Spec sheet

ARGOLIGHT ARGO-SIM slide for fluorescence imaging systems

02/2018

Introduction

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

Argo-SIM slides are specifically designed for structured illumination microscopes, as well as any system exploiting deconvolution algorithms. The slides consist in a special glass piece (ArgoGlass®) set on a metal 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.

Fluorescence properties

Patterns are excitable from 350 nm to 650 nm. The emission is a broad continuum and the efficiency decreases as the excitation wavelength shifts towards the red.

Fluorescence stability

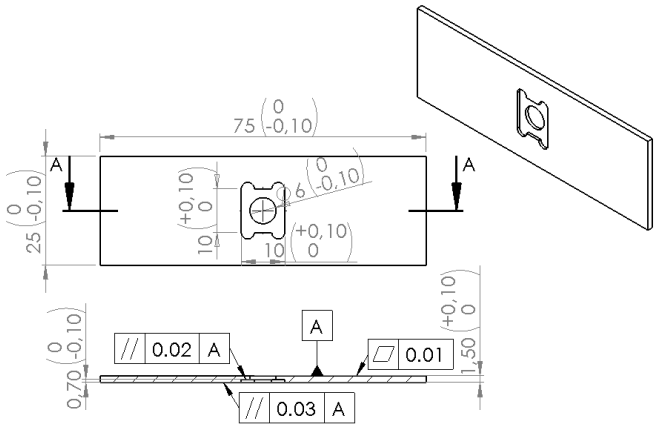
Under normal use (irradiances, either peak or average, no higher than 50 GW/cm^2), the fluorescence spectrum for a given illumination setting is identical in shape and intensity to any similar part of the patterns.

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.

Read the full study at www.argolight.com.

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 one of microscope cover glasses.

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 mmersion, but continuous exposure longer 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 coverglass, 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).

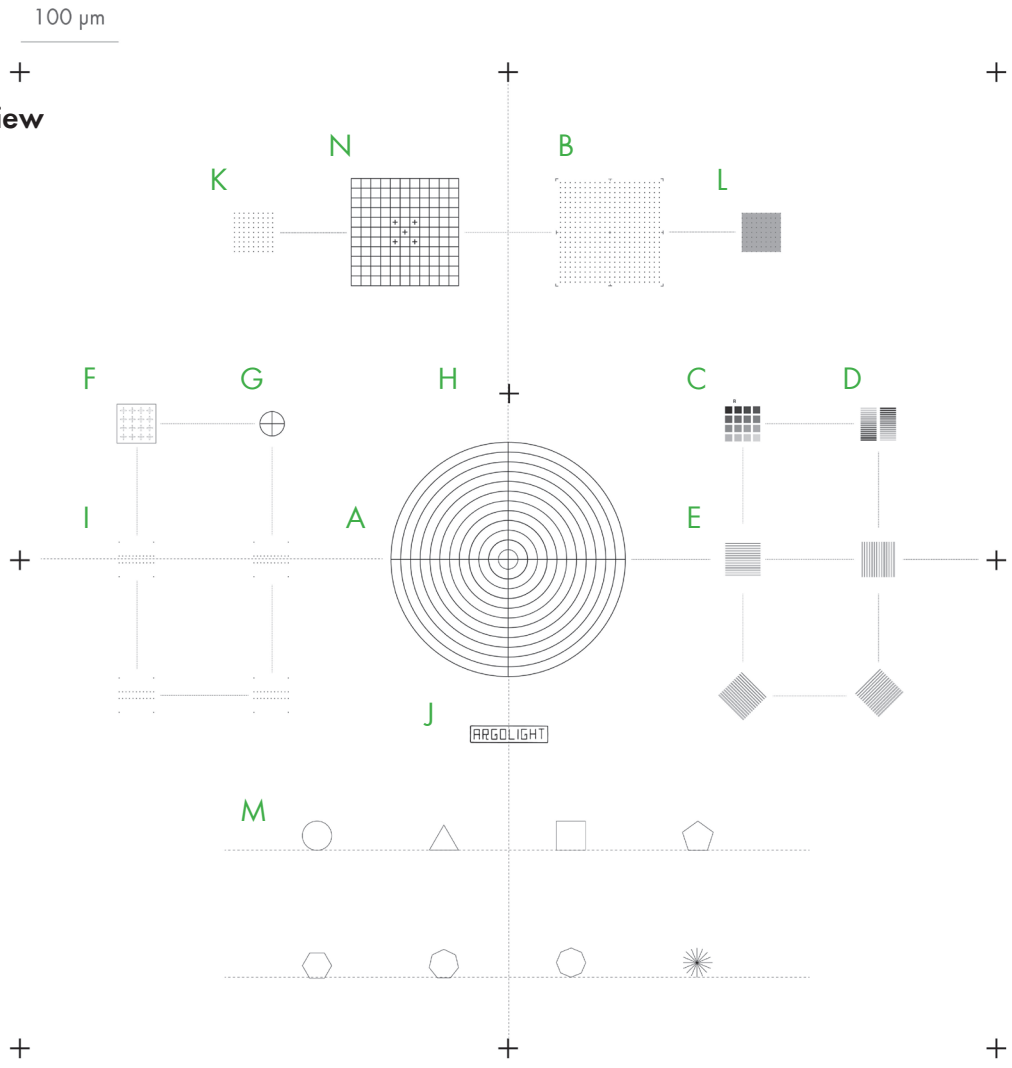
Patterns description can be found in the back of this spec sheet.

Spec sheet

ARGOLIGHT ARGO-SIM slide for fluorescence systems

02/2018

Patterns overview



Patterns description

The slide contains 14 types of patterns.

Pattern A - Target. Concentric circles with increasing radii from 10 µm to 120 µm with a step of 10 µm, featuring a target.

Pattern B - 2D Matrix of rings. A 2D matrix of 21 × 21 rings, separated by 5 µm, on a total field of 110 µm × 110 µm. The field of rings is surrounded by eight landmarks, and exhibits a 3 µm long cross in its center.

Pattern C - 4 x 4 Intensity. Sixteen 6 µm-wide squares having different fluorescence intensity levels following a linear evolution, organized in a 4 × 4 matrix.

Pattern D - 2x16 Intensity Twice sixteen 15 µm × 0.7 µm rectangles having different fluorescence intensity levels following a linear evolution, organized in a 2×16 matrix.

Pattern E - Gradually spaced lines. Pairs of 36 µm-long lines which spacing gradually increases, from 0 to 390 nm, with a step of 30 nm. Four sets of lines are present: one vertical, one horizontal, and two oriented at + and - 45°.

Pattern F - Matrix of crosses. A matrix of 4 × 4 crosses, having a length of 5 µm and separated by 10 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 1.5 µm, with a step of 100 nm.

Pattern G - Meridians of a sphere. Three circles of diameter 25 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. 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, 0.5, 0.25 and 0.125 µm.

Pattern J - Logo. Letters forming the name "Argolight", and surrounded by a 80 µm × 18 µm frame.

Pattern K - 3D Matrix of rings. A 3D matrix of 9 × 9 × 9 rings, separated by 5 µm, on a total volume of 40 µm × 40 µm × 40 µm.

Pattern L - Matrix of rings on a background. This pattern is identical to pattern A, with a background that is 10 µm below.

Pattern M - Geometrical figures. A circle, a triangle, a square, a pentagon, an hexagon, an heptagon, an octagon and a star with 16 arms.

Pattern N - Grid. A grid with a step of 10 µm, with 5 crosses of 5 µm length in some squares.