Introduction:

RQ 800 is a high-purity synthetic quartz glass (≥ **99.999%** SiO_2) characterized by extremely low impurity levels.
It offers significantly higher transmission than natural quartz glass in the wavelength range of 150–260 nm and demonstrates excellent resistance to UV-induced damage (solarization) in this spectral region.

Visual Characteristics:

Standard Inspection Lighting:
The term “visible” is used for flaws (typically > 0.25 mm) that can be seen under general overhead inspection illumination. The light source is typically 0.75 – 1.25 m above the piece, with the tubing viewed at a distance of 0.3 – 0.6 m from the inspector, with a white/black background.

Airlines

A: Airline (enclosed):

Definition:
A void, wholly within the tube wall including those bumping up the surface.

Limits:

Size	Total Cumulative Length of Airlines per Piece	Maximum Airline Width
13.0 mm OD to 25.0 mm OD	10 %	0.50 mm
25.1 mm OD to 30.0 mm OD	10 %	075 mm
30.1 mm OD to 40.0 mm OD	10 %	0.75 mm
40.1 mm OD to 50.0 mm OD	10 %	1.00 mm
50.1 mm OD to 70.0 mm OD	10 %	1.00 mm

B: Open ID or OD Airline:

Definition:
A void, open to the ID ore OD surface, which has sharp, knifelike edges.

Limits:
None permitted (above visual detection of 0.1 mm width).

C: “Bumpy” ID or OD Airline:

Definition:
A raised area in the wall of the tubing, directly over an enclosed void near the surface, on the ID or OD.

Limits:
10 % maximum total cumulative length of airlines per piece, except none so thin as to open with the pressure of a gloved fingernail.

Dirt

Definition:
Removable foreign material adhering to the tube surfaces.

Limits:
- Not permitted on the inner surface. Exceptions: A light, uniform layer of quartz cutting dust at the tube ends is permitted. Furnace-cut material may exhibit a moderate amount of quartz cutting dust on the inner surface.

- Clearly visible, uneven cutting dust on the outer surface is not permitted. Furnace-cut material may exhibit a moderate amount of quartz cutting dust on the outer surface.

- Fingerprints are not permitted.

- For every 300 mm of length, no spot or clearly visible water stain with a diameter greater than 2.0 mm, or smaller spots that together exceed the corresponding diameter area of 2.0 mm (3.14 mm²), is permitted.

- A clearly visible, uneven graphite coating on the outer surface is not permitted.

Checks, Cracks and Tears

Definition:
- Crack: A thin break line in the wall that extends through part or all of the wall. The line may also be circular as from impact damage. Cracks are readily visible.
- Check: Small fracture perpendicular to the circumferential surface, “V” or chevron shaped extending inward.
- Tears: Small fractures on the outside surface of the quartz with minor “>” (chevron) shapes or diamond “<>” shapes running along the surface. Fine tears are similar to scratches. Rejectable tears are readily visible and can be felt with a short fingernail.

Limits:
No readily visible Cracks, Checks or Tears under Standard Inspection Lighting.

Scratch

Definition:
A narrow line abrasion of the surface (over 0.3 mm wide).

Limits:
- The total length of the scratches should not exceed 25% of the tube length.
- No single scratch exceeding 150 mm.
- No scratches on the inside surface.
- No scratches around the tube adding to twice the tube circumference.

Scuffs

Definition:
Relatively broad lines, bands and/or areas of surface abrasion.

Limits:
The permitted area must not exceed 12.5x12.5 mm^2, and a maximum of 1 spot per 300mm tube length.

Vapour

Definition:
A haze of silica deposited on the tube surface seen when viewed with the unaided eye.

Limits:
Reject any degree having a colour other than white.

Striations

Definition:
Circumferential surface variations resulting in optical distortions, over the full length of the tube.

Limits:
- Several individual striations or flow lines that appear to be heavier than the faint uniform striations are not permitted.

- Colored striations are not permitted.

The above criteria are based on visual inspection with naked eye.

Inclusions

A: Enclosed Inclusions:

Definition:
Foreign matter wholly enclosed within the tube wall (over 0.3 mm).

Limits:
- Individual inclusion (spot): Max 0.5 mm diameter.
- Cluster (3 or more individual inclusions where each inclusion passes individually):
  Long length (> 300 mm): Max of 2 clusters in any 300 mm of tubing length.
  Short length: (≤ 300 mm): Max of 1 cluster per tube.

B: ID Exposed Inclusions:

Definition:
Foreign matter apparently exposed to the bore surface (over 0.3 mm).

Limits:
None permitted.

C: OD Exposed Inclusions:

Definition:
Foreign matter exposed to the outside surface (over 0.3 mm).

Limits:
- Individual inclusion (spot): Max 0.5 mm diameter.

- No more than 1 inclusion cluster in any 300 mm of tubing length.

Devitrifications

Devitrifications are optical surface defects caused by recrystallization.
limits:
Devitrifications < 0.2mm should not be considered.
Devitrification between 0.2 and 0.5 mm: not more than 2 spots per metre are allowed.
Devitrification > 0.5 mm is not permitted.

Dimensional Characteristics:

Standard Tubing – Tolerance guidelines

Size		OD	Wall	Siding	Ovality	Bow
OD	Wall (as a % of nominal OD)	Tolerances (as a % of nominal OD)	Tolerances (as a % of nominal Wall)	Max (as a % of nominal Wall)	Max (as a % of nominal OD)	Max (prorate to actual tube's length)
13 to 20 mm	< 18 %	± 1.25 %	± 8 %	8 %	2.0 %	1.5 / 1000 mm
20.1 to 40 mm	All	± 1.125 %	± 8 %	8 %	2.0 %	1.5 / 1000 mm
40.1 to 70 mm	All	± 1.125 %	± 10%	10 %	2.0 %	1.5 / 1000 mm
> 70 mm		On demand				

Cut Length

Definition:
All lengths parallel to the centerline or any other physical part of the tube

Limits:
FC (Furnace Cut) Standard Specification: specified length ± 10 mm.
TC (Trim Cut) Standard Specification: specified length ± 1 mm.

Outside Diameter (OD)

Definition:
All diameters in all cross-sectional planes along length ("all points in").

Inside Diameter (ID)

Definition:
Minor axis diameter at the tube ends (as measured by plug gages).
ID is not a criterion unless specifically given in print, order or standard.

Wall Thickness (WT)

Definition:
All wall thicknesses on the circumference of both ends.

Ovality

Definition:
Out of Round Diameter (circular run-out tolerance).
Expressed as a percent = (Max OD - Min OD) / Specified Nominal OD x 100 %
Expressed as an amount = Max OD - Min OD

Siding (Eccentric wall)

Definition:
Difference between greatest and least wall thickness, at either tube end.
Expressed as a percent = (Max Wall - Min Wall) / Specified Nominal Wall x 100 %
Expressed as an amount = Max Wall - Min Wall

Bow

Definition:
Amount of deviation to a straight edge, usually a curve.
Measurement = Max Gap to a Straight Surface / Length of tube

Note: Bow is often specified as a maximum amount over a given length (such as per 1000 mm). The maximum deviation per tube is prorated for the actual length of the tube.

Company Address:

RAESCH QUARZ (GERMANY) GmbH
In den Folgen 3
D-98693 Ilmenau
Phone 0049-3677-4696-0 / Fax 0049-3677-4696-3690
E-Mail: info@raesch.net
Internet: www.raesch.net

Effective Documents:

Sorting criteria RQ 800 (F_Z_239)