

Sight glass information

The flow cells of the Chemtronic / Monitek photometer can be equipped with various sight glass materials to fit the requirements of your application. This page contains a list of common window materials and their characteristics.

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- Borosilicate / Pyrex

Sapphire

The sensors and probes of our turbidimeter and photometer are typically equipped with sapphire windows. Sapphire is because of its crystalline structure and its excellent material characteristic permanent resistant against corrosion and abrasion. White Sapphire is used as window material for the flowcells of UV-, VIS- and NIR- photometer and shows a good transmission down to UV- wavelengths of 254nm, but it achieves not the excellent UV- transmission values of quartz.

- Free of abrasion and corrosion
- Extreme chemical resistance
- Food-, Biotech- and Pharma- certified (FDA and 3-A proofed material)*
- Spectral range: UV, VIS, NIR

* Food and Drug Administration: [FDA website](#)

3-A Sanitary Standards Inc.: [3-A website](#)

Metaglas

Introduction

Conventional sight glasses are sensitive to stress like to high pressure or mechanical shocks. Under worse conditions they may catastrophically fail without warning and cause dangerous situations as well as high expenses. If the sight glass fails during the plant is fully operational, the accident will produce major cost and safety implications. METAGLAS® eliminates this mode of sight glass failure, helps to improve safety and avoids the expenses and inconveniences of unscheduled plant shut downs. These advantages are due to the unique „glass fused to metal“ fabrication of METAGLAS®, which provides an unsurpassed strength and integrity.

METAGLAS® is made by melting circular glass inside a metal frame. This results in the fusion of glass and metal. The glass solidifies during the cooling procedure. The different thermal expansion coefficients between glass and metal frame produce an uniform compressive force throughout the glass. This high degree of mechanical force makes METAGLAS® the strongest and most secure sight glass material.

Special Features

- Reliability against total failure due to the mechanically prestressed glass
- Extreme high pressure-, impact- and temperature resistance
- Simple installation and extreme mechanical stability
- Spectral range: Vis / Nir

Applications

METAGLAS® is the perfect technique to realize high pressure applications. The unique properties of METAGLAS® makes it as well ideally suited for sanitary applications where a perfect hygienic design is required. METAGLAS® has been subjected to the most rigorous tests by specific testing facilities as TUV, 3-A, ... in chemical-, pharmaceutical-, biotech- and food industry and has subsequently been integrated into their working standards.

Technical standards

- Pressure Equipment Directive 97/23/EG 02/98 module H/H1 (DIN/EN/ISO9001)
- Materials according TUV specifications & DIN/EN standards
- Sight glass fused to metal according DIN 7079
- AD Standards W0/TRD 100
- 3-A Standard for food processing

Material and technical data

- Duplex stainless steel 1.4462
- Carbon steel 1.0570
- Hastelloy and others
- Borosilicate according to DIN 7080
- Quartz
- Operating Temp.: -30° C to +280° C
- Operating Pressure: 64 bar (TUV)
- max. 1000 bar, depending on material and design

International Organization for Standardization: [ISO website](#)

Deutsches Institut fuer Normung E. V.: [DIN/EN website](#)

Technischer Ueberwachungs Verein: [TUV Rheinland Group website](#)

Quart

Advantages of measuring windows made from quart:

- good UV / VIS / IR transmission
- high temperature resistance
- low temperature expansion coefficient
- allows extreme temperature changes
- high chemical material purity

Differences in Quart material

Quart is divided in two categories:

- Synthetic quart (SQ/NSG) - made of pure silicatetrachloride (SiCl_4)
- Natural quart (SILUX®) - made of mountain- cristal or pegmatiert quart

Applications:

- High temperature applications
- UV- Photometry

PVC

Polyvinylchlorid (short PVC) is an amorphe thermoplastic synthetic material. Hardness and toughness of the PVC- material can be varied by adding softening agents. PVC is easy to dye, resistant against acids, lyes, alcohol, oil and bencine. PVC does not show any resistance against acetone, ether, benzene, chloroform and concentrated hydrochloric acid. PVC is constant in form up to temperatures of approximately 65°C and malleable at temperatures of 120°C to 150°C . The material is easy to glue (solvent- or two component adhesives) and easy to weld. PVC is divided in two categories PVC-soft (PVC-P /P=plasticized) and PVC-hard (PVC-U /U=unplasticised).

Advantages of windows made from clear- PVC:

- good chemical resistance against water, acids and lyes
- easy to machine
- allows complex forms

Polyphenylsulphon Windows

Polyphenylsulphon (PPSu) is an amorphous first-class performance thermoplastic, PPSu shows a better mechanical stability and chemical resistance as Polysulphone and Polyetherimid. Additionally it shows an excellent hydrolytic resistance compared to other amorph thermoplastics. PPSu does not even fail in steam pressure applications. Therefore PPSu has an unlimited steam- sterilization resistance, which will survive other materials by a factor of 40:1. These characteristic makes PPSu to an excellent choice for steam sterilisable biotech equipment because it shows as well an excellent resistance against common acids and cleaning agents over a wide temperature range.

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