

Material Information

Materials Business
Corning Incorporated
Corning, New York 14831

Corning Code: 7056

Page 1 of 7

Description

Glass Type -- alkali borosilicate
Color -- clear
Forms available -- pressed ware, gob, strip, tubing
Principal uses -- faceplates, Kovar sealing

Properties

Mechanical	Metric	English
Density	2.29 g/cm ³	143 lb/ft ³
Young's Modulus	6.4 x 10 ³ kg/mm ²	9.2 x 10 ⁸ psi
Poisson's Ratio	0.21	
Shear Modulus	2.7 x 10 ³ kg/mm ²	3.8 x 10 ⁸ psi

Viscosity

Working Pt. (10 ⁴ poises)	1058°C	1936°F
Softening Pt. (10 ^{7.0} poises)	718°C	1324°F
Annealing Pt. (10 ¹³ poises)	512°C	954°F
Stralg Pt. (10 ¹⁴ poises)	472°C	882°F

Thermal

Coefficient of Expansion (0-300°C)	51.5 x 10 ⁻⁷ /°C	28.5 x 10 ⁻⁷ /°F
(25°C to Set Point 477°C)	54.5 x 10 ⁻⁷ /°C	30.0 x 10 ⁻⁷ /°F

Optical

Refractive Index (589.3 nm)	1.487
Birefringence Constant	300 $\frac{\text{nm/cm}}{\text{kg/mm}^2}$

Electrical

Log ₁₀ Volume Resistivity @ 250°C	10.3 ohm-cm
@ 350°C	8.4 ohm-cm
Dielectric Constant @ 20°C; 1 MHz	5.7
Loss Tangent @ 20°C; 1 MHz	0.27%

Chemical

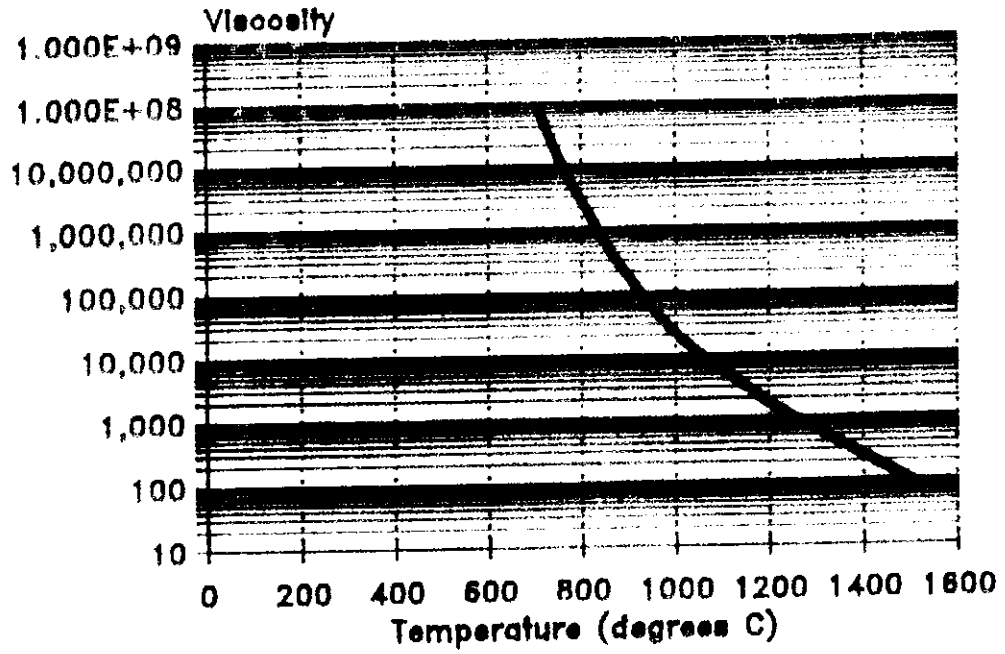
Weathering * 1-2
 Acid Durability ** 2

- * Weathering is defined as corrosion by atmospheric-borne gases and vapors such as water and carbon dioxide. Glasses rated 1 will almost never show weathering effects; those rated 2 will occasionally be troublesome, particularly if weathering products cannot be removed; those glasses rated 3 require more careful consideration.
- ** The Acid Durability column classifies glasses according to their behavior in 5% hydrochloric acid at 95°C (203°F) for 24 hours.

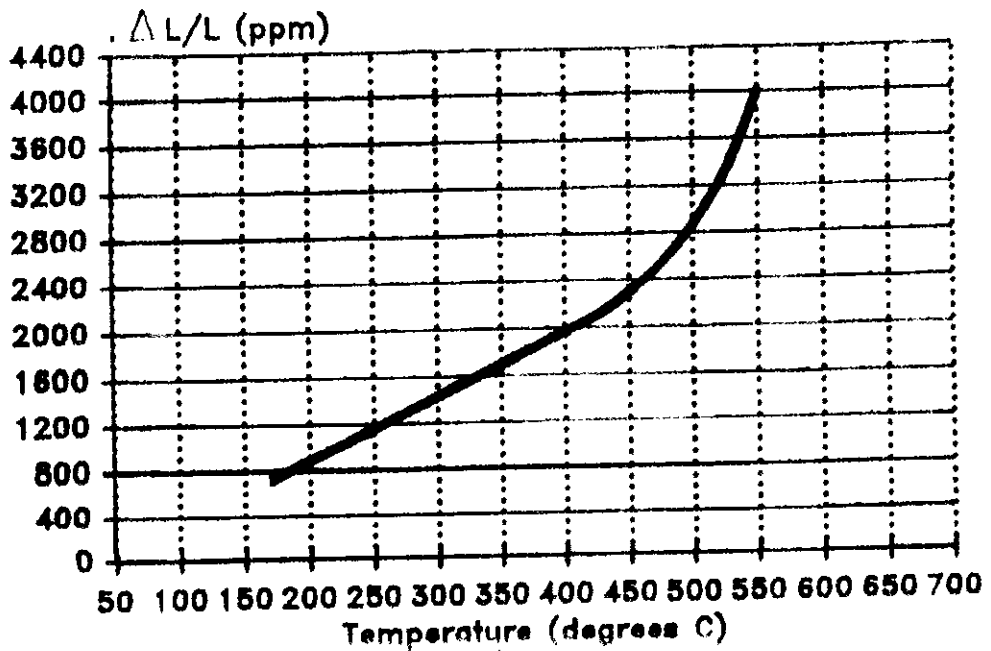
Classification	Thickness Loss (in.)
1	< 10 ⁻⁶
2	10 ⁻⁶ — 10 ⁻⁵
3	10 ⁻⁵ — 10 ⁻⁴
4	> 10 ⁻⁴

Values are listed with four degrees of accuracy. Those that are underscored (e.g. 2) result from recent determination and are reliable. Values not underscored are estimates offered with confidence. When two values are listed with one underscored, this indicates the range within which the true value lies; the underscored value is the more probable one (e.g. 2-3). A question mark indicates considerable uncertainty.

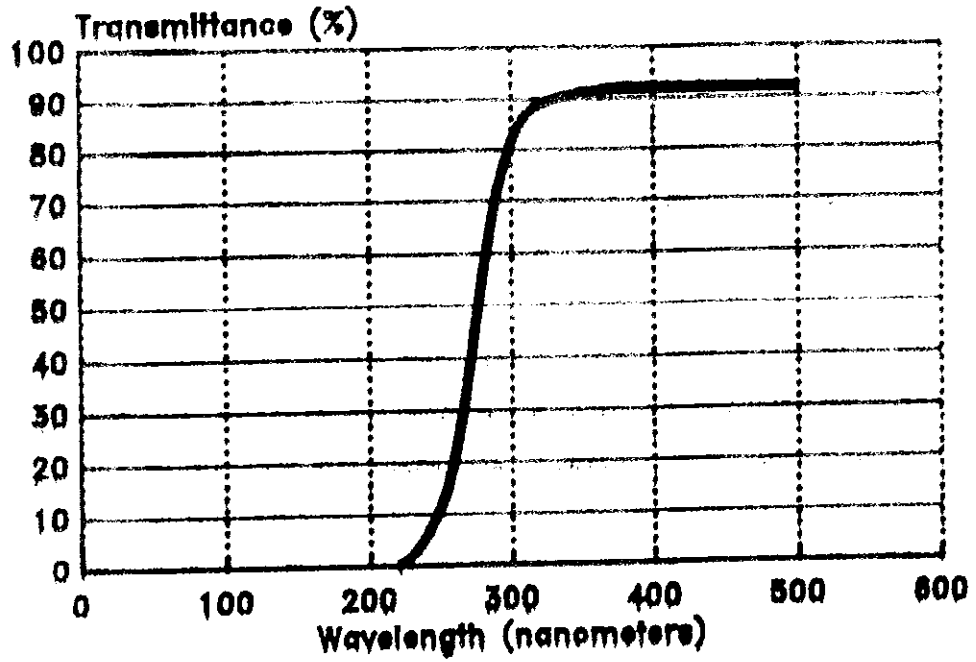
VISCOSITY



THERMAL EXPANSION

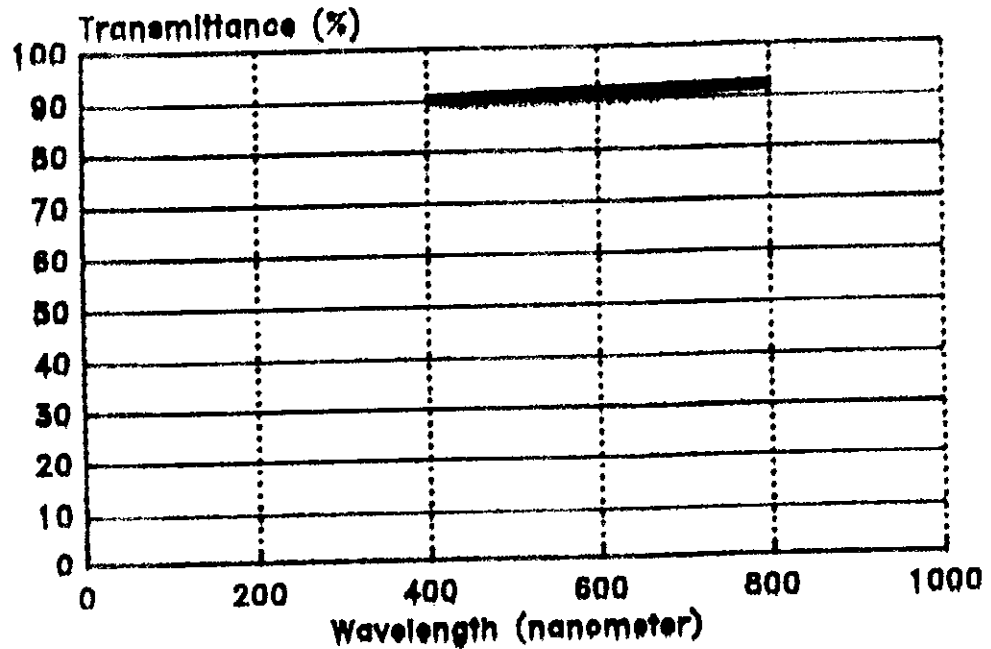


TRANSMITTANCE



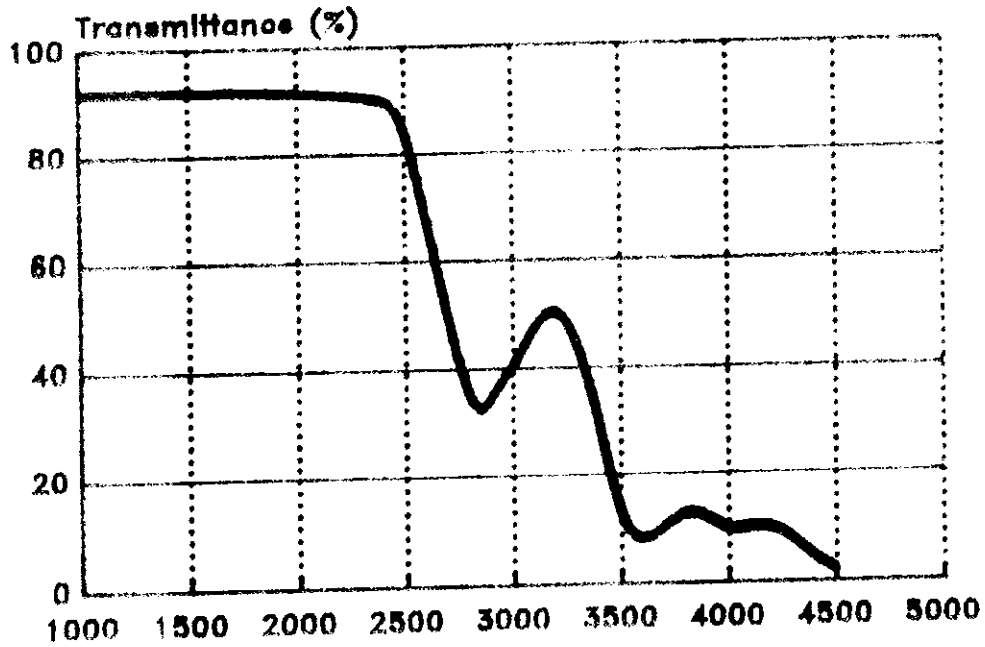
t=0.99 mm (.039")

TRANSMITTANCE



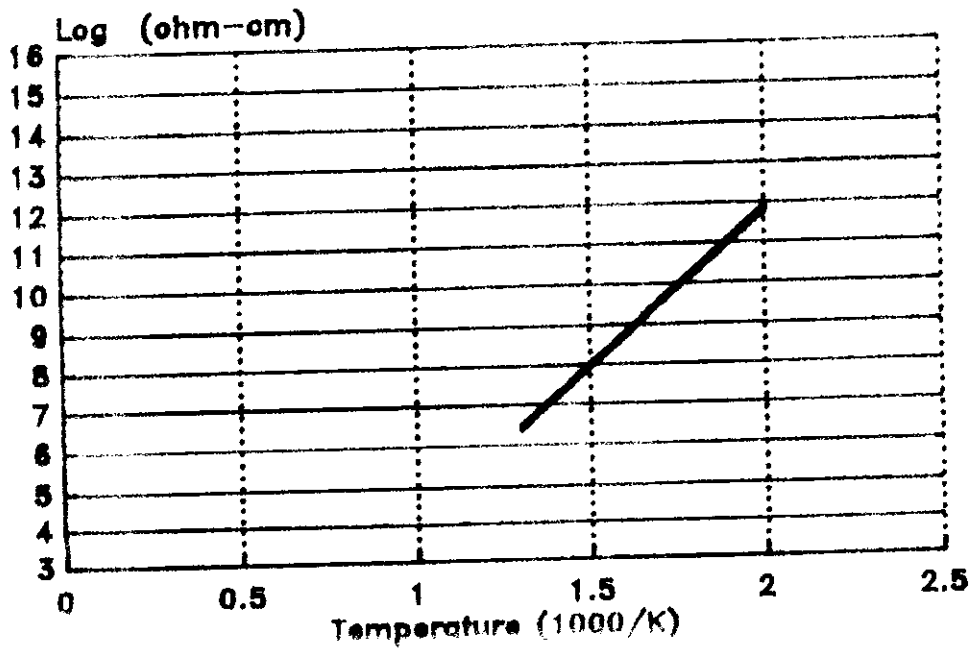
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TRANSMITTANCE

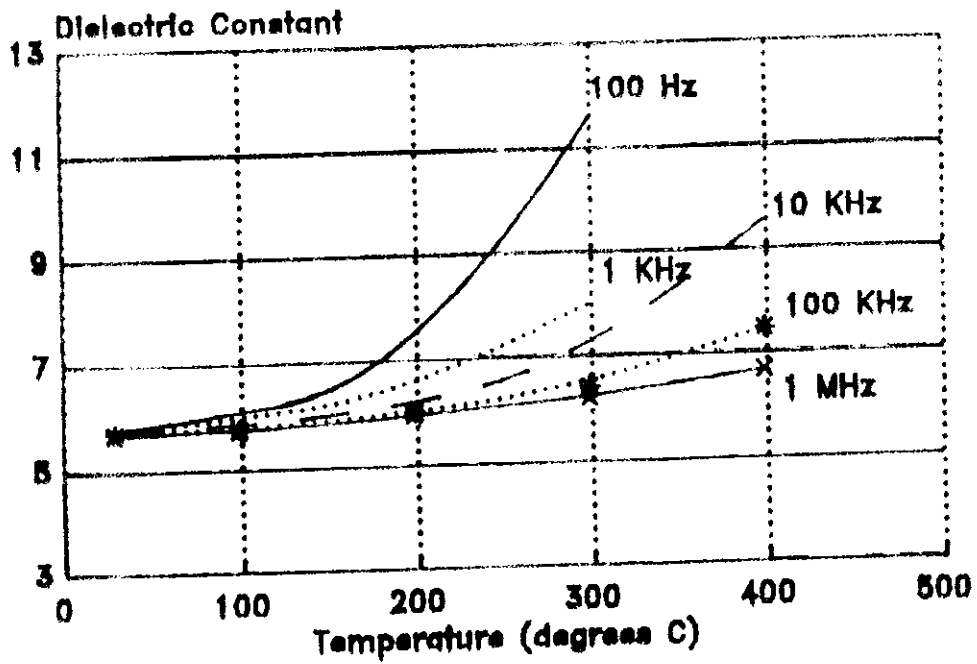


t=0.99 mm (.039")

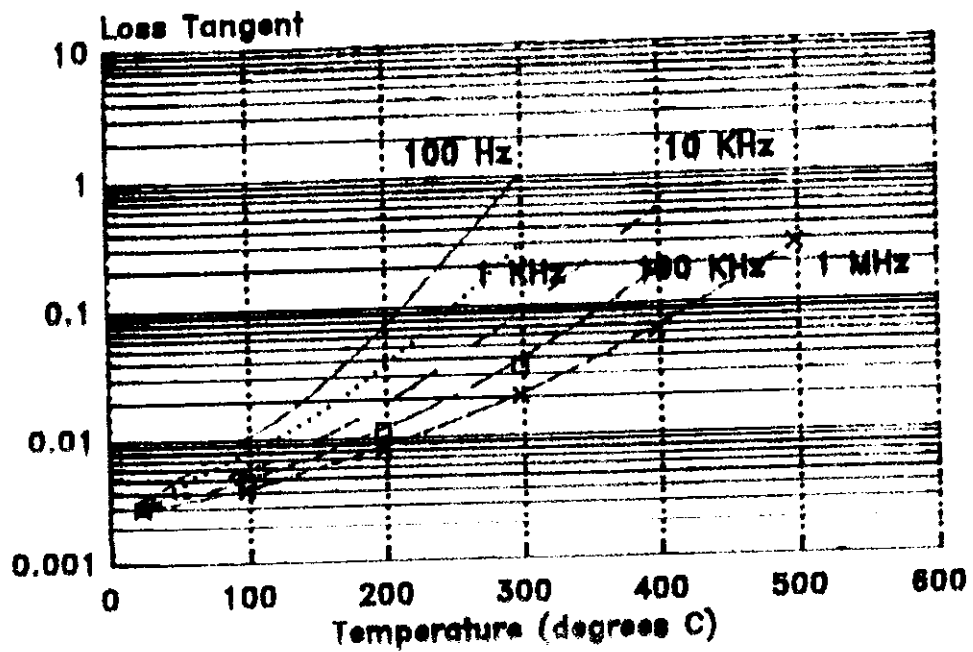
DC VOLUME RESISTIVITY



DIELECTRIC CONSTANT



LOSS TANGENT



Our FINAL 7052 MELT . . .

has been completed. Although Corning will no longer be producing code 7052 glass tubing, we will offer an improved glass tubing in the Fall of '92. Many customers have asked why we are discontinuing a glass tubing that has been produced for such a long time. There are several important reasons:

- The tank used for 7052 tubing is old and has seen it's last melt. It is now being dismantled.
- Current tank replacement costs prohibit building a new tank and dedicating it solely to the production of 7052 tubing. The price of 7052 would have to increase to a point where it would simply not make economic sense for our customers. Besides, a tank designed around 7052 glass would be useable for a very limited number of other glasses.
- The replacement tank is compatible with a wide range of glasses besides 7056, such as 0120 and 7720, 7070.
- The tank size has been scaled down to accommodate more economical, lower volume melts.

Meet 7056 . . .

Corning's glass code that will serve as a direct replacement for 7052. In most cases there are several reasons why glass code 7056 should gain your acceptance.

- 7056 promises improved quality compared to 7052 . . . fewer stones, airlines, and inclusions
- Corning's world class technical and engineering support teams will provide support for you to make the shift from 7052 to 7056 glass
- Our new "state of the art" tank means that 7056 tubing will be priced more competitively than 7052 tubing.
- 7056 will be made in U.S.A. . . . in Corning, NY. That means on-time shipments and world class customer service.
- We promise to deliver a product that meets your requirements the first time, every time.



Corning wants to make 7056 your preferred glass code and we're willing to work hard to meet your requirements. We will keep you informed about all developments that will impact you, our 7056 customer. We are ready to supply you with the technical information you need to bring 7056 into your supply line and make your product line a success.

The Vello & Vello-Downdraw Processes

The Vello process is the fastest tube draw process in use in the world today. It is a result of years of process development engineering programs by Corning Incorporated. Although there are a number of different methods for producing glass tubing, the Vello and Vello Downdraw processes are more efficient than others and produce better quality in many cases.

From the bowl, the glass flows down through an orifice formed by a circular ring and a bell shaped device suspended by a hollow shaft in the center of the ring.

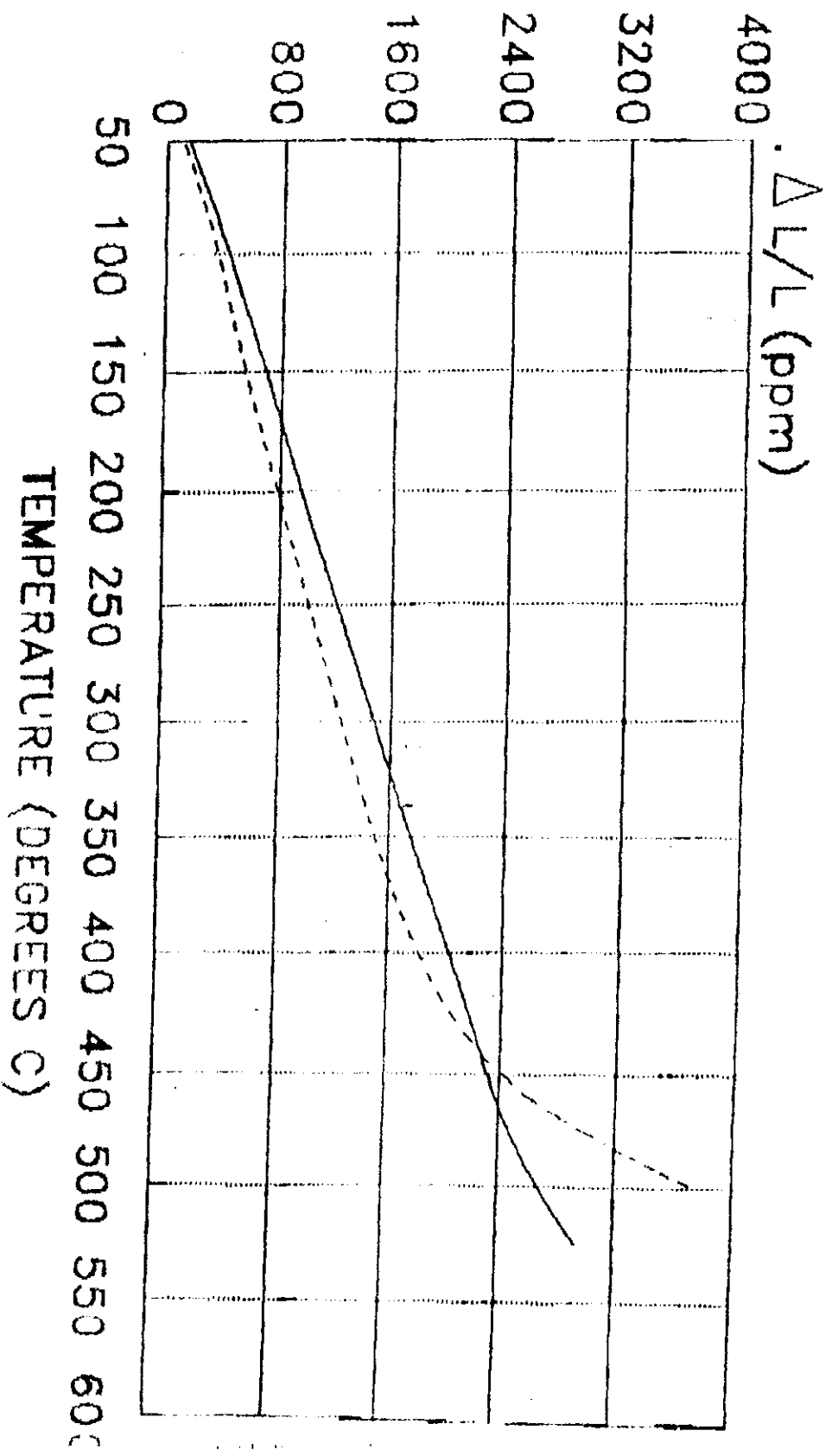
Tubing is formed as the glass flows down through the ring and over the bell. Before it becomes rigid, the glass is usually pulled into a horizontal position by a

pulling machine located at some distance from the tank. Between the tank and the pulling machine, the tubing is supported by air formers, carbon slides, rollers, diabolos, or a combination of these depending upon the glass and tubing sizes.

Diameter and wall can be regulated by increasing the flow of the blowing air, by raising or lowering the bell within the fixed ring, by adjusting the speed of the pulling machine, or by regulating the energy input to the bowl. Additional size changes are made by using different sizes of rings and bells.

For large sizes, the equipment is converted to perform the Vello-Downdraw process, and the tubing moves straight down rather than being pulled horizontally.

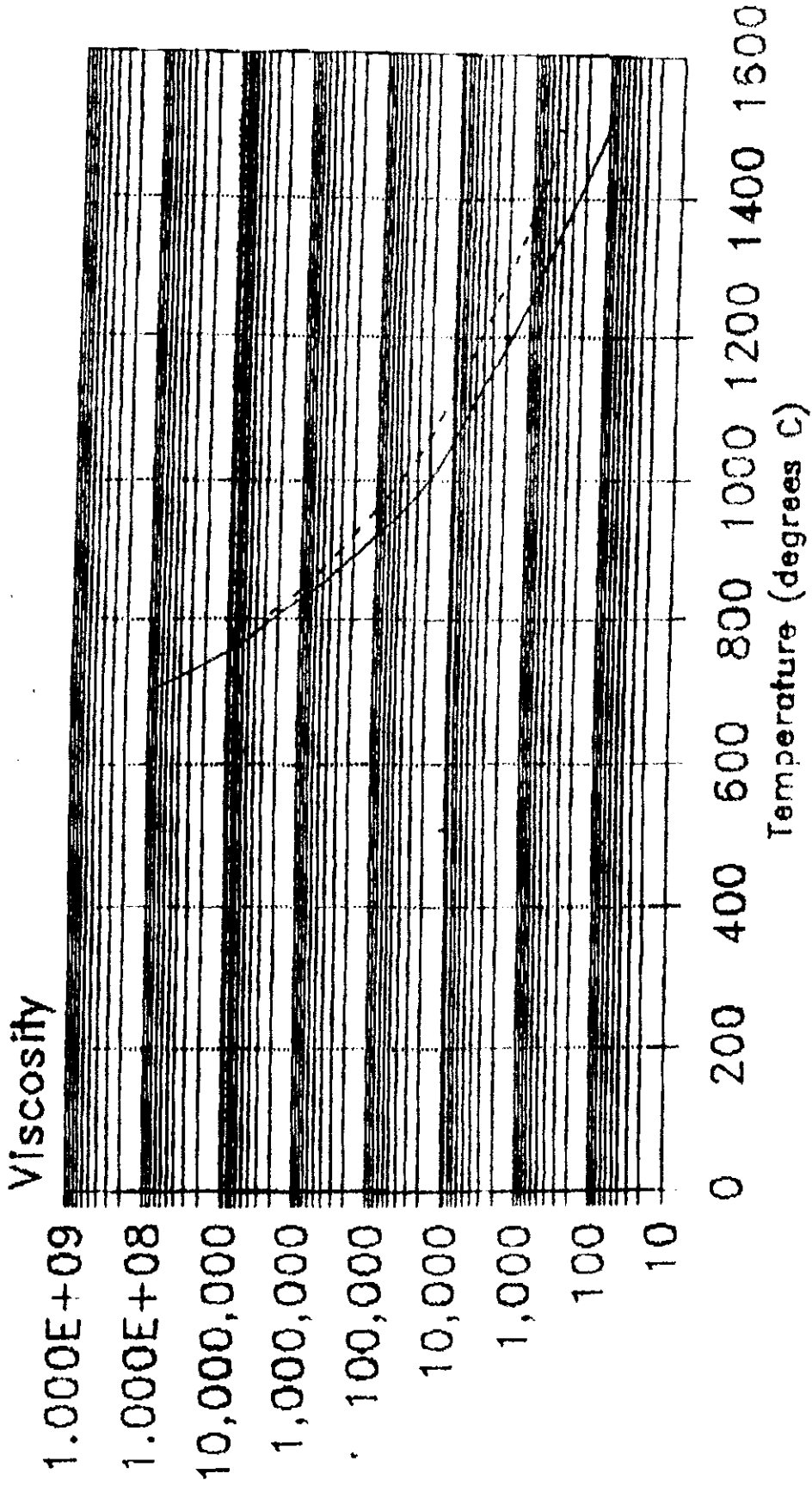
7056 & 7052 THERMAL EXPANSION



—— 7056 - - - - 7052

over current

7056 & 7052 VISCOSITY



— 7056 - - - - 7052

Product Specification

Codes 7056 and 7057

Optical Quality Gob, Strip and Pressings

1.0 Optical Properties

- 1.1 Index of Refraction (n_D): $1.4864 \pm .0030$
(Control Anneal: $40^\circ\text{C/hr. anneal}$)
- 1.2 Dispersion: 65.2
- 1.3 Light Absorption (Maximum Absorption Coefficient):
.015/cm (Log Base e)
- 1.4 Anneal: Strip and pressings: 74 mu/cm
Gobs: 180 mu/cm

2.0 Internal Quality

2.1 Inclusions:

2.1.1 Gobs and Pressings:

Maximum Size: 0.010" mean diameter

Minimum Size Countable: 0.002"

Maximum Number per piece:

<u>Piece Weight</u>	<u>Number Allowed</u>
Under 20 gms	0
21-100 gms	1
101-300 gms	2
301-500 gms	3
501-700 gms	4
701-900 gms	5

- 2.1.2 Strip: Maximum Size: 0.020" mean diameter.
Maximum number per lb. between 0.010"
and 0.020" mean diameter: 5
Minimum size to count: .010"

- 2.2 Striae: No Striae shall be visible when a fluorescent light is viewed through the polished surfaces of a gob, pressing, or strip from approximately 4-1/2 feet.

12/18/70

J. E. Gelm

Optical Products