

DETAILED TRAINING PROGRAM

COLD END & QUALITY CONTROL TRAINING

by EmpakGlass

We combine the power of technology with knowledge and experience, so our customers gain a competitive edge in the container Glass Industry.

Choosing the right strategic partners is the key success factor to any business therefore EMPAKGLASS is the right partner choice for you.

management@empakglass.com

www.empakglass.com

EMPAKGLASS[®]
PERFORMANCE SOLUTIONS

COLD END & QUALITY CONTROL TRAINING

We combine the power of technology with knowledge and experience, so our customers gain a competitive edge in the container Glass Industry.

Choosing the right strategic partners is the key success factor to any business therefore EMPAKGLASS is the right partner choice for you.

EmpakGlass Training & Support Programs

COLD END & QUALITY CONTROL TRAINING

INTRO

The modern Quality philosophy within a glass container manufacturing must incorporate a "right first time" attitude. This attitude when correctly applied at each stage of manufacture; it does minimize the production of substandard goods. It also highlights those areas of production where these occur, so enabling a good standard of production efficiency to be attained which helps contain manufacturing costs.

It is well known that prevention is the best way of ensuring that the customer does not receive substandard goods or substandard service. Investment in the prevention of failures in quality will protect the customer and produce dividends in the form of reduction of costs of waste, errors, re-work and checking.

EmpakGlass provides integrated support services that embody this approach to Quality in the glass container industry.

Our Cold End and Quality Control Department provides our partners training support in quality control and quality assurance specific for the glass container industry.

The detail level of the training is adjustable for both more experienced and industry newcomers accordingly with our customer needs.

The training is structured for 5 days duration.



Performance Solutions
New markets / New Opportunities /
Independency

We speak your language

Through its worldwide network, EMPAKGLASS provides customers with everything important to the manufacture of glass, from the idea through development to production.

Reliable international partners at your disposal.

Please contact us with your questions, even if you do not find the topic on this brochure, we will come back to you with an answer and proposal for solutions.

Copyright reserved. Not to be copied/distributed in whole or part without written permission from Empakglass, Ltd.

COLD END & QUALITY CONTROL TRAINING

We combine the power of technology with knowledge and experience, so our customers gain a competitive edge in the container Glass Industry.

Choosing the right strategic partners is the key success factor to any business therefore EMPAKGLASS is the right partner choice for you.

EmpakGlass Training & Support Programs

COLD END & QUALITY CONTROL TRAINING

CONTENTS

1. Introduction.



- Who is the boss???

2. Glass.



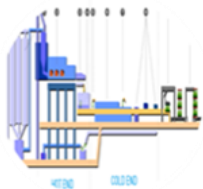
- Glass Properties. Temperature vs Viscosity. Chemical Durability. Devitrification. Light Transmission – Colour. Glass Composition vs Glass Properties. Glass Composition - Commercial oxide glass compositions (approximate). Main Oxides. Oxides Role. Cullet.

3. Strength of Glass. Fracture. Stress Concentrators.



- Strength of Glass. Loads, Stresses and the Fracture Equation. Fracture Origin. Surface Discontinuities. Stress Concentrators.

4. Upstream Process Overview.



- Batch. Melting. Glass conditioning. Forming. Annealing.

Performance Solutions
New markets / New Opportunities /
Independency

We speak your language

Through its worldwide network, EMPAKGLASS provides customers with everything important to the manufacture of glass, from the idea through development to production.

Reliable international partners at your disposal.

Please contact us with your questions, even if you do not find the topic on this brochure, we will come back to you with an answer and proposal for solutions.

Copyright reserved. Not to be copied/distributed in whole or part without written permission from Empakglass, Ltd.

COLD END & QUALITY CONTROL TRAINING

We combine the power of technology with knowledge and experience, so our customers gain a competitive edge in the container Glass Industry.

Choosing the right strategic partners is the key success factor to any business therefore EMPAKGLASS is the right partner choice for you.

EmpakGlass Training & Support Programs

COLD END & QUALITY CONTROL TRAINING

CONTENTS

5. Surface Treatments.



- Hot End Coating. Cold End Coating.

6. Quality Assurance.



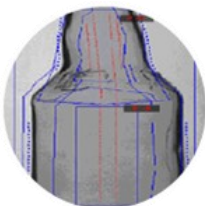
- Overview. Raw Materials. Moulds. Packaging materials. Furnace process control. Melting/Glass quality. Forming Machine. Hot End coating. Annealing. Cold End Coating. Cold End. Sampling Plan. Defect Classification (example). Defect Classification and AQL level (example). Overview - Traceability. Overview - Quality Control Laboratory. Cold End transport – Container resistance.

7. Inspection Procedures.



- Introduction. Communication. Lehr Inspection. Good Practices. Inspecting a glass container. Defects (examples). Gauging. How to use gauges. Critical Defects. Limitations on Inspection. QEC Inspector Tasks.

8. Automatic Inspection.



- The basic pillar. Challenging Inspection Machines. How to simulate samples ? LNM (MNR). Cold End Inspection Equipment.

Performance Solutions
New markets / New Opportunities /
Independency

We speak your language

Through its worldwide network, EMPAKGLASS provides customers with everything important to the manufacture of glass, from the idea through development to production.

Reliable international partners at your disposal.

Please contact us with your questions, even if you do not find the topic on this brochure, we will come back to you with an answer and proposal for solutions.

Copyright reserved. Not to be copied/distributed in whole or part without written permission from Empakglass, Ltd.

COLD END & QUALITY CONTROL TRAINING

We combine the power of technology with knowledge and experience, so our customers gain a competitive edge in the container Glass Industry.

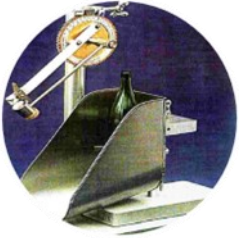
Choosing the right strategic partners is the key success factor to any business therefore EMPAKGLASS is the right partner choice for you.

EmpakGlass Training & Support Programs

COLD END & QUALITY CONTROL TRAINING

CONTENTS

9. Quality Laboratory Tests.



- Thermal shock test. Internal pressure test. Impact Test. Vertical load test. Capacity (volume) test. Glass thickness. Dimensional control. Calibration.

10. Job Changes.



- Job change preparation. Cold End Maintenance. Day-shift Quality inspector. Product approval. A good practice. Improving Job Change time - Introduction. Benefits of improving Job Change time. Measuring Job Change efficiency - Job Change Index. Stability, Variability, Efficiency, Quality. SMED Methodology. SMED Methodology - Example of application in Cold End and Quality areas.

11. Food Safety.



- Introduction. Food Safety Management system. Loose glass procedures. PRP – Prerequisite program. Contamination. Loose glass procedures – Physical Contamination. Good Manufacturing Practices. Summary.

12. Container Requirements.



- Requirements for specification. Choosing forming process. Calculation of Mechanical strength of bottles. Effect of design on pressure resistance. Theoretical calculations of pressure resistance. Calculation of Mechanical strength of bottles. Effective mass. Radius of Gyration. Tip ratio. Theoretical Wall-thickness calculation.

Performance Solutions
New markets / New Opportunities /
Independency

We speak your language

Through its worldwide network, EMPAKGLASS provides customers with everything important to the manufacture of glass, from the idea through development to production.

Reliable international partners at your disposal.

Please contact us with your questions, even if you do not find the topic on this brochure, we will come back to you with an answer and proposal for solutions.

Copyright reserved. Not to be copied/distributed in whole or part without written permission from Empakglass, Ltd.