

CORNING

Tubing Specification
Dental Cartridge Tubing



Dimensional Specification

All requirements and criteria applicable to dimensional characteristics are summarized in the table below. For details see “Tubing Specifications — Definition and Supporting Information”.

Sample size according to ISO 2859 unless specified otherwise. Reference volume = 1 pallet.

Requirement	Definition Item	Unit Defect Spec / Limit		AQL	Remarks
Outer Diameter	OD_{avg}	The individual tubing sample is defective if there is a 60 mm section out of tolerance over the entire length.		Cumulative AQL of 0.25	Standard tolerances see page 4
Circularity	$NCR = 1/2 (OD_{max} - OD_{min})$	OD range	Limit for NCR		
		< 12.0 mm	0.4% of OD_{nom}		
Inner Diameter	ID_{avg}	The individual tubing sample is defective if there is a 60 mm section out of tolerance over the entire length.			See page 4
Wall Siding (Lop)	$WS = WT_{max} - WT_{min}$	Maximum siding value is 6% of the nominal wall thickness.			
Length	L_{max}	The individual tubing sample is defective if overall length is out of tolerance.			Standard tolerances see page 4
Bow	B_{center}	Defective if greater than 0.8 mm			Over a 1000 mm length
	Snaky bow B_s	Defective if greater than 0.3 mm		Over a 200 mm length	
Square Cut	SC	$OD < 12.0$	1.0 mm of OD_{nom}	2.5	
		Useable end	Customer specific		Only upon request
Glazing	GID _{max} as a percentage of OD_{nom}	Light	Sharp edges rounded with a minimum turn in	1.5	May be specified differently on the two tube ends
		Medium	Approximately 80% of OD_{nom}		
		Heavy	Approximately 70% of OD_{nom}		

Notes

OD, WT, NCR, WS, measurements are to be taken on the usable length of the tube. Any local deviation in each that corresponds with knots or stones or other dimensionally relevant visual characteristic shall not be evaluated with respect to the dimensional specification, but rather according to the relevant visual specification.

Visual Quality Specifications

Requirements applicable to visual characteristics are summarized in the tables below.
For details see “Tubing Specifications — Definition and Supporting Information”.

Sample size according to ISO 2859 unless specified otherwise. Reference volume = 1 pallet

Requirement	Detail / Parameter	Individual Defect Definition	AQL / Criteria	Remarks		
Airlines	Single	$L > 150 \text{ mm}$ or $W > 0.08 \text{ mm}$	0.4	Defective if any airline in the tube exceeds limit length or width		
	Aggregate length of airlines	Aggregate length of airlines $L > 15 \text{ mm}$ and $W > 0.02 \text{ mm}$	$\leq 6.5 \%$	As a percentage of tested tubing length		
	Open inside airlines	$L > 15 \text{ mm}$ and $W > 0.02 \text{ mm}$	0.25			
Inclusions	Size (S) / count	Tube is defective if inclusion count per 5 kg tubing exceeds the following limits.		Inclusions up to 0.5 mm are not a defect. AQL not specified. 5 kg tubing must be controlled		
		$S \geq 0.8$			Max 1 allowed per 5 kg	
		$S \geq 0.5$			Max 10 allowed per 5 kg	
Glass Particles	Size (S) / count	Tube is defective if the following maximum allowed numbers of glass particles is exceeded.	0.65	Glass particles up to 0.2 mm are not considered.		
		OD range [mm]			$S \geq 0.5$	$S \geq 0.2$
		$OD < 12.0$			0	5
Cracks	Surface cracks	Any size, any length	0.025	End cracks $\leq 2 \text{ mm}$ are not considered defects, 40 mm from each side not considered		
	End cracks	$L > 2.0 \text{ mm}$	1.0			
Scratches Coated tubes	Longitudinal	$W > 0.2 \text{ mm}$ AND $L > 50 \text{ mm}$	1.5	40 mm from each side not considered Only for bundlepack		
	Aggregate length	$W > 0.2 \text{ mm}$ AND $AL > 200 \text{ mm}$				
	Circular	$W > 0.2 \text{ mm}$ AND $Arc > 1 \text{ circumference}$				
Scratches Uncoated tubes	Longitudinal	$W > 0.2 \text{ mm}$ AND $L > 200 \text{ mm}$	1.5	40 mm from each side not considered (applies also for all tubes in sleeve pack)		
	Aggregate length	$W > 0.2 \text{ mm}$ AND $AL > 600 \text{ mm}$				
	Circular	$W > 0.2 \text{ mm}$ AND $Arc > 1 \text{ circumference}$				
Surface Impurities	Outer surface	If impurities cannot be easily removed $> 1.5 \text{ mm}$	0.1			

Other Requirements

Requirements for other characteristics are summarized in the tables below.

Requirement	Detail	Defect Specification	AQL	Remarks
Residual Stress	Longitudinal	Stress > 4.0 MPa	2.5	
	Circular	Stress > 4.5 MPa		
Mix-Up	Delivered articles is not uniform in the pallet	E.g. different glass types, dimensions, coating level, different identification (label)	Not permissible	
Identification	Wrong data	Incorrect identification data on the bundle label. E.g. declared dimensions, bundle weight, pallet weight	Not permissible	Test unit = 1 bundle
	Missing bundle label	Missing bundle labels	Not permissible	
Certificates	Wrong or missing data	Missing certificate or pallet label	Not permissible	
Type I	EP 3.2.1 – Test B, USP660 – Glass grain test	> 0.1 ml of 0.02 M HCl per 1g of glass	Not permissible	JP 7.01 Test For glass containers for Injections upon request

Standard Dimensions

Length standard tolerance is -0.0 +4.0 mm.

The following table defines the standard OD and ID tolerances depending on the OD and ID nominal values.

OD (mm)	ID (mm)	OD tol (mm)	ID tol (mm)
8.65	6.85	0.12	0.10

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