charge shipping for all other items. We also provide you with substantial UPS, FedEx, and freight discounts. * COD, insurance, handling & other fees still apply. ** Certain other items may be included w/these items to qualify for FREE SHIPPING

FREIGHT DISCOUNTS

When making a purchasing decision, price is not the only factor involved - freight can be a substantial cost of receiving an order. We have obtained the very best freight rates from the carriers we work with and we pass these savings on to you. So, not only are our prices extremely competitive, but we can have your order delivered to you for substantially less.

50% OFF 3 DAY SHIPPING

If you would like your order shipped Fed Ex Express Saver shipping, we will give you 50% off the published rate – an incredible savings. For example, a 60 lb package to New York costs about 80.00 to ship. This same package shipped with us costs you about \$40. This works out to a few dollars more than ground shipping and you get your package up to 6 days sooner!

NEW FedEx 3 DAY DELIVERY SERVICE

With this FedEx service, you will get your orders up to a week sooner than regular Ground Service; 3 days max to the East Coast (vs. up to 7 days), 2 days Central, 1 day Pacific.*** Delivery days are approximate. Remote areas may take slightly longer.

FedEx \$8.00 UPGRADES

We will upgrade Kugler, Q-Color, Wiesenthal & Zimmermann orders for an extra \$8.00/box. Other orders can be upgraded to FedEx 3Day delivery for a nominal charge and you will receive your order up to one week sooner.

DELIVERY METHODS

Orders are shipped by UPS, FedEx or common carrier.

US MAIL

There is an extra \$20 handling fee for all mail (surface or air) foreign & domestic. Packages are insured for an additional fee. There is no insurance for packages shipped to Mexico. Packages that are insured and lost or damaged by the postal service may take several months to be replaced. Packages to Mexico can not be traced or replaced by the postal service or C&R LOO, Inc. Packages sent by the postal service are sent at your own risk.

RELEASE WITHOUT SIGNATURE

If you want FedEx or UPS to leave your package at the door without a signature, please let us know and we will mark your package "release without signature." Please be aware that neither we, nor the shipping company will responsible for the shipment once it is left at your door without a signature.

HANDLING & INSURANCE

We charge \$4.00 +\$1.50 (Fed Ex Surcharge) per box for normal handling. Large, unusual items, UPS wooden sheet glass boxes, etc., are more. Please call for current prices on the items you are ordering. Ground insurance is \$0.35 per \$100. Air insurance is \$2.50 up to \$500, over \$501, insurance is \$0.50 per \$100. Other insurance rates vary.

GUARANTEES

Guarantee does not apply to weather related delays. The day an item is shipped does not count as a delivery day. For example, an item ordered and shipped on a Monday to New York via 3 day delivery will be delivered on Thursday or sooner.

SHIPPING INFORMATION (continued)

FEDEX SERVICES

Method	Place Order Before	Delivery Time	Approximate Cost
FedEx First Overnight	2:00 pm PST	Next working day by 8:00 am to most locations.	8 x regular UPS
FedEx Priority Overnight	2:00 pm PST	Next working day by 10:30 am in most areas and by 4:30 pm to other areas. (5:00 pm in Alaska and Hawaii) in most areas, or noon the second working day in other areas.	6 x regular UPS
FedEx Standard Overnight	2:00 pm PST	Next working day by 3:00 pm in most areas and 4:30 pm in other areas. Some areas are not eligible for this service.	4 x regular UPS
FedEx 2 Day	2:00 pm PST	2 working days (except some locations in Hawaii and Alaska)	2.5 x regular UPS
FedEx Express Saver	2:00 pm PST	1-3 working days	Same as regular UPS
FedEx International	2:00 pm PST	1-3 working days All INTERNATIONAL destinations (except Canada) 3-5 days	

FedEx offers Saturday and Sunday delivery service also with Priority Overnight and FedEx 2Day rates plus an additional \$10.00. Delivery time is same as above delivery time. Sunday delivery service is offered to 50 major U.S. metro areas, from and U.S. origin except Hawaii. Rates for Sunday delivery is Priority Overnight plus \$20.00. Time of delivery is Sunday by 3 pm. Ask sales person if your area is available for Saturday or Sunday deliveries.

- There will be NO Sunday delivery on Easter.
- C.O.D and Hold at location will NOT be available for Sunday delivery.
- Sunday delivery service only offered Friday, unless Friday is a holiday and pickup is then on Thursdays for Sunday delivery

UPS SERVICES

Method	Place Order Before	Delivery Time	Approximate Cost
UPS Sonic Air	9:00 am PST	SAME DAY. Ask sales person for information.	Varies on Location
UPS Next Day Early A.M.	2:00 pm PST	Guaranteed overnight by 8:00 am to Major areas.	8 x regular UPS
UPS Next Day Air	2:00 pm PST	Guaranteed overnight by 10:30 am to every address in the U.S. and Puerto Rico.	6 x regular UPS
UPS Next Day Saver	2:00 pm PST	Guaranteed by 3:00 pm	5 x regular UPS
UPS 2nd Day Air A.M.	2:00 pm PST	Guaranteed in two-working days by noon to every address in the U.S. and Puerto Rico.	4 x regular UPS
UPS 2nd Day Air	2:00 pm PST	Guaranteed in two-working days every address in the U.S. and Puerto Rico.	3 x regular UPS
UPS 3 Day Select	2:00 pm PST	Guaranteed in three-working days to 48 states (does not include Alaska and Hawaii).	2 x regular UPS
UPS Ground	2:00 pm PST	Guaranteed day-definite delivery means your commercial ground packages arrive by the day promised-guaranteed.	1 x regular UPS
UPS International	1:00 pm PST	depends on location	Varies on Location

UPS offers Saturday delivery with all Early AM Next Day Air or Next Day Air for rate plus an additional \$10.00

US MAIL SERVICES

Method	Place Order Before	Delivery Time	Approximate Cost
Express Mail Domestic	11:00 am PST	Overnight in most cases. Delivery by noon the next day This includes Saturdays, Sundays, and holidays to no additional cost.	\$13.65 up to 8 oz.
Priority Mail Domestic	11:00 am PST	Within 2-3 days in most areas.	\$3.85 up to 2 lbs.
Parcel Post Domestic	11:00 am PST	1-10 days	Rate + \$20.00 various on locations
International Express	11:00 am PST	2-3 days 170 countries	Rate + \$20.00 various on locations
Global Priority	11:00 am PST	Various on location	\$3.75 up + \$20.00 if not a letter pak.
Parcel Post Air or Surface	11:00 am PST	Various on location	Rate + \$20.00 Various on locations

DELIVERY DAYS

SCHEDULED DELIVERY DAYS FOR GROUND AND FED EX EXPRESS SAVER SERVICES

New FedEx[®] Federal Express Service

3 DAY SERVICE AT GROUND COST!

* Delivery days are approximate.
Remote areas can be more.

UPS GROUND

1 DAY
2 DAYS
3 DAYS
4 DAYS
5 DAYS
6 DAYS
7 DAYS

ALASKA
UPS Next Day Air
UPS 2nd Day Air

Service to some remote areas may require additional days.

ENTIRE STATE OF HAWAII
UPS Next Day Air
UPS 2nd Day Air

PUERTO RICO
UPS Next Day Air
UPS 2nd Day Air



FULL SHEET BOX

C&R LOO FULL SHEET SHIPPING BOX

Purchasers of Nachtmann, Fischer, Uroboros, Bullseye and our other sheet glass can now take advantage of an innovative concept that offers both the convenience of ordering in small quantities and the benefits of prompt, inexpensive shipment via UPS and FED EX.

THE KEY TO THIS UNIQUE PROCESS IS THE CUSTOM-DESIGNED C&R LOO FULL SHEET UPS BOX (U.S. PATENT #366851) THIS SERVICE WILL MAKE OUR SHEET GLASS MORE READILY AVAILABLE TO YOU, NO MATTER WHERE YOU ARE OR HOW MUCH GLASS YOU NEED.

Once we receive your order, we can send you any quantity of sheet glass – whether it's one sheet or 30 sheets – with our C&R LOO Full Sheet Boxes. You get just what you want when you want it.

Weighing less than 70 lbs when filled with 4 full sheets, the C&R LOO Full Sheet Box has been extensively tested to ensure that the glass will arrive safely – less need to worry about breakage, time of delivery, or how to unload a 600-pound case of glass. And, as always, we will custom pick your order to suit your needs. Just let us know what you want and we will get it to you.

With our UPS & FED EX Next day and Priority Saturday service, glass that you order by 2 in the afternoon on a Friday can be delivered to you on Saturday morning. All other UPS & FED EX services are also available. In addition to our usual payment methods, COD is accepted for sheet glass orders (continental U.S. only).

A few days after you receive your glass, FedEx will pick up the empty box and return it to us to use again. The reuse of the box enables us to be more environmentally friendly by reducing wasted packaging.

If you do not require full sheets, we can also ship 1/2 and 1/4 sheets by UPS & FED EX.



TECHNICAL INFORMATION

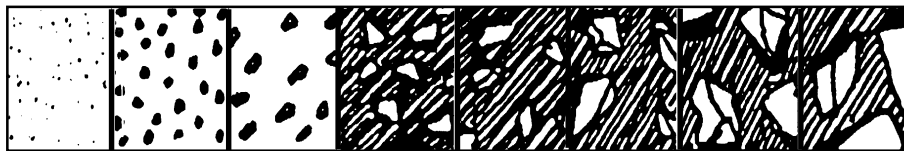
ROD AND CANE WEIGHTS

NAME	QUANTITY	APPROXIMATE WEIGHT	APPROXIMATE WEIGHT
Q-Colors	1 Rod	1.00 kg	2.20 lbs
Kugler	1 Rod	0.60 kg	1.40 lbs
Wiesenthalhütte	1 Rod	0.60 kg	1.30 lbs
Effetre & Murano	1 Cane	0.08 kg	0.15 lbs
Lauscha	1 Cane	0.10 kg	0.20 lbs
Bullseye	1 Cane	0.02 kg	0.05 lbs
Satake	1 Cane	0.08 kg	0.15 lbs
Glass Alchemy	1 Cane	0.05 kg	0.10 lbs
Northstar	1 Cane	0.05 kg	0.10 lbs

FRIT & POWDER SIZES AND APPROXIMATE EQUIVALENTS

Size	Q-Colors	Kugler	Wiesenthalhütte	Uroboros	Bullseye	Mesh #
0.00 - 0.50mm	0P	0P	0P	F1	08	60-35
0.25 - .50 mm	00P	00P	0	F2		35-18
0.5 - 1.0 mm	0	0	1	F3	01	18-8
1.0 - 2.4 mm	1	1	2	F3	02	8-5
2.4 - 3.8 mm	2	2	3	F5	03	5+
3.8 - 5.0 mm	3	3	4	F5	03	
5.0 - 8.0 mm	4	4	5	F5		
8.0 - 11.5 mm	5	5	6	F7		

POWDER 00-POWDER K-0 K-1 K-2 K-3 K-4 K-5/6





COMPATIBILITY

In order to be compatible glass color rods must agree in coefficient of expansion, viscosity, and annealing range with the base glass being used. Q-Colors and Kugler rods are designed to have a similar coefficient of expansion and viscosity and therefore are generally compatible with one another.

Rods with the same batch number will generally have the same rate of expansion. If you use a rod from a different batch, you should conduct another compatibility test.

Most of the color rods have a relatively high lead content which allows expansion of approximately $2-3 \times 10^{-7}$ without danger of damaging results. The following list of colors are for technical reasons, produced free of lead and therefore require a very close tolerance level for off hand glass blowing:

Q-Colors: 20, 67, 68, 69, 77, 78, 121, 125, 134, 140, 141, 216.

Kugler: 20, 67, 68, 69, 77, 78, 121, 125, 130, 134, 140, 141, 216, and 220.

CAUTION: ALL Q-COLORS, KUGLER, AND WIESENTHAL PRODUCTS SHOULD BE TESTED FOR COMPATIBILITY WITH YOUR CULLET OR BATCH BEFORE PRODUCTION!

The ideal test for compatibility is the one that most closely simulates YOUR process of blowing glass.

For information on annealing and tempering, refer to The Handbook of Glass Manufacture by Dr. Fay V. Tooley, Section 14 "Annealing and Tempering."

Check our web page for more information.

COMPATIBILITY TESTS

TEST 1: PULL TEST

Heat a 1/4" wafer of color in the glory hole on the end of a puntile rod and marver it out. Gather an equal amount of your base glass. Place side by side and marver until they are fused together. Pull out into a thin cane. Break the cane into a 24" long section. If the two glasses differ in linear expansion, you will see that the cane has a small bend in it. The glass of greater linear expansion will be on the inside of the bend. It is tricky to get consistent results from this test at first, but once you become more accustomed to it, it can be quite reliable and you will soon recognize a pattern in your results.

TEST 2: BALL TEST

Gather a tiny amount of color. Encase the color with clear glass. Anneal. Cut into the glass with a diamond saw. If the glass cracks violently, it is not compatible. If the glass does not crack, it is likely to be compatible.

TEST 3: POLARIZING FILTER TEST

This is a simple way of testing a variety of colors at one time. Blow out a rondel of your base glass. Heat up a small amount of each color you wish to test and apply it to the rondel. Snip and press so that a 1 inch button of the test color is fused to the rondel. Anneal. Sandwich the rondel in between 2 polarizing filters, hold it up to a strong light source and rotate the top filter until it darkens (filters available, see end of catalog). If the color is not compatible you will see a strong halo of light around the color. If there is only a small halo, you can probably use the color safely. It is recommended that only pieces with little or no halo be used in sandblasting or cutting and polishing.

EXPANSION TABLES

PLEASE USE THESE COEFFICIENT OF EXPANSION NUMBERS WITH CAUTION

These COE numbers were originally intended to be used to compare PROJECTED relative changes in expansion of a given glass with changes in composition of the SAME or SIMILAR glasses to EACH OTHER. The numbers are used by glass formulators to PREDICT changes in expansion when making raw material changes and therefore CAN NOT BE USED TO DETERMINE COMPATIBILITY OF GLASS. The numbers are usually based on temperatures from 0 to 300 degrees C, and since the COE of a glass at 300 degrees C is different from the COE of the same glass at 500 degrees C, THE COE NUMBER SHOULD NOT BE USED AS A GUIDELINE FOR COMPATIBILITY. **The only way to determine what works for you is to use the glass and see what happens.** In addition, COE's can be either MEASURED or CALCULATED. If the COE is calculated, there are several ways to calculate the COE of a particular glass. The calculated COE of a glass determined using one methodology can be different from the calculated COE of a glass using a different methodology. You need to know which methodology was used to calculate the COE.

The "fit" of a particular glass is a function of both viscosity (resistance to flow) and expansion (change in size as temperature changes). Expansion affects the compatibility below the strain point, viscosity affects compatibility from the strain point to the annealing point. Two different glasses can be compatible if the strain caused by the mismatch due to viscosity is canceled out by the strain caused by the mismatch in expansion. For example, if the viscosity differences result in tension between the two glasses and the expansion differences result in an equal amount of compression between the two glasses, then two forces cancel each other out and the glasses are said to be "compatible" even though the COE's of the two glasses may be different. Also, two glasses with the same COE can be incompatible if the viscosities of the two glasses are different.

One last word - in addition to the above, the temperature at which you work, the shape & size of the object you are making, and numerous other factors other than the COE of a glass will also affect compatibility. For example, many people commonly use "104 COE" Moretti together with "91 COE" Kugler or Q-Colors in glass work. You would not think that this works looking at the numbers, but it can.

COLOR COEFFICIENT OF EXPANSION TABLE

VENDOR NAME	CALCULATED C.O.E.	MEASURED C.O.E.*
Q-Colors	89 x 10 ⁻⁷	91-94 x 10 ⁻⁷
FA-Powders	89 x 10 ⁻⁷	91-94 x 10 ⁻⁷
Kugler Tr Colors	83-86 x 10 ⁻⁷	91-95 x 10 ⁻⁷
Kugler Op Colors	83-86 x 10 ⁻⁷	89-93 x 10 ⁻⁷
Zimmermann	86-90 x 10 ⁻⁷	94 x 10 ⁻⁷
Wiesenthal Old Formula (SOFT)		97-99 x 10 ⁻⁷
Wiesenthal New Formula (HARD)		88-92 x 10 ⁻⁷
Uroboros 90		90 x 10 ⁻⁷
Uroboros & Spectrum 96		96 x 10 ⁻⁷
Bullseye		90 x 10 ⁻⁷
Effetre Cane		104 x 10 ⁻⁷
Murano Cane		104 x 10 ⁻⁷
Satake Lead Colors		120x10 ⁻⁷
Satake Soda Colors		113x10 ⁻⁷
Lauscha		98-104 x 10 ⁻⁷
Float Glass Colors		83x10 ⁻⁷
Pyrex & Duran		33x10 ⁻⁷
Northstar & Glass Alchemy		33x10 ⁻⁷
CR Colors		96x10 ⁻⁷

BASE GLASS COEFFICIENT OF EXPANSION TABLE

VENDOR NAME	CALCULATED C.O.E.*	MEASURED C.O.E
Glasma 71		96 x 10 ⁻⁷
Spruce Pine 87	87 x 10 ⁻⁷	96 x 10 ⁻⁷
Spruce Pine 83	83 x 10 ⁻⁷	91-92 x 10 ⁻⁷
EB Batch-Regular	94.2 x 10 ⁻⁷	96.6 x 10 ⁻⁷
EB Batch-S.F. State	92.7 x 10 ⁻⁷	94.9 x 10 ⁻⁷
EB Batch-Special		94.6 x 10 ⁻⁷
EB 91		91.5 x 10 ⁻⁷
Uroboros 90		90 x 10 ⁻⁷
FHC		91.5 x 10 ⁻⁷
4C		89 x 10 ⁻⁷
6C		92 x 10 ⁻⁷
8C		90 x 10 ⁻⁷
Lenox		94.9 x 10 ⁻⁷
Borosilicate		34 - 35 x 10 ⁻⁷
Louie (new formula)		87.5 x 10 ⁻⁷
Wiesenthalhütte Old		97 - 99 x 10 ⁻⁷
HG Clear		116.5 x 10 ⁻⁷
Float Glass		83 x 10 ⁻⁷
Schott S-8		109 x 10 ⁻⁷
Schott S-5		101 x 10 ⁻⁷

*Calculated numbers are ascertained by standards est. by English and Turner.