Proposed Agenda
E. W. Bowman, Incorporated
Lehr Training and Annealing Seminar

INTRODUCTION TO ANNEALING LEHRS
Hands-on inspection of:

- Heated Zones-operation and design
- Cooling Zones-operation and design with and without super fans
- Skid Frames-internal belt return
- Recirculating Fan-heated zone and cooling zone
- Recirculating Fan-with fan speed sensor
- Control Panel-layout and function
- Drive Table-operation and design
- Roll-trunnion style manufacturing
- Charge Table-design and operation, belt tracking
- Burners-operation and trouble-shooting
    - Burners-Eclipse 50MME
    - Burners-Hauck-EWB57
    - Burners-Midco-DS45
    - Burners - Eclipse Ratio - Air

. **OPERATION AND MAINTENANCE ISSUES ON ANNEALING LEHRS-E. W. BOWMAN, INC.**

OPEN FORUM QUESTION AND ANSWER PERIOD-facilitated by **Robert Holmes**-E. W. Bowman, Inc. Field Service Supervisor

Seminar Attendees and Bowman personnel will participate in a question and answer period. All attendees are encouraged to generate and submit questions beforehand, or bring to the seminar, lehr related questions.*

* Historically, this question and answer period has been extremely beneficial and free-flowing. If necessary, this will extend past 5:00 P.M. or continue on to the next morning session.

ANNEALING PROCESS TECHNICAL SEMINAR-E. W. BOWMAN, INC.
facilitated by **John Hann**- E. W. Bowman, Inc. Sales/Service, Glass Process Specialist

I. **Annealing-Key Definitions**
A. Stress/Strain and Force
B. Thermal Conductivity
C. Expansion and Contraction
D. Thermally Introduced Stress
E. Annealing

II. **Annealing Process and Equipment**
A. Creation of Thermally Introduced Stress in Glass Containers
B. Removal (annealing) of Thermally Introduced Stress in Glass Containers

1. Annealing Lehr
    a. Major Components
    b. Annealing Point
    c. Strain Point
    d. Exit Temperature

C. Measurement of Annealing
    1. Polariscope
        a. Operation
        b. Interpretation of Colors and Shading
    2. Real versus Apparent
    3. Scratch Testing

III. **Annealing Lehr Principles of Operation**

A. Cooling Zone Pressurization and Control of Airflow
B. Ware Entrance Temperature
C. Loading Patterns
D. Tunnel Time
E. Control of Annealing Curve
F. Good Ware Quality
    1. Surface Defects
    2. Weight and Thickness Control

III. **Annealing Lehr Principles of Operation** (Continued)

G. Maintenance
H. Record Keeping
    1. Zone Temperatures
    2. Belt Speed
    3. Loading Pattern
    4. Fast Cooling

QUESTION AND ANSWER PERIOD

Adjournment