The Optics and Radiometry Laboratory
is accredited by the
National Association of Testing Authorities, Australia
to ISO 17025
Accreditation number 1923
in the following classes of test

NATA is a signatory to the APLAC mutual recognition arrangement for the mutual recognition of the equivalence of testing, calibration and inspection reports.

Accreditation No. 1923

Scope of Calibration measurements

1.56 Precision and reference optical equipment

.02 Focimeters

including following the methods of ISO 8598
with least uncertainties of measurement of-
0.015 m^{-1} in refractive power in the range -25 to +25 m^{-1}
0.01 $cm.m^{-1}$ in prismatic power to 20 $cm.m^{-1}$
1° in axis

.03 Lens, refractive and prismatic power

including following the methods of ISO 8598, ISO 12311
with least uncertainties of measurement of-
0.01 m^{-1} in refractive power in the range -0.25 to +0.25 m^{-1}
0.015 m^{-1} in refractive power in the range -25 to +25 m^{-1}
0.01 $cm.m^{-1}$ in prismatic power to 20 $cm.m^{-1}$
1° in axis

1.61 Luminous intensity

.01 Incandescent lamps

with least uncertainties of measurement of -
1.0% in luminous intensity for incandescent lamps, with or without broadband filters
1.3% in luminous intensity for other incandescent sources
from 0.01 cd

.02 Other sources

with least uncertainties of measurement of -
1.3% in luminous intensity
from 0.01 cd

1.62 Luminous flux

.01 Incandescent lamps

Light sources with maximum dimension (excluding cap) not exceeding 0.3 m
with least uncertainties of measurement of -
2.0% from 1.5 lm

.02 Other sources

Light sources with maximum dimension (excluding cap) not exceeding 0.3 m
with least uncertainties of measurement of -
2.5% from 1.5 lm

1.63 Luminance

.01 Measurement of luminance

Incandescent sources, with or without broadband filters
with least uncertainties of measurement of -
1.5% or 0.01 $cd.m^{-2}$ (whichever is the greater) from 0.1 $cd.m^{-2}$
for incandescent lamps, with or without broadband filters
including following the methods of ADR48/00, UN-ECE 4
Other sources
with least uncertainties of measurement of -
2.0% or 0.01 $cd.m^{-2}$ (whichever is the greater) from 0.1 $cd.m^{-2}$

.02 Calibration of luminance meters

including following the methods of CIE Publication 69
Incandescent sources, with or without broadband filters
with least uncertainties of measurement of -
1.4% or 00.01 $cd.m^{-2}$ (whichever is the greater) from 0.1 $cd.m^{-2}$ for incandescent lamps, with or without broadband filters

1.64 Illuminance

.01 Measurement of illuminance

Incandescent lamps
with least uncertainties of measurement of -
0.9% in the range 0.1 to 10 000 lux
Other sources
with least uncertainties of measurement of -
1.5% in the range 0.1 to 10 000 lux

.02 Calibration of illuminance meters

including following the methods of CIE Publication 69
Photometers for Illuminant A and correction factors for Illuminant C
with least uncertainties of measurement of -
1.2% in the range 1 to 10 000 lux

1.65 Broad-band visible light measurements

.01 Transmittance

Measurements of luminous transmittance with incandescent lamps
with least uncertainties of measurement of - 0.01

.02 Reflectance

Measurements of luminous reflectance with incandescent lamps on plane mirrors
including following the methods of ADR14/02 UN-ECE 46 and 81
with least uncertainties of measurement of -

0.01 for measured values greater than 0.80 or less than 0.20
0.02 for measured values between 0.20 and 0.80

.03 Luminance factor

with least uncertainties of measurement of -
3.0% of measured value + 0.01 with incandescent lamps
5.0% of measured value + 0.01 with other white light sources

.04 Chromaticity

Incandescent lamps, with or without broadband filters or other white light sources
with least uncertainties of measurement of -
0.004 in CIE 1931 coordinates (x and y)

.06 Haze

Measurement of haze
including following the methods of ASTM D1003 and EN 15152
with least uncertainties of measurement of -
0.1% at 0% haze, rising to 0.45% at 20% haze and 0.65% at 40% haze

.07 Gloss

Measurement of gloss
including following the methods of -
ASTM D523, DIN67530, ISO2813, AS1580.602.2, AS/NZS4443 C1.2.4.6
with least uncertainties of measurement of -
0.3 gloss units for high gloss (all geometries)
1.2 gloss units for semi gloss

.08 Calibration of transmittance densitometers

with least uncertainties of measurement of -
0.01 absorbance from 4 ABS

.09 Calibration of reflectance densitometers

with least uncertainties of measurement of -
0.02 reflectance in the range 0.02 to 1

.10 Calibration of incident light tricolorimeters

with least uncertainties of measurement of -
0.002 x and y

.11 Calibration of reflectance tricolorimeters

by the methods of -
ORLAB 11-1
with least uncertainties of measurement of -
0.001 in CIE (1931) coordinates (x and y)

.13 Calibration of hazemeters

including following the methods of ASTM D1003
with least uncertainties of measurement of -
0.1% at 0% haze, rising to 0.45% at 20% haze and 0.65% at 40% haze

.14 Calibration of gloss meters

including following the methods of -
ASTM D523, DIN 67530, AS 1580.602.2, ISO 2813
with least uncertainties of measurement of -
0.4 gloss units for high gloss (all geometries)
2.8 gloss units for semi gloss 20°
1.0 gloss units for semi gloss 60°
2.3 gloss units for semi gloss 85°

1.66 Retroreflection

.01 Reflex reflectivity

Retroreflective materials and devices (including coefficient of luminous intensity)
including following the methods of -
AS/NZS 1906.1, AS 1906.2, AS 1906.3, AS/NZS 1906.4, AS 1512, AS 3790, AS 2142, ADR 47/00 and UN-ECE 3
with least uncertainties of measurement of -
7.5%

.02 Chromaticity

Daytime colour: Retroreflective materials and devices
including following the methods of -
AS/NZS 1906.1, AS 1906.2, AS 1906.3, AS/NZS 1906.4, AS 1512, AS 3790, AS 2142 and ADR 47/00
with least uncertainties of measurement of -
0.003 x and y
Reflex reflectivity colour: Retroreflective materials and devices
including following the methods of AS/NZS 1906.1
with least uncertainties of measurement of -
0.002 x and y

1.68 Spectral measurements of light sources

.01 Spectral radiance

with least uncertainties of measurement of -
0.7 nm in wavelength
3.3% at 380 nm falling to 1.0% at 555 nm and rising to 1.8% at 780 nm in spectral radiance

.02 Spectral irradiance

with least uncertainties of measurement of -
0.3 nm in wavelength
18% at 280 nm falling to 2.0% at 380 nm, 1% at 555 nm and rising to 2.4% at 830 nm in spectral irradiance

.03 Chromaticity

with least uncertainties of measurement of -
0.0015 in chromaticity
0.06 in CIE colour rendering index

.04 Correlated colour temperature

with least uncertainties of measurement of -
15K
In the region of 2856K rising to ± 50K at 5500K and ± 200K at 12000K

.05 Distribution temperature

Incandescent lamps
with least uncertainties of measurement of -
15K in the region of 2856K

.06 Calibration of spectroradiometers

with least uncertainties of measurement of -
0.1 nm in wavelength
0.1% minimum detectable stray light
3.3% at 380 nm falling to 1.0% at 555 nm and rising to 1.8% at 780 nm in spectral radiance response
18% at 240 nm falling to 2.0% at 380 nm, 1.0% at 555 nm and rising to 2.4% at 830 nm in spectral irradiance response

1.69 Spectrophotometry

.01 Spectral transmittance

Transmittance measurement of sunglasses, eye protectors for industrial applications, filters for eye protectors, transparent materials (non-fluorescent), sun protective clothing
Transmittance in the UV-VIS spectrum including
by the methods of -
AS/NZS 1067 and similar methods, BS 2724-1987, ANSI Z80.3, AS/NZS 3957 (excluding Appendix E to G), AS/NZS 4399, EN 167
with least uncertainties of measurement of -
$0.0004 + 0.0014t + 0.1\Delta t/\Delta\lambda$
Transmittance in the infra-red spectrum 700-3300 nm including by the methods of
AS 1338.1/2/3
with least uncertainties of measurement of -
$0.001+ 0.002t + 0.2\Delta t/\Delta\lambda$ for transmittance between 1.00 and 0.01
7.5% of transmittance for transmittance between 0.01 and 0.001
10% of transmittance for transmittance between 0.001 and 0.0001
12.5% of transmittance between 0.0001 and 0.00001
20% of transmittance between 0.00001 and 0.00000005
Measurement of solar energy transmittance of sheet materials to ASTM E424
Method A, ASTM E903 and similar methods including calculations to ISO9050
with least uncertainties of measurement of -
0.2% of measured value

.02 Spectral reflectance

Measurement of solar energy reflectance (terrestrial) of sheet materials
including following the methods of ASTM E424 Method A including calculations to ISO9050
with least uncertainties of measurement of -
0.5% of reflectance measured valued
Spectral reflectance measurement - diffuse and total (non-fluorescent)
with least uncertainties of measurement of -
In the wavelength range 320 to 780 nm
$0.0004 + 0.0047\rho + 0.1\Delta\rho/\Delta\lambda$
Specular included and matt and gloss sample specular excluded
$0.0005 + 0.0047\rho + 0.1\Delta\rho/\Delta\lambda$
Semi-gloss samples specular excluded
$0.0004 + 0.0014\rho + 0.1\Delta\rho/\Delta\lambda$
Samples with specular reflection only
In the wavelength range 780 to 2500 nm
$0.001+ 0.0049\rho + 0.2\Delta\rho/\Delta\lambda$

.03 Chromaticity

with least uncertainties of measurement of -
Colour difference measurements
with least uncertainties of measurement of -
0.4 delta E in CIE LUV and CIE LAB
0.001 in CIE (1931) coordinates (x and y)
Chromaticity of fluorescent material
including following the methods of -
AS/NZS 1906.1, AS/NZS 1906.4, EN 471
with least uncertainties of measurement of -
0.4 delta E in CEI LUV and CIE LAB
0.001 in CIE (1931) coordinates (x and y)

.04 Calibration of spectrophotometers

By the method of ORLab 1.8
with least uncertainties of measurement in the ultraviolet-visible spectrum of -
0.3nm in wavelength

0.1% minimum detectable stray light
0.1% transmittance
0.9 % reflectance

Scope of Pattern Approval Testing measurements

3.40 Geometry of optical components and systems

.01 Rear view mirrors

including test and examinations for compliance with ADR14/02

.11 Eye protection wear

including test and examinations for compliance with -
AS/NZS 1337.1 (except Appendices R, W, X); AS/NZS 1338.1, AS/NZS 1338.2, AS/NZS 1338.3, AS 1609; BS 2092; ANSI Z80.1, AS/NZS 4066, AS 4067, ANSI Z87.1, AS 2228.1, EN 166, EN 167, EN 168
Refractive and prismatic power measurements, haze, visual inspection, flammability, mechanical strength, impact strength, dimensions, resistance to corrosion, hot solids exposure, and stability at elevated temperatures of eye protectors for industrial applications, filters for eye protectors,
eye protectors for motor cyclists, racing car drivers, racquet sports, and firefighters faceshields
with least uncertainties of measurement of -
0.005 m^{-1} for refractive power;
0.03 $cm.m^{-1}$ for prismatic power

.12 Sunglasses

including test and examinations for compliance with -
AS/NZS 1067; BS 2724; EN 1836, ANSI.Z80.3
Consumer Product Safety Standard, Section 62, Trade Practices Act 1974
(Commonwealth Goverment Gazette No. 5439, 28/10/85)
Refractive and prismatic power measurements, surface power measurements, visual inspection, dimensions, bridge strength, robustness, thermal stability at elevated temperatures and lens retention of sunglasses and fashion spectacles
with least uncertainties of measurement of -
0.005 m^{-1} for refractive power;
0.03 $cm.m^{-1}$ for prismatic power

.15 High visibility safety garments

including test and examinations for compliance with -
AS/NZS 4602:1999, AS/NZS 4602

3.41 Optical quality

.03 Lenses

Tests on spectacle lenses
including test and examinations for compliance with -
AS 2228.1, AS/NZS ISO 21987, EN 166, EN 167, EN 172, AS/NZS 1337.6, ISO 16034, AS/NZS ISO 16034, EN 14139 and ORLAB 2.51.6
with least uncertainties of measurement of -
0.005 m^{-1} for refractive power (nominal afocal lenses)
0.015 m^{-1} for refractive power (prescription lenses)
0.01 $cm.m^{-1}$ for prismatic power

3.44 Distribution of luminous intensity

.05 Traffic signal lanterns

Luminaires with light emitting dimensions not exceeding 0.3 m
including test and examinations for compliance with -
AS 2144, ISO/CIE 16508, EN 12368, AS 4191,
AS/NZS 4192
with least uncertainties of measurement of -

0.1° in angle
1.0% in luminous intensity for incandescent lamps,
with or without broadband filters
1.3% in luminous intensity for other sources

.06 Motor vehicle signal lamps

Luminaires with light emitting dimensions not exceeding 0.3 m
including test and examinations for compliance with -
ADR 1/00, 6/00, 45/01, 46/00, 49/00, 50/00, 52/00, 53/00, 54/00, 55/00, 60/00, 74/00,76/00, 77/00
UN-ECE 1, 2, 5, 6, 7, 8, 19, 20, 23, 31, 38, 50, 56, 57, 72, 76, 87, 91, 98 and similar methods
with least uncertainties of measurement of -
0.1° in angle
1.0% in luminous intensity for incandescent lamps,
with or without broadband filters
1.3% in luminous intensity for other sources

.09 Other luminaires

Luminaires with light emitting dimensions not exceeding 0.3 m
with least uncertainties of measurement of -
0.1° in angle
1.0% in luminous intensity for incandescent lamps, with or without broadband filters
1.3% in luminous intensity for other sources
Marine signalling lamps and Airfield signalling lamps to International Regulations for Preventing Collisions at Sea (COLREGS), ATAC Uniform Shipping Laws Section 16, Civil Aviation Safety Authority Manual of Standards Pert 139
including test and examinations for compliance with and guidelines of CIE Publication No 121 and IES LM-79
with least uncertainties of measurement of -
0.1° in angle
1.0% in luminous intensity for incandescent lamps with or without broadband filters
1.3% in luminous intensity for other sources

3.45 Luminance

.01 Measurement of luminance

including test and examinations for compliance with -
AS/NZS 2144, AS/NZS 2293.3, ADR 48/00, ADR 53/00, UN-ECE 4

.03 Field measurement of luminance

with least uncertainties of measurement of -
1.9% or 0.01 $cd.m^{-2}$ (whichever is the greater) from 0.1 $cd.m^{-2}$
for incandescent lamps, with or without broadband filters

3.46 Illuminance

.01 Measurement of illuminance

including test and examinations for compliance with -
AS 4004 and IEC 60601-2-41

.03 Field measurement of illuminance

with least uncertainties of measurement of -
1.9% in the range 1 to 10 000 lux

3.50 Other tests on optical systems

.04 Power a.c. and d.c.

with least uncertainties of measurement of -
0.2% a.c. voltage
0.2% a.c. current
0.2% d.c. voltage
0.2% d.c. current

3.51 Retroreflective materials

.01 Reflex reflectivity

Retroreflective materials and devices (including coefficient of luminous intensity)
including test and examinations for compliance with -
AS/NZS 1906.1, AS 1906.2, AS 1906.3, AS/NZS 1906.4, AS 1512, AS 3790, AS 2142, ADR 47/00, UN-ECE 3
with least uncertainties of measurement of -
7.5%

.02 Chromaticity

Daytime colour: Retroreflective materials and devices
including test and examinations for compliance with -
AS/NZS 1906.1, AS 1906.2, AS 1906.3, AS/NZS 1906.4, AS 1512, AS 3790, AS 2142, ADR 47/00
with least uncertainties of measurement of -
0.003 x and y,
Reflex reflectivity colour: Retroreflective materials and devices
including test and examinations for compliance with AS/NZS 1906.1
with least uncertainties of measurement of -
0.002 x and y,

3.52 Spectrophotometry testing

.01 Spectral transmittance

Transmittance measurement of sunglasses, eye protectors for industrial applications, filters for eye protectors, transparent materials (non-fluorescent), sun protective clothing

Transmittance in the UV-VIS spectrum
including test and examinations for compliance with -
AS/NZS 1067, AS/NZS 1337.1, BS 2724-1987, ANSI Z80.3, AS/NZS 3957 (excluding Appendix E to G), AS/NZS 4399, EN 166, EN 167, EN 169, EN 170, EN 171, EN 172

Transmittance in the infra-red spectrum 700-3300 nm
including test and examinations for compliance with -
AS/NZS 1338.1 AS/NZS 1338.2, AS/NZS 1338.3, EN 166, EN 167, EN 169, EN 170, EN 171, EN 172
Measurement of solar energy transmittance of sheet materials to ASTM E424 Method A, ASTM E903 including calculations to ISO 9050

3.53 Broad-band visible light measurements

.01 Transmittance

Measurements of luminous transmittance with incandescent lamps
including test and examinations for compliance with -
ADR 8/01, AS 4174, AS/NZS 2080, AS/NZS 3957, ANSI Z26.1, ASTM D 1003, AFAMRL-TR-85-016, BS 857:1967, BS AU 178a:1992, EN 15152, EN 2155-9, JIS R 3211, JIS R 3212, JIS K 7136, JIS K 7361-1, UN/ECE 43, CIE 38, ISO 3538,

ISO 13468-1, ISO 14782
with least uncertainties of measurement of -
0.01

.02 Reflectance

Measurements of luminous reflectance with incandescent lamps on plane mirrors
including test and examinations for compliance with -
ADR 14/02, UN-ECE 46 and 81
with least uncertainties of measurement of -
0.01 for measured values greater than 0.80 or less than 0.20
0.02 for measured values between 0.20 and 0.80

.06 Haze

Measurement of haze/wide angle scatter
including test and examinations for compliance with ASTM D1003, ISO 12311, ISO 12312-1 and EN 15152
with least uncertainties of measurement of -
0.1% at 0% haze, rising to 0.45% at 20% haze and 0.65% at 40% haze

3.54 Spectral measurements of light sources

.02 Spectral irradiance

including test and examinations for compliance with -
AS 4004, CIE 13.3, IEC 60601-2-41
with least uncertainties of measurement of -
0.3nm in wavelength
18% at 280 nm falling to 2.0% at 380 nm, 1% at 555 nm and rising to 2.4% at 830 nm in spectral irradiance

.03 Chromaticity

including test and examinations for compliance with -
AS 4004, AS/NZS 2144, AS 4191, AS 4192, CIE 13.3, IEC 60601-2-41,
ADR 1/00, 6/00, 45/01, 46/00, 49/00, 50/00, 52/00, 53/00, 54/00, 55/00, 60/00, 74/00,76/00, 77/00 and
UN-ECE 1, 2, 5, 6, 7, 8, 19, 20, 23, 31, 38, 50, 56, 57, 72, 76, 87, 91, 98 and IES LM-79
with least uncertainties of measurement of -
0.0015 in chromaticity
0.06 in CIE colour rendering index

.04 Correlated colour temperature

including test and examinations for compliance with -
AS 4004, CIE 13.3, IEC 60601-2-41 and IES LM-79
with least uncertainties of measurement of -
15K in the region of 2856K rising to 150K at 5500K and 1 200K at 12000K

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