



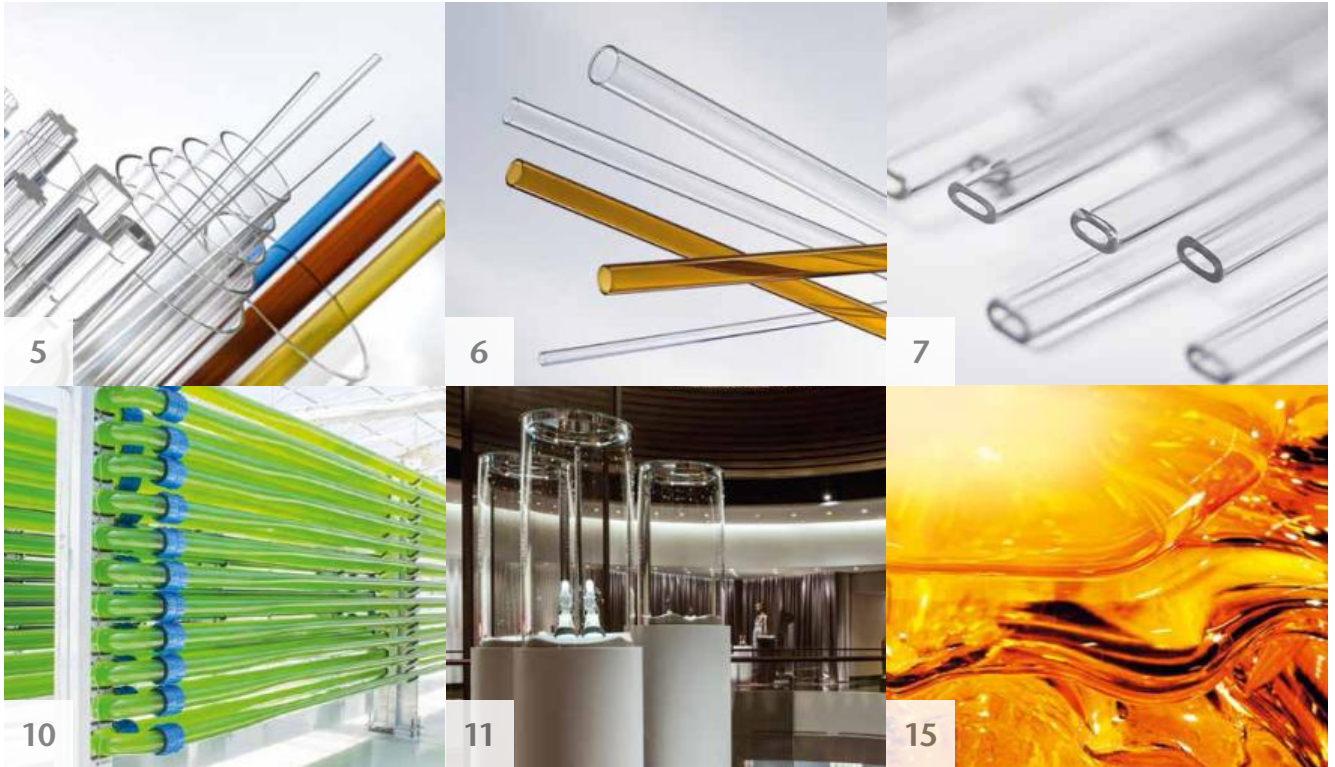
SCHOTT
glass made of ideas

Technical Tubing
at a glance

SCHOTT is a leading international technology group in the areas of specialty glass and glass-ceramics. With more than 130 years of outstanding development, materials and technology expertise we offer a broad portfolio of high-quality products and intelligent solutions that contribute to our customers' success.

With a production capacity of more than 140,000 tons and production sites in Europe, South America and Asia, SCHOTT's business segment Tubing is one of the world's leading manufacturers of glass tubes, rods and profiles. Approximately 60 glass types are produced in large external diameters and a variety of lengths based on site overlapping strategies in development, production and quality assurance.

SCHOTT Tubing provides customised products and services for international growth markets such as pharmaceuticals and electronics as well as industrial and environmental engineering.



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Why glass?

Outstanding properties in the spotlight

Glass is a remarkable material. Discover the versatile features of glass.

■ Transparency

The SCHOTT Tubing Portfolio offers individual solutions. Select either Transmission or Blocking for each spectral region: whether UV transparent, blocked or with special requirements in the visible or infrared spectrum. Applications e.g.: UV-lamps, light protecting packaging

■ Chemical resistance

At SCHOTT Tubing you will find glass appropriate for almost all corrosive environments as the chemical durability of our products is unrivaled. Applications e.g.: Primary packaging material for pharmaceuticals, laboratory

■ Temperature resistance

SCHOTT Tubing products display outstanding resistance even at searing temperatures of 400 °C. As opposed to plastics, you can rely on the durability of our glass even under extreme conditions. Applications e.g.: halogen lamps, laboratory, flash lamps

■ Electrically insulating

Another special feature of glass is its high insulation properties. Applications e.g.: X-ray tubes

■ Thermal expansion

Take advantage of our many years of expertise in bonding glass with other metals or materials. Our product range includes glass suitable for bonding with molybdenum, Kovar and tungsten, as well as iron-based alloys and ceramics. Applications e.g.: halogen lamps, solar receivers, flash lamps

■ Impermeability

Thanks to its high density, both pure glass and glass-metal bonds are very well suited to creating vacuums and to sealing sensitive materials such as gas mixtures into one volume. Applications e.g.: display industry, solar receiver, X-ray tubes, halogen lamps

■ Refractive index

SCHOTT Tubing Glass stands out for its wide spectrum of refractive indexes. Applications e.g.: fiber optics, light guides for endoscopy

■ Dielectric strength

You also benefit from the outstanding electrical field shielding demonstrated by our glass. Application e.g.: diodes

■ Mechanical properties

Glass is brittle, this may sound like a disadvantage, but we put it to use. Whether it's the option to be able to break glass (e.g. sprinkler) or the challenge of producing especially durable glass: We provide individual solutions for a wide range of challenges

To find the right glass type for your application, our “glass tubing explorer” will assist you. You can search by application or by the (above mentioned) physical and chemical properties of our glass types.

www.schott.com/glass-tubing-explorer

60 types of specialty glass – an extraordinary variety

The SCHOTT Tubing portfolio contains 60 different types of glass. We achieve very tight sealings for almost all possible partner materials by using the proper thermal expansion coefficients. SCHOTT's special glasses offer various UV-transmissivities, individual solutions with full UV protection, as well as products with colored glass and special infrared requirements. Our glass displays extremely high chemical durability, from laboratory applications to special glass which for instance, must withstand corrosive gases in industry processes. Our custom tailored products can also be used under extreme conditions – whether you are applying high or low temperatures.

Products at a glance

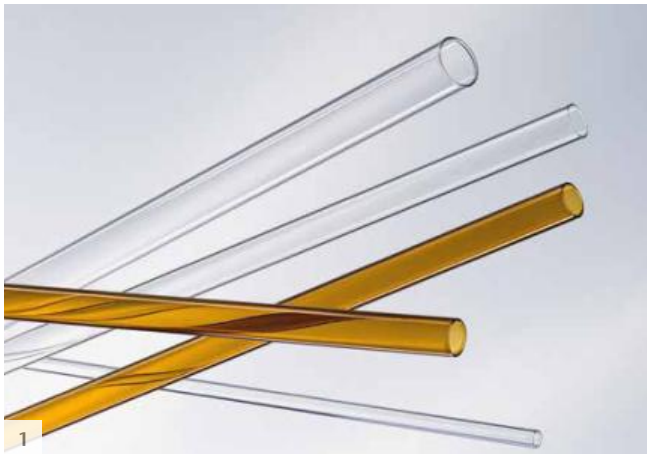
DURAN®: high chemical resistance in corrosive environments with high heat resistance

Kovar glasses 8250, 8245: practically impermeable sealing with Kovar possible paired with high electrical insulation

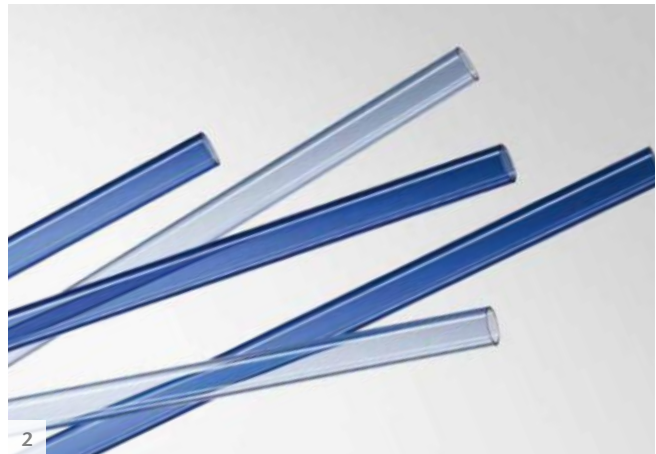
Aluminosilicate glasses 8252, 8253: suitable for sealing with molybdenum electrodes and useable at extraordinary high temperatures

8337B: maximized UV-transmission in combination with sealability to Tungsten and Kovar

DUROBAX® amber: best hydrolytic glass with light protection in the UV- and visible range



1



2



3

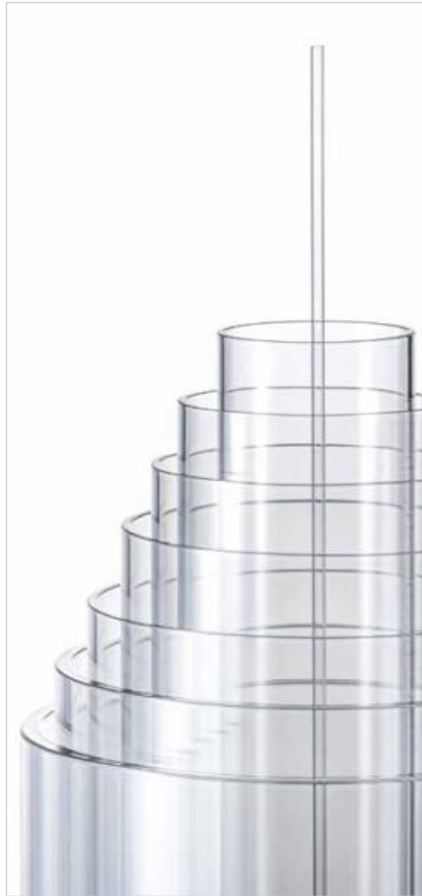
1: DUROBAX®
3: ILLAX®

2: Tubing doped with cobalt

Precision



CONTURAX®



DURAN®

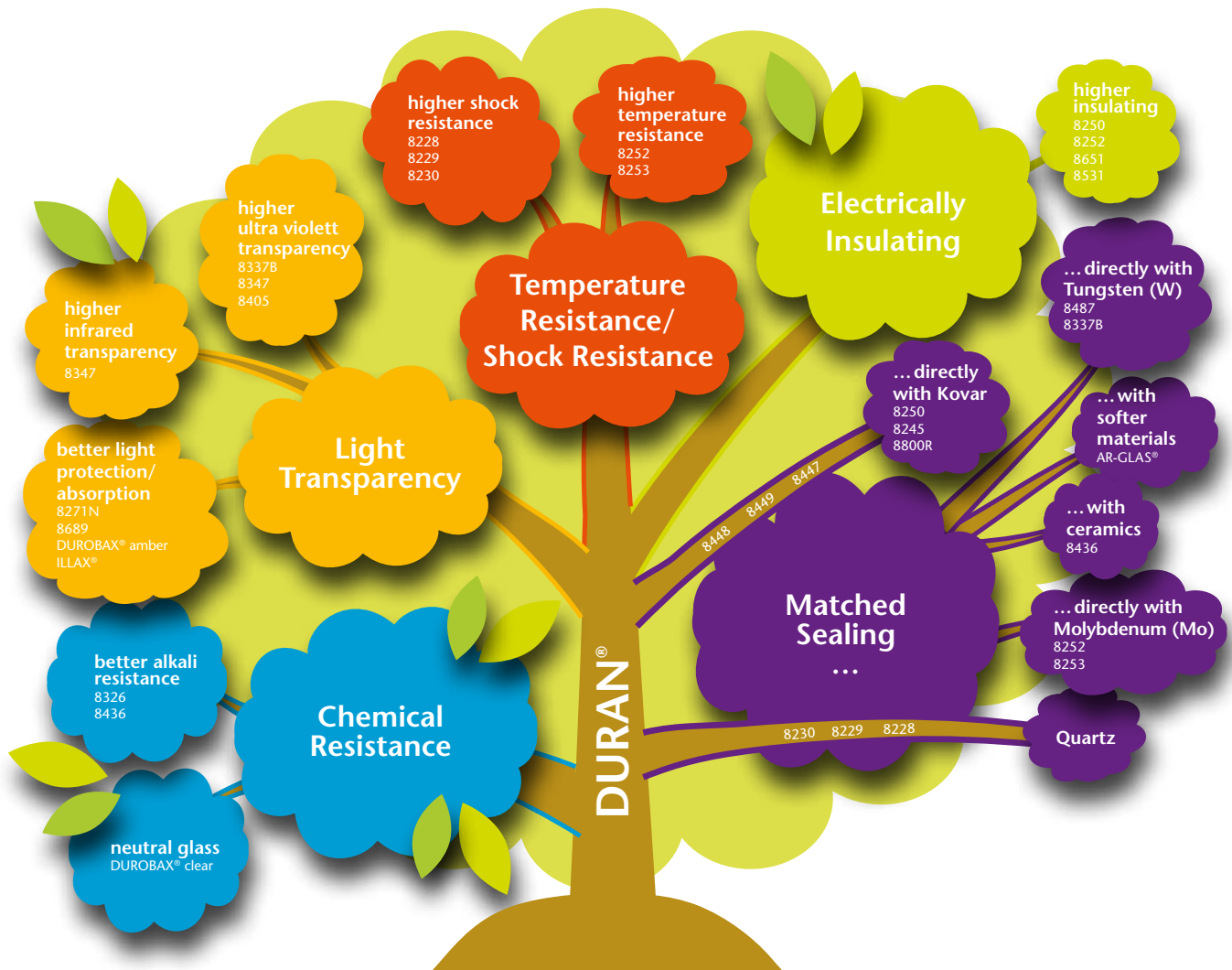


CONTURAX® and CONTURAX® Pro

We offer DURAN® glass as tubes or rods that offer maximum precision. Our glass tubing is available with an outside diameter of 1 to 460 mm and in lengths from 0.3 mm to 10 m with extremely tight geometrical tolerances. Thanks to precise geometry, SCHOTT glass tubing is perfect for all applications where exact dimensions are needed. Whether it's the variable lengths, the wide range of sizes or the excellent physical and chemical properties – DURAN® glass tubing is the ideal solution for a wide range of industrial applications.

The CONTURAX® line also contains glass rods and tubing with a wide variety of profiles of non-round cross section. The CONTURAX® Pro line contains rectangular glass tubing profiles. Both CONTURAX® and CONTURAX® Pro are made out of high grade borosilicat glass 3.3. Products are available in rectangular, triangular or individually specified shapes, and are manufactured in a patented, continuous and direct drawing process. CONTURAX® and CONTURAX® Pro glass tubing is applied in wall systems, design objects and particular in industries with photobioreactors for algae farming.

Main Technical Tubing Portfolio



Technical data overview

Chemical Resistance	hydrolytic resistance class	acid resistance class	alkali resistance class	coefficient of mean linear thermal expansion
DURAN®	1	1	2	3.3
DUROBAX® clear	1	1	2	4.9 (neutral glass expansion)
8326	1	1	2	6.6
8436	1	2	1	6.6

Light Transparency	ultra violett (UV)	visible	infrared (IR)
DURAN®	poor	good	medium
8337B	very good (T > 80 % at 254 nm - WT 1 mm)	very good	
8347	very good (T > 80 % at 254 nm - WT 1 mm)	very good	good
8405	good	very good	
8271N	blocked	medium	
8689	blocked	medium	
DUROBAX® amber	blocked	partly blocked	bad
ILLAX®	blocked	partly blocked	

T = transmission, WT = wall thickness

Temperature Resistance / Shock Resistance	transformation temperature (°C)	coefficient of mean linear thermal expansion
DURAN®	525	3.3
8252	720	4.6
8253	790	4.7
8228	700	1.3
8229	600	2.0
8230	570	2.7

Electrically Insulating	electric volume resistivity ($\Omega \cdot \text{cm}$) (logarithm) at 250 °C	electric volume resistivity ($\Omega \cdot \text{cm}$) (logarithm) at 350 °C
DURAN®	525	3.3
8250	720	4.6
8252	790	4.7
8531	700	1.3
8651	600	2.0

Matched Sealing ...	directly with:			
	Kovar	Tungsten (W)	Molybdenum (Mo)	others
8250	x			
8245	x			
8800R	x			
8447	x			
8487		x		
8337B		x		
8252			x	
8253			x	
8436				ceramics
AR-GLAS®				other metals (Platinum, ...)
8228				Quartz
8448				DURAN®
8449				links DURAN® with 8447
8229				links DURAN® with 8228

Individual solutions for different types of glass tubing



Tubular Glass Photobioreactors (PBR)
located at A4F - Algae for Future, Portugal

Enable biological growth

Let's enhance organic growth. SCHOTT special glass tubing is the best technical and economic solution for the construction of photobioreactors (PBR) for algae cultivation.

With the development of oval special glass tubing with thin wall thickness, we enable algae producers to grow the microorganisms even more efficiently.

The PBR consists of SCHOTT oval glass tubes, U-Bends and Couplings.



Discs and square forms out of glass 8250 and 8337b

Saw-cut forms

Glass from SCHOTT Tubing is the base material for glass spheres that can be used in many areas. Special glass tubing is further processed and applied in industry, electronics and lighting.



DURATAN®

Prestressed glass

Prestressed glass offers high stability, resistance to temperature differences, scratch resistance and an almost negligible degradation under the sun. Therefore thermally prestressed glass is ideal for applications with extreme requirements.



Qela Store, Doha, Qatar
DURATAN®, Image by Adrian Haddad for Qela

Glass and coatings

SCHOTT Tubing has developed the first anti-reflective, dirt resistant and easy to clean coating. It is grease repellent and resists moisture and smudges. The coating moreover provides for maximum light transmission, making the glass practically invisible.

Exceptional expertise and capacity for innovation

Discover glass in all its variety

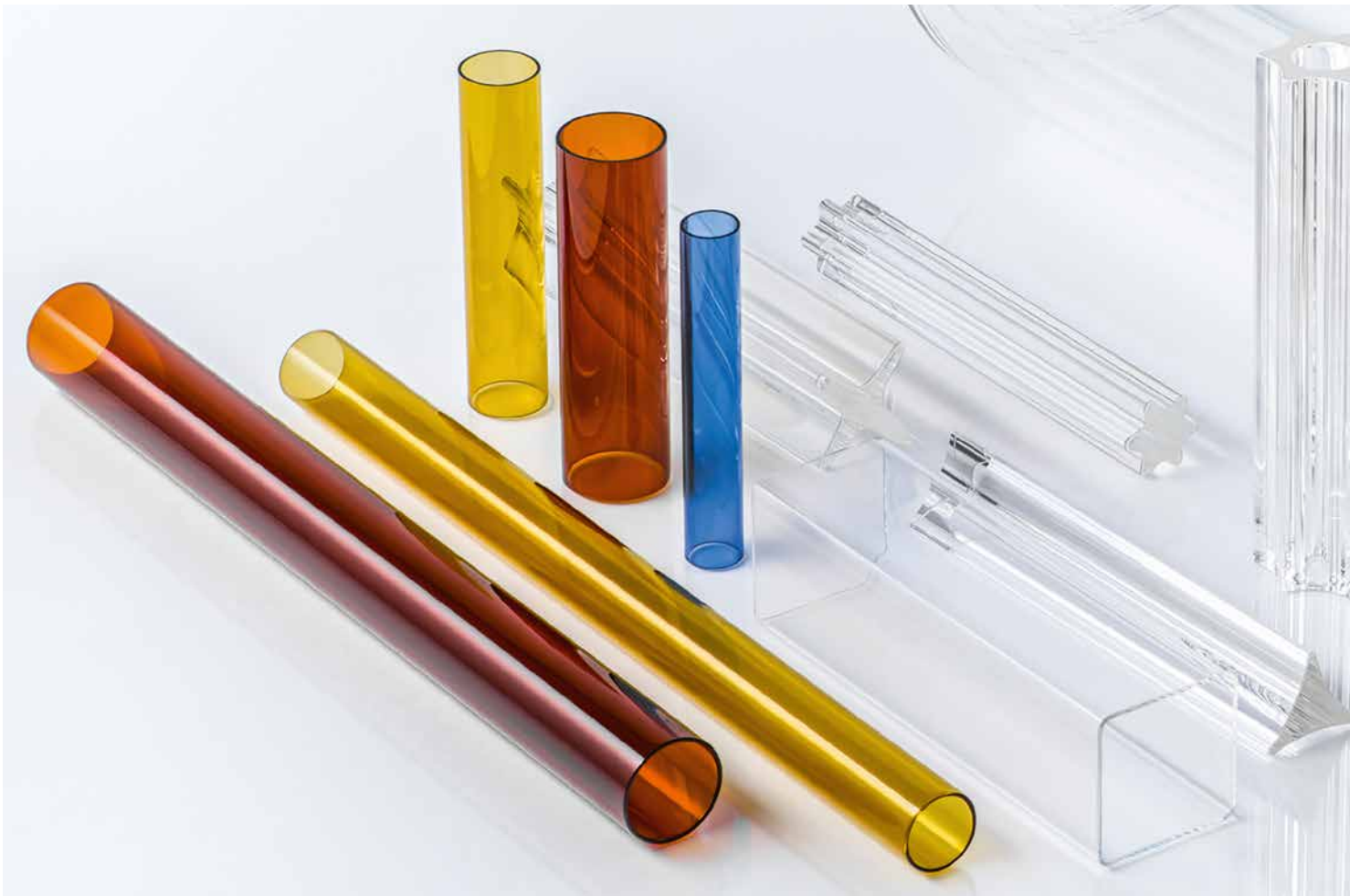
We have dealt with glass for 130 years and have never stopped developing it. Nowadays we make it possible for our customers to deliver products that exceed expectations and stoke enthusiasm. The challenges our customers and markets face drive us to improve existing products and to innovate. Together we change markets.

**Would you like to take on new challenges by further developing your products with our glass materials?
Would you like to develop a new product and are wondering whether glass is the appropriate material?**

SCHOTT Tubing is your contact for targeted development of existing glass products or for establishing innovative products in new markets. As your sparring partner you reap the benefits of two way exchanges – together we will spawn ideas and solutions to constantly set new standards in scores of industries – often by virtue of small details, and time again with far reaching leaps in innovation.

That's why we will ask you the following question again in the future:

What's your next milestone?



Scientific Services from SCHOTT Tubing

Experts in glass

The glass specialists at SCHOTT Tubing will assist you with in-depth expertise for queries on production, processing and applying glass tubes and rods. Take advantage of this expert knowledge and don't hesitate to get in touch. Our highly qualified employees have comprehensive know-how of processes and the properties of glass. From material selection and technical feasibility studies to product development - we provide outstanding individual consulting and services.

Technical and scientific consulting

Do you need assistance in material selection or in processing our glass tubes or rods?

Are you seeking material data or would you like to assess unspecified material properties?

Our technical consultants offer you access to the experience and knowledge that has been filled with 130 years of expertise in the development and manufacture of glass. We know the specifications of about 60 types of special glass and we deliver individual, custom-tailored recommendations. We respond quickly and reliably to over 500 inquiries a year we receive.



SCHOTT Tubing

Inspiring solutions for individual customer requirements

SCHOTT's business segment Tubing offers tailor made products and services for a wide range of applications such as laboratory, industrial and environmental engineering, electronics, and lighting as well as architecture and design.

Our expertise

- Glass tubes, rods, capillaries and profiles made of more than 60 special glass types with high optical quality
- Outside diameter range from 1 to 460 mm and lengths from 0.3 mm to 10 m with narrow geometric tolerances
- Technical and scientific consulting for challenges with existing innovations with glass

Advantages

- Constant high geometrical and optical quality
- Tailor made profiles, shapes and lengths
- Huge variety for physical properties: coefficient of thermal expansion, transmission, temperature stability and chemical resistance etc.
- Longstanding experience in specialty glasses





Let's rediscover materials for industrial applications.

By providing specialty glass tubing with outstanding characteristics,
we enable engineers and designers to think in new dimensions.

What's your next milestone?

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