



Introduction

Argolight multidimensional slides are specifically designed for assessing and following the performances of fluorescence-based imaging systems.

Argo-HM slides are specifically designed for high-magnification systems, typically for magnifications from 20 up to 100×. The slides consist in a special glass piece (ArgoGlass) set on a stainless steel carrier. Different fluorescent patterns are embedded inside the glass. They also exhibit a contrast in bright and dark fields, DIC (Differential Interference Contrast) and phase contrast. The patterns are accurately positioned and stable to light illumination. The analysis of pattern images can be simplified using Argolight software solutions.

Fluorescent properties

Patterns are excitable from 300 nm to 550 nm, with a maximum emission efficiency at around 340 nm. The emission is a broad continuum and the efficiency decreases as the excitation wavelength shifts towards the red.

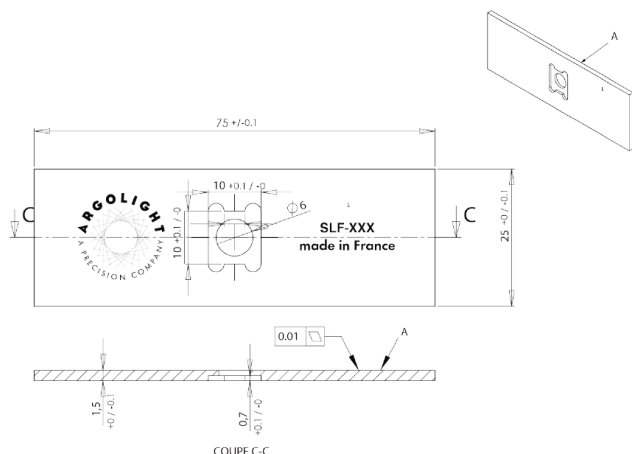
Stability of the fluorescence

Under normal use (irradiances, either peak or average, no higher than 50 GW/cm²), the fluorescence spectrum for a given illumination setting is identical in shape and intensity to any similar part of the patterns.

Under specific illumination configurations, the intensity of the patterns may decrease. However, this decrease is transient. The fluorescence intensity recovers to its initial value after some time. The recovery time depends on the irradiation conditions (power density, wavelength, pixel size, exposure time).

This behaviour is reproducible: for a given intensity and exposure time, the rate of decrease and recovery time will always be the same.

Schematics of the slide



ArgoGlass Description

ArgoGlass is a special glass produced at the Argolight facility to insure its homogeneity and purity. Its refractive index is similar to the glass used in glass slides or glass coverslips.

Slide compatibility

Imaging compatibility

Compatible	Not compatible but not damaging	Not compatible and damaging
Widefield Microscopy Confocal Microscopy Structured Illumination Microscopy FLIM Spinning Disk Microscopy	PALM STORM FRAP FRET Any imaging technology using depletion or multiple dyes.	STED Multiphoton Microscopy Any imaging technology using ultrashort pulsed laser

Objective compatibility

The slides are compatible with dry and oil immersion objectives. The slides are compatible with water as an immersion liquid, but continuous exposure higher than five minutes should be avoided.

Patterns inside the slide

Patterns are positioned (170 ± 5) μm below the top glass surface, on a horizontal plane which flatness is within ± 5 mrad.

This emulates the presence of a microscope cover-slip, having a thickness of (170 ± 5) μm and a refractive index of (1.5255 ± 0.0015) at 546.1 nm.

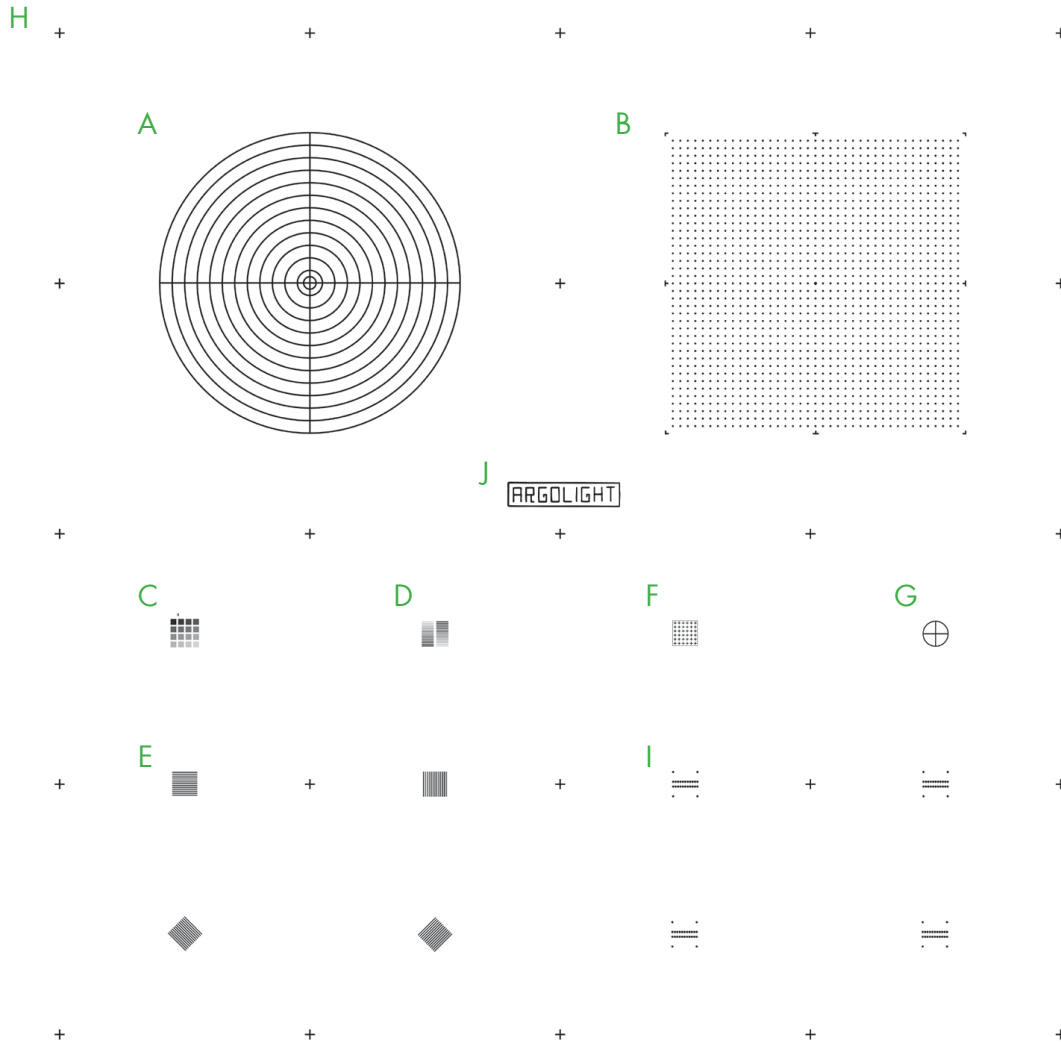
The maximum relative positioning error is ± 110 nm in XY and ± 110 nm in Z within each individual pattern.

The thickness (in the Z direction) of these patterns is about (600 ± 200) nm FWHM (Full Width at Half Maximum).

Patterns description can be found in the back of this spec sheet.

Patterns overview

100 μm



Patterns description

The slide contains 10 types of patterns.

Pattern A - Target. This pattern consists in concentric circles with increasing radii from 25 μm to 300 μm with a step of 25 μm, plus an extra circle with a radius of 12.5 μm, featuring a target.

Pattern B - Field of rings. This pattern consists in a matrix of 39 × 39 rings, separated by 15 μm, on a total field of 600 × 600 μm². The field of rings is surrounded by eight landmarks, and exhibits a 7.5 μm long cross in its center.

Pattern C - 4x4 Intensity. This pattern consists in sixteen 8.5 μm-wide squares having different fluorescence intensity levels following a linear evolution, organized in a 4×4 matrix.

Pattern D - 2x16 Intensity This pattern consists in twice sixteen 22.5 μm × 1.5 μm rectangles having different fluorescence intensity levels following a linear evolution, organized in a 2×16 matrix

Pattern E - Gradually spaced lines. This pattern consists in pairs of 50 μm-long lines which spacing gradually increases, from 100 to 700 nm, with a step of 50 nm. Four sets of lines are present: One vertical, one horizontal, and two oriented at + and - 45°.

Pattern F - Matrix of crosses. This pattern consists in a matrix of 6 × 6 crosses, having a length of 5 μm and separated by 8 μm, surrounded by a frame. The crosses are composed of vertical lines that are in the same plane, and by horizontal lines, going gradually deeper within the glass. The spacing between the vertical and horizontal lines gradually increases, from 0 to 3.5 μm, with a step of 100 nm.

Pattern G - Meridians of a sphere. This pattern consists in three circles of diameter 50 μm in different orthogonal planes, featuring the meridians of a sphere.

Pattern H - Repositioning crosses. The repositioning crosses are 20 μm long and are positioned 500 μm from one to another in the X direction, the Y direction, or both.

Pattern I - 3D Crossing stairs. This pattern consists in empty cylinders embedded at different depths, like two crossing stairs, surrounded by four pillars.

There are four stairs in the slide, with varying steps: 1, 0.75, 0.5 and 0.25 μm.

Pattern J - Logo. This pattern consists in letters forming the company name "Argolight", and surrounded by a 220 μm × 50 μm frame.