



GLASSWORKS

— INTERNATIONAL —

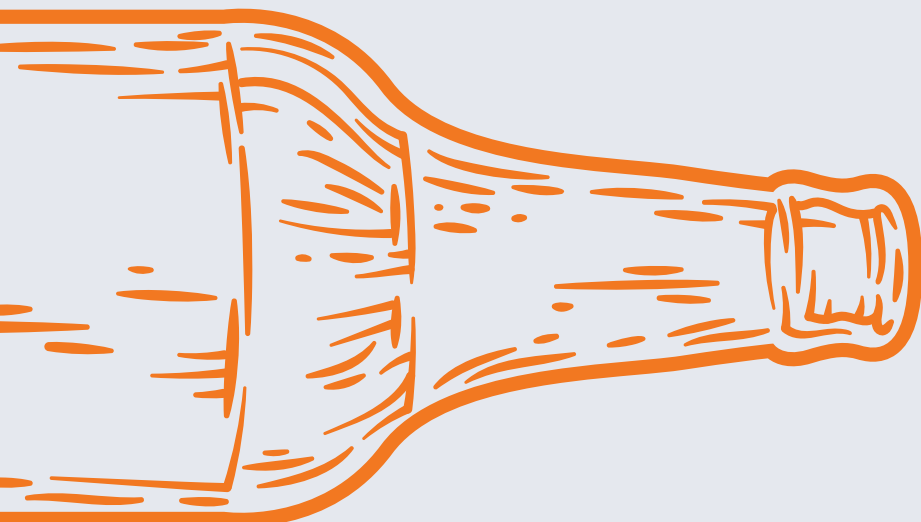
GENERAL TECHNICAL GUIDELINES

FOR THE SUPPLY OF GLASS BOTTLES AND JARS



CONTENTS

1.0 Scope	4
2.0 General	4
3.0 Food Safety Declaration and Legislations	4
4.0 Glass Composition and Quality	4
5.0 Design and Tolerances	5
6.0 Process Stage and Quality Control	5
6.1 Furnace and Glass Quality	5
6.2 Hot End	6
6.3 Cold End	6
6.3.1 Manual Inspection	6
6.3.2 Automatic Inspection	7
6.4 Final Inspection	7
7.0 QC Laboratory	8
8.0 Traceability	8
9.0 Packaging	8
10.0 Defect Classifications and AQLs	9
10.1 Defects and Defect Categories	9
10.2 Sampling Plans - ISO 2859	11



1.0 Scope

Glassworks International Ltd (GWI) is committed to the quality and safety of glass bottles and jars that are placed onto the market for the use as food and beverage containers.

As part of this commitment, GWI have obtained accreditation to **BRCGS Agents & Brokers**, and as part of the supplier approval process, the company solely works with Glass Manufacturers with GFSI (**Global Food Safety Initiative**), recognised food safety quality management systems in place.

The purpose of this document is to lay out the general technical guidelines which are expected to be adopted by all hollow glass container manufacturers / suppliers. Some of the requirements are considered mandatory and these are highlighted in bold, with other requirements documented establishing the minimum standards for the manufacture of glass bottles and jars for the food and beverage sectors.

The list of processes and related tests and frequencies contained herewith are not exhaustive and may differ from manufacture to manufacture, and may be subject to change as part of a customer specific agreement.

2.0 General

It is expected that suppliers will adopt the principles of good manufacturing practice, and in support of this have accreditation to quality management systems such as ISO 9001, and FSSC 22000. Furthermore, suppliers must adopt and be able to demonstrate the principles of the **Modern Slavery Act 2015**, have a **Quality and Ethical policy** in place; and endeavour to work to the **Paris Agreement 2015** and have a measure of the carbon footprint for the activities for each site of manufacture.

3.0 Food Safety Declaration and Legislations

All glassware supplied must conform to EU/ UK regulations as listed below and must provide a declaration of conformance for the glassware they supply.

TITLE	REGULATION
Materials & Articles in Contact with Food	EC-1935/2004
The General Product Safety Regulations	2005
Packaging and Packaging Waste Requirements	EU 94/62/EC

4.0 Glass Composition and Quality

All glass supplied will be of type III Silica-Soda-Lime composition with and be resistant to chemical attack and comply to US Pharmacopeia 37 2014 - for hydrolytic resistance.

All glass to be free of chemicals as listed on the dangerous substances referred to on the "candidate list" issued by ECHA UK REACH or any other substances that may put the product at risk.

The glass supplied to be homogeneous, free of chord (liable to fracture), of consistent colour. For amber glass, the light transmission **must not exceed 10%** at a wavelength of 450nm.

The presence of seed within the glass, defined as 0.5mm max in size is allowed up to 5 per 1 gram of glass.

Blister is to be classified as a defect and categorised according to the size- see defect list in section 9.0.

5.0 Design and Tolerances

Unless otherwise agreed, all bottles and jars are to be designed to ensure compliance with the strength and performance attributes commensurate with the requirements for use, e.g. for use for hot fill, heat treatment and pressurisation (ref docs TEC7, Cetie DT11.00 or their equivalent).

The dimensional tolerances applied are expected to be in line with the industry best practice guidelines such as Cetie DT02.00, British Glass TEC 4 or their equivalent.

Each product and variation thereof is to be supported by a container drawing, technical specification and packing specification. Authorisation must be obtained for any major changes of these specification.

6.0 Process Stage and Quality Control

The following processes and quality control checks, tests and frequencies are considered to be representative of those adopted by the glass container manufacturing industry. However, they may differ due to the individual companies' requirements and depending upon risk and resources available to them.

For each check or test carried out, it is expected that a record is kept detailing any actions taken for each non-compliance event. This includes the contingency action put in place for the duration that a key piece of inspection equipment is out of operation.

6.1 Furnace and Glass Quality

SUBJECT	MINIMUM TEST FREQUENCY	SPECIFICATION
Glass Density	Daily Mon-Fri	+/- 10 points drift
Seed Count	Daily Mon-Fri	Max 5/gram
Light Transmission	Daily Mon-Fri	Amber - Max 10% at 450nm
Chemical Durability	Annually for each furnace	EP & USP Pharmacopeia
Heavy Metals	Periodic	200ppm Cumulative
Migration (not covered by any specific EU regulation)	Voluntary-Periodic	EC Directive 84/500
External Cullet-post consumer	Daily	Ferrous - 15g/tonne Non-ferrous- 15g/tonne CSP- 25g/Tonne Organic-3000g /Tonne

6.2 Hot End

Due to the extended timeframe required to allow for containers to cool to a temperature sufficient to enable their safe inspection, checks on the containers at the Hot End are limited. Reliance is therefore placed on the Cold End to perform this activity, with the Hot End more focused on process control, machine minding and swabbing etc.

This is reflected in the tests and checks shown in the table below.

CHECK	MINIMUM TEST FREQUENCY	SPECIFICATION
Gob Temperature	Daily	According to internal tolerance
Manual Gob Weight	Daily Mon-Fri	According to internal tolerance
Automatic Gob Weight Control - mandatory for NNPB process	Continuous checking system	According to internal tolerance
Blank Temperatures (NNPB)	x1 per shift	According to internal tolerance
Visual Inspection	x1 bottle from each section per hour	According to defect list
Manual Gauging	x1 bottle from each section per hour	According to Go No Go gauge
External Cullet-post consumer	Daily	Ferrous- 15g/tonne Non-ferrous- 15g/tonne CSP- 25g/Tonne Organic-3000g /Tonne

6.3 Cold End

There is a combination of manual and automatic inspection undertaken at the Cold End. It is expected that where key inspection processes are not available, for example due to lack of availability or breakdown, a contingency (generated from a HACCP study) is put in place to mitigate any risk to the final product quality. An example of this being use of manual inspection using a light screen as a substitute for by-pass of the automatic sidewall inspection unit.

6.3.1 Manual Inspection

CHECK	MINIMUM TEST FREQUENCY	SPECIFICATION
Visual Inspection	x1 bottle from each section every 2 hours	According to defect list
Manual Gauging (inc. weight checks)	x1 bottle from each section every 2 hours	According to Go No Go gauge
Automatic Inspection	x2 per shift (x1 every 4 hours)	Challenge sample test
AQL Sample Inspection	Usually sample sizes of 80, 125, 200 & 300 depending upon size of batch	ISO 2859-1 – sampling by attributes inspection level 1
Light Screen	Voluntary, unless implemented to provide alternative to sidewall inspection	-

6.3.2 Automatic Inspection

INSPECTION APPARATUS	DETECTION OF DEFECTS
Rotary inspection equipment For round containers, but provide limited (*) facility to check for non-rounds.	Neck checks - various types which produce reflection/refraction to light beams Unfilled sealing surface Thin Glass (*) Base Checks(*) Sidewall defects (certain inspection units only)
Sidewall Camera Base inspection - may have facility of stress analyser (*)	Body defects Proud mould seams Inclusions Stress - poor annealing, inclusions (*)
Top - Camera Base inspection	Unfilled sealing surface Internal flanges External flanges Chipped rings Choked bores (Narrow mouth only) Pitted sealing surface
Base - Camera Based inspection	Spikes Deep baffles Damaged bases (scabby) Tramp and fused glass Inclusions

6.4 Final Inspection

Final product inspection is expected to take place after the automatic inspection process. The inspection is statistically based with the use of internationally recognised sampling plans such as ISO 2859 or their equivalent. The typical AQLs and the defect categorisations are shown in more detail in section 9.1. Sampling plans are shown in section 9.2.

PROCESS STAGE	MINIMUM TEST FREQUENCY	SPECIFICATION
Post Inspection Sampling By Attributes	Internal sampling plan - to be undertaken real time.	Sampling plans contained with ISO 2859- Table 2-A single sampling plans for normal inspection (inspection level 1 or above)
Packaging	Visual inspection x2 per shift	According to individual product packing specification
Dispatch	Visual inspection - for each load assembled.	Internal SOP supported by photographic standards

7.0 QC Laboratory

Lab testing - minimum strength & performance test in accordance of CETIE DT11.00 - British Glass TEC 7 or equivalent guidelines.

CHECK/TEST	MINIMUM TEST FREQUENCY	SPECIFICATION
Dimensional Assessment (including wall thickness)	One full set of containers from each machine x1 per day	According to individual container drawing
Weight & Capacity	One full set of containers from each machine x1 per shift	According to individual container drawing
Annealing & Homogeneity	x1 per shift	Strain Disc No. 4 (max)
Hot End Coating	x1 per shift	Cetie DT 13.00
Cold End Coating	x1 per shift	Cetie DT 13.00
Internal Pressure	x1 per shift - pressurised containers only	Cetie DT 11.00
Impact Test	x1 per shift	According to individual product technical specification
Vertical Load	x1 per day	According to individual product technical specification
Thermal Shock	x1 per shift	Min of 42 Deg C downward thermal shock
Ad Hoc Test	According to individual product technical specification	According to individual product technical specification

8.0 Traceability

As a minimum requirement, the final product must be traceable back to the individual pallet. Each pallet to be clearly labelled, which is expected to contain an individual sequential pallet number, ideally an SSCC bar code, details of the product, product code, batch number, date of production. Full traceability must be maintained, ideally with the use of computerised recording systems, from the point of manufacture, through to warehousing and dispatch. This includes any subsequent processing such as printing and re-processing activities.

In certain circumstances where availability allows, traceability may be enhanced by the addition of laser or ink jet codes.

The **traceability system** must be tested at least x1 per year.

9.0 Packaging

All pallets of glassware supplied are required to be packaged in a manor which facilitates their safe transport and handling and storage, and are individually shrink wrapped with polythene film which provides protection against the ingress of debris, moisture, pests and insects.

It is a requirement that all wooden pallets are heat treated in accordance with ISPM 15 international standards and are free from mould.

10.0 Defect Classifications and AQLs

Defects are classified in 4 categories (sometimes 3 with Major A and Major B combined). Individual defects are placed into the appropriate category according to the severity. Below is a non-exhaustive list of the most common defects which have been placed into their respective categories. The defects which appear in the Critical list appear in the Cetie DT 26 document and are generally accepted as Critical throughout the industry.

Cetie does not provide guidelines on the categorisation of other defects, as this is usually the responsibility of the individual manufacture through experience and/or specific customer agreement.

10.1 Defects and Defect Categories

CRITICAL 0.01%	LIST OF POSSIBLE DEFECTS	
<p>Their presence have the potential to cause harm or damage to the end user or others in the immediate vicinity of its use.</p> <p>The listed defects are documented in Cetie DT 26 – this does not preclude specify customer requirements.</p>	<ul style="list-style-type: none"> • Overpressed finish • Stuck plug • Sugary top • Damaged ring finish • High top • Choked bore • Stuck – sharp • Flanged joint • Internal contamination • Tramp glass • Internal fused glass • False bottom • Spike • Birdswing 	<p>The following defects are potential critical defects depending upon their severity -</p> <ul style="list-style-type: none"> • *Internal Flange • *Split ring • *Internal blister-broken • *External skin blister-broken

**The defects asterisked above if not deemed critical.*

MAJOR A 0.65%	LIST OF POSSIBLE DEFECTS	
<p>Their presence have the potential to make the container incapable of supporting the usage conditions.</p>	<ul style="list-style-type: none"> • Over sized neck finish • Oversized body • Finish checks • Body & Base checks • Cocked neck • Out of vertical • Minimum wall thickness • Sunken body/panel • Failed thermal shock • Failed internal pressure • Unfilled/warped top • Bad annealing • Capacity specification breach 	

MAJOR B 1.0%	LIST OF POSSIBLE DEFECTS
<p>Their presence have the potential lead to cause:</p> <ul style="list-style-type: none"> • Reduced efficiency during use • Impaired efficiency of filling and packing equipment 	<ul style="list-style-type: none"> • Blisters \geq 3.0mm • Hot and Cold End coating spec breach • Poor glass distribution • Oval body • Drop punt (spinners) • Hollow neck • Offset neck ring joint • Offset body mould joint

MINOR 4.0%	LIST OF POSSIBLE DEFECTS
<p>Their presence unlikely to result in its return to the source, but in a condition which is less than desirable to the end user.</p>	<ul style="list-style-type: none"> • Blisters $<$ 3.0mm • Dappled body • Cord- no strain • Hot end coating bloom • External graphite • Shear marks • Swung baffle • Washboards • Pressure marks

10.2 Sampling Plans - ISO 2859

Tables to be used for sampling procedures for inspection.

Table 1 - Sample size code letters (see 10.1 and 10.2)

LOT SIZE	SPECIAL INSPECTION LEVELS				GENERAL INSPECTION LEVELS		
	S-1	S-2	S-3	S-4	I	II	III
2 to 8	A	A	A	A	A	A	B
9 to 15	A	A	A	A	A	B	C
16 to 25	A	A	B	B	B	C	D
26 to 50	A	B	B	C	C	D	E
51 to 90	B	B	C	C	C	E	F
91 to 150	B	B	C	D	D	F	G
151 to 280	B	C	D	E	E	G	H
281 to 500	B	C	D	E	F	H	J
501 to 1,200	C	C	E	F	G	J	K
1,201 to 3,200	C	D	E	G	H	K	L
3,201 to 10,000	C	D	F	G	J	L	M
10,001 to 35,000	C	D	F	H	K	M	N
35,001 to 150,000	D	E	G	J	L	N	P
150,001 to 500,000	D	E	G	J	M	P	Q
500,001 and over	D	E	H	K	N	Q	R

ISO 2859-1:1999+A1:2011 (E)

