

# MATSUNAMI's Technology (12 times in total)

## Episode 11: Inspection/Measurement technology



At Matsunami, there are various methods to inspect our final productions in order to secure our quality.

In response to each company's requirement, we apply various tests such as environmental test, complicated shape measurement, spectrum measurement and etc.

In addition, visual inspection addressed in our clean room enable us to deliver our products (CMOS and other sensor cover glass) without defects more than 3µm level. Various visual inspection standards are set at Matsunami.

### Advantage

#### Clean room overview: 1000 class level (10 Class level for clean booth)

#### Inspection method for glass surface and interior

- High-brightness light inspection for micro defects (10,000 ~300,000 lux)
- Visual inspection with fluorescent lamp (600~8,000 lux)
- Microscopy inspection
- Automation inspection line
- CCD image inspection



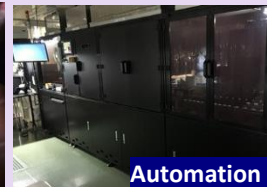
Inspection line for FPD Glass



High-brightness light inspection for micro defects

#### Inspection method for glass interior, pulse defect, surface unevenness

- Image inspection(Collimator lens)
- Xenon irradiation test
- Strain inspection

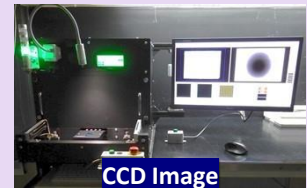


Automation inspection line



CCD Image

- 1 Matsunami Master System; only qualified and limited inspectors are allowed to conduct visual inspection.
- 2 Meet inspection needs for 3µm~20µm level defects for products such as optical glass, cover glass for camera module.
- 3 Various methods tackle various inspection needs.
- 4 Clean room packaging guarantee our glass without any dust
- 5 Wide range of size is available (from certain mm level to FPD size)
- 6 Automation inspection is also available for mass production

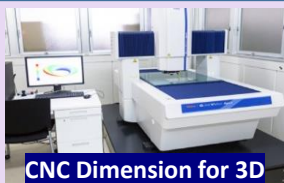


### Inspection equipment

Periodic calibration for all instruments in accordance with ISO9001, enable our reliable inspection measuring.

- CNC Dimension machine (Quick Vision)
- Automatic right angle measuring machine
- Digital Caliper
- Digital Micrometer
- Measuring Microscope
- Non-contact laser surface analyzer
- Needle-type shape measuring machine
- Image measuring machine
- Laser interferometer

- Spectrophotometer
  - Haze meter
  - Chromaticity meter
  - Abbe refractometer
  - Strain tester
  - Illuminance meter
  - Surface Stress meter
  - Strength bending tester
- and so on equipment to guarantee Matsunami's fine and precision glass products



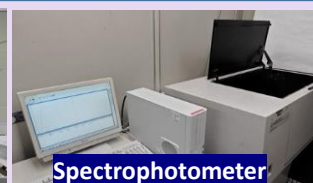
CNC Dimension for 3D



Laser microscope



Laser interferometer



Spectrophotometer

#### ● Various quality characteristics can be measured.

**SHAPE:** Thickness, dimension, deformed contour shape, thread surface, corner, squareness, circle, 3D shape

**SURFACE:** Roughness, waviness, flatness, parallelism, wavefront aberration, contact angle

**OPTICAL PROPERTY:** Transmittance, reflectance, haze, refractive index(abbé number), glass strain(internal stress)

**THERMAL PROPERTY:** Thermal expansion, glass thermal characteristics(softening point, transition rotation, strain point, slow cooling rotation)

**MECHANICAL PROPETRY:** Hardness, breaking strength(bending, falling ball test), strengthening stress(CS/DOL)

**RELIABILITY:** Constant temperature and humidity test, high temperature, low temperature, heat cycle test

We, welcome your inquiry and looking forward to supporting your business.