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|  <b>BOSCH</b><br><b>Security Systems</b><br>P.O. Box 80002<br>5600 JB Eindhoven,<br>The Netherlands | <b>Product Tests Report</b><br>MIC IP starlight 7100i and MIC IP ultra 7100i | 14 May 2021  |
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## Product Tests Report

Product name: MIC IP starlight 7100i | MIC IP ultra 7100i | MIC inteox 7100i 8MP | MIC inteox 7100i 2MP

Model number and description:

MIC-7522-Z30B, PTZ 2MP HDR 30x IP68 black  
MIC-7522-Z30W, PTZ 2MP HDR 30x IP68 white  
MIC-7522-Z30G, PTZ 2MP HDR 30x IP68 grey  
MIC-7522-Z30BR, PTZ 2MP HDR 30x IP68 enhanced black  
MIC-7522-Z30WR, PTZ 2MP HDR 30x IP68 enhanced white  
MIC-7522-Z30GR, PTZ 2MP HDR 30x IP68 enhanced gray  
MIC-7504-Z12BR, PTZ 8MP 12x IP68 enhanced black  
MIC-7504-Z12WR, PTZ 8MP 12x IP68 enhanced white  
MIC-7504-Z12GR, PTZ 8MP 12x IP68 enhanced gray  
MIC-7604-Z12BR, PTZ 8MP 12x enhanced black  
MIC-7604-Z12WR, PTZ 8MP 12x enhanced white  
MIC-7604-Z12GR, PTZ 8MP 12x enhanced gray  
MIC-7602-Z30B PTZ 2MP 30x starlight black  
MIC-7602-Z30W PTZ 2MP 30x starlight white  
MIC-7602-Z30G PTZ 2MP 30x starlight gray  
MIC-7602-Z30B PTZ 2MP 30x starlight black  
MIC-7602-Z30W PTZ 2MP 30x starlight white  
MIC-7602-Z30G PTZ 2MP 30x starlight gray  
MIC-7602-Z30BR PTZ 2MP 30x starlight enhanced black  
MIC-7602-Z30WR PTZ 2MP 30x starlight enhanced white  
MIC-7602-Z30GR PTZ 2MP 30x starlight enhanced gray  
MIC-ITS1080P-W30X6,  
MIC-ITS1080P-G30X6,  
MIC-ITS1080P-WE30X6,  
MIC-ITS1080P-GE30X6,  
MIC-ITS4K-WE12X6,  
MIC-ITS4K-GE12X6,  
MIC-ITS1080P-B30X7,  
MIC-ITS1080P-W30X7,  
MIC-ITS1080P-G30X7,  
MIC-ITS1080P-BE30X7,  
MIC-ITS1080P-WE30X7,  
MIC-ITS1080P-GE30X7,  
MIC-ITS4K-BE12X7,  
MIC-ITS4K-WE12X7,  
MIC-ITS4K-GE12X7,  
MIC-7604-Z12BR-OC,  
MIC-7604-Z12WR-OC,  
MIC-7604-Z12GR-OC,

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MIC-7602-Z30BR-OC,

MIC-7602-Z30WR-OC,

MIC-7602-Z30GR-OC,

The above-mentioned Bosch Security Systems product has been tested in accordance and was found to comply with the tests listed below which were carried out during the development phase of the product. Please note that for some tests, test conditions exceed the range that Bosch recommends for effective continuous operation of the camera.

Data subject to change without notice.

#### ENVIRONMENTAL TEST

| BS EN 50130-5:1999 Alarm systems Part 5: Environmental test methods  | Specific Test Description<br>(Temperatures stated are outside of the camera housing)   | Comments  | Passed |
|--|--|---|--------|
| Dry heat Operational<br>IEC-60068-2-2, edition 6.0 (2007-07-16)  | Temp. +70 °C, duration 48 hours  | Illuminator included.                                 | Yes    |
| Dry heat Storage<br>IEC-60068-2-2, edition 5.0 (2007-07-16)  | Temp. +70 °C, duration 4 hours   | Illuminator included.                                 | Yes    |
| Cold storage<br>IEC-60068-2-1, edition 6.0 (2007-03-13)  | Temp. -40 °C, duration 4 hours   | Illuminator included.                                 | Yes    |
| Cold operational<br>IEC-60068-2-1, edition 6.0 (2007-03-13)  | Temp. -40 °C, duration 48 hours  | Illuminator included.                                 | Yes    |
| Cold start test  | Power off, soak (4 hours) @ -40 °C, power up unit, unit must power up & function normally within < 50 minutes.   | Illuminator included.                                 | Yes    |
| Cold Operational Endurance<br>IEC-60068-2-1, edition 6.0 (2007-03-13)  | Temp -40 °C, Duration 48 hours   | Illuminator included.                                 | Yes    |
| Damp Heat (Operational)<br>IEC-60068-2-30, edition 3.0 (2005-08-10)  | 70 °C / 95 %RH for 6 hours, 35 °C/85% RH for 16 hours. Repeat for 5 cycles total.  | Illuminator included.                                 | Yes    |
| IEC 60529 Ingress Protection Rating (IPxx)<br>Degrees of protection provided by enclosures (IP Code) [Dust, water ingress (operational)] | (Camera with mounting adaptor)<br>Dust tight (no dust ingress; complete protection against contact).<br>Water immersion: 24 hours<br>Water depth: 1.8 meters     | IP68<br>Illuminator included.                         | Yes    |
| IEC 60529 Ingress Protection Rating (IPxx)<br>Degrees of protection provided by enclosures (IP Code) [Dust, water ingress (operational)] | (Camera with MIC-IP67-5PK kit)<br>Dust tight (no dust ingress; complete protection against contact).<br>Water immersion: 30 minutes<br>Water depth: 1 meter      | IP67<br>Illuminator included.                         | Yes    |
| UL Type rating (similar to NEMA XX)  | Water immersion: 24 hours<br>Water depth: 1.8 meters   | Type 6P (UL)<br>Illuminator included.                 | Yes    |
| Salt Mist Spray<br>ISO 12944-6: C5-M (High); Aluminum Housing Components   | 1440 hrs at 35 °C, 5 parts Sodium Chloride and 95 parts water, then 720 hrs at 38%, D.I Water  | Illuminator included last 440 hrs.                    | Yes    |
| External Mechanical Impact<br>(IK Code or Impact rating)<br>IEC 62262:2002-02  | IK10- Energy 20J, 5.05 kg steel mass test slug, 50 mm striking radius, drop height 0.4037 m 5 drops per side, impact 5 sides, 25 total impacts. Excludes window. | Fully functional after all impacts and cycling power. | Yes    |
| Vibration sinusoidal operational<br>IEC 60068-2-6:1995<br>Test Fc: Vibration (sinusoidal), 10m/s <sup>2</sup> (1.0G)                     | Freq. Range 10-150Hz, 10m/s <sup>2</sup> , 3 axes, sweep rate 1 octave/m 20 sweeps/axis, (1.0g)  | 0.5G on canted unit                                   | Yes    |
| Sinusoidal vibration test<br>IAW MIL-STD-167-1A  | Exploratory Test 4Hz - 25Hz @ .01-in single amplitude (.02-in DAD)<br>1Hz frequency intervals for (15) second dwells.  |   | Yes    |

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| BS EN 50130-5:1999 Alarm systems Part 5:<br>Environmental test methods | Specific Test Description<br>(Temperatures stated are outside of the<br>camera housing)  | Comments                                     | Passed |
|--|--|--|--------|
|  | Variable Frequency Test 4Hz - 15Hz @ .03-in single amplitude (.06-in DAD)<br>16Hz - 25Hz @ .02-in single amplitude (.04-in DAD)<br>1Hz frequency intervals for (5) minute dwells.<br><br>Endurance Testing 25Hz @ .02-in single amplitude (.04-in DAD)<br>The duration of Endurance Testing is to be 2 hours total, and should be performed at each frequency of prominence identified in the Exploratory and Variable Freq Tests previously performed |  |        |
| Shock operational<br>IEC 60068-2-27:4.0 2008-02                        | Shock, Half Sine Impulse, 11ms, 45G, non-repetitive shocks (three shocks in each axis and in each direction)   | Illuminator included.<br>20G on canted units | Yes    |
| Vibration, Sinusoidal<br>NEMA TS-2-2003, Section 2.2.8                 | Frequency range: 5 to 30 Hz, Number of axes: 3, Sweep rate: Resonant Search: 1 full sweep within a period of 12.5 min.<br>Endurance: 1 octave x min-1. Amplitude: Resonant Search: 0.015in. double amplitude (pk-pk) displacement<br>- Endurance: 0.5g (5 m/s <sup>2</sup> )   | Illuminator included.                        | Yes    |
| Wind speed (160mph wind tunnel test)                                   | Camera only, MIC sunshield, MIC illuminator Sustained 120-150 mph winds for a 40 minute period without structural damage or loss of video or PTZ function.   | Illuminator and sunshield included.          | Yes    |
| Sound level (audible noise)  | < 65 dB  |  | Yes    |
| Transportation Tests (ISTA 2A)   | Cycles per min. (rpm) 285, Frequency 4,75Hz, Duration 50 minutes   |  | Yes    |
| Transportation Tests (ISTA 2A (modified))                              | ISTA - 0.810 m free fall drop<br>10 faces/edge/corner of box   |  | Yes    |

#### ADDITIONAL CERTIFICATIONS

| Functional tests description   | Description   | Comments            | Passed |
|--|---|---------------------|--------|
| SMPTE 274M-2008 Standard<br>3840 x 2160 Image Sample Structure, Digital Representation and Digital Timing Reference Sequences for Multiple Picture Rates | Resolution: 3840x2160<br>Scan: Progressive<br>Color representation: complies with ITU-R BT.709<br>Aspect ratio: 16:9<br>Frame rate: 25 and 30 frames          | For 4K cameras      | Yes    |
| 1920 x 1080 Image Sample Structure, Digital Representation and Digital Timing Reference Sequences for Multiple Picture Rates                             | Resolution: 1920x1080<br>Scan: Progressive<br>Color representation: complies with ITU-R BT.709<br>Aspect ratio: 16:9<br>Frame rate: 25, 30, 50 and 60 frames/ | For HD cameras      | Yes    |
| SMPTE 296M-2001 Standard<br>1280 x 720 Progressive Image Sample Structure - Analogue and Digital Representation and Analogue Interface                   | Resolution: 1280x720<br>Scan: Progressive<br>Color representation: complies with ITU-R BT.709<br>Aspect ratio: 16:9<br>Frame rate: 25, 30, 50 and 60 frames/s | For HD cameras      | Yes    |
| Conformant with NTCIP protocols 1205, 2301, 1101:1996, 2202:2001, 2101:2001, 2102:2003   |   | For ITS models only | Yes    |
| Conformant with Open Network Video Interface Forum (ONVIF)   | Interoperability between network video products, regardless of manufacturer Profile S, Profile G, Profile T   |                     | Yes    |

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**ADDITIONAL ENVIRONMENTAL – FUNCTIONAL BOSCH TESTS**

| Environmental test methods  | Specific Test Description   | Comments              | Passed |
|---|---|-----------------------|--------|
| MTBF calculation of used components<br>Based on: for electronics, MIL-HDBK-217FN1,<br>GB, GC, 25 °C.<br><i>MIC IP starlight 7100i (MIC-7522-Z30x)</i> | Camera only: MTBF 108,063 hours<br>Camera + illuminator: MTBF 87,738 hours  |                       | Yes    |
| MTBF calculation of used components<br>Based on: for electronics, MIL-HDBK-217FN1,<br>GB, GC, 25 °C<br><i>MIC IP starlight 7100i (MIC-7522-Z30xR)</i> | Camera only: MTBF 107,947 hours<br>Camera + illuminator: MTBF 83,718 hours  |                       | Yes    |
| MTBF calculation of used components<br>Based on: for electronics, MIL-HDBK-217FN1,<br>GB, GC, 25 °C.<br><i>MIC IP ultra 7100i (MIC-7504-Z12xR)</i>    | Camera only: MTBF 109,116 hours<br>Camera + illuminator: MTBF 84,420 hours  |                       | Yes    |
| HALT (Highly Accelerated Life Test)   | Ambient Operational Test: +25 °C<br>Completed: 11/26/2013<br><br>HALT LOL/UOL Voltage Test:<br>1 - Step mains voltage down from nominal<br>24VAC by 2 volts every 5 minutes until<br>operational failure and/or destruct failure.<br>Completed: 01/22/2014*<br><br>2 - Step mains voltage up from nominal 24<br>VAC by 2 volts every 5 minutes until<br>operational failure and/or destruct failure.<br>Completed: 01/24/2014*<br><br>HALT LOL/UOL Temperature Test:<br>1 - Step temperature down from -40 °C by 5<br>°C every 4 hours (minimum) until operational<br>failure and/or destruct failure.<br>Completed: 01/16/2014*<br><br>2 - Step temperature up from +40 °C by 5 °C<br>every 4 hours (minimum) until operational<br>failure and/or destruct failure.<br>Completed: 01/23/2014*<br><br>HALT Vibration Test:<br>1 - The DUT is initially vibrated at<br>acceleration level of 5g (rms) for minimum<br>period of at least 10 minutes. After 10<br>minutes' exposure, the DUT is tested<br>operationally and results are recorded. The<br>operating vibration level is then increased by<br>5g (rms) and the process is repeated for the<br>next step in the test. This sequence is<br>repeated until the DUT fails operational<br>testing or the test level reaches 50g (rms).<br><br>COLD Start Test:<br>1 - Set chamber temperature at -45 °C.<br>Power removed from test unit for minimum<br>period of 5 hours, then operate the test<br>switch to restore power. The test unit shall<br>complete its start-up sequence and then<br>resume operation. Completed: 11/27/2013 | Illuminator included. | Yes    |

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| Environmental test methods                                      | Specific Test Description   | Comments              | Passed |
|---|---|-----------------------|--------|
| NEMA TS-2 Traffic Controller Assemblies with NTCIP Requirements | TS 2 Section 2.2.7 Transients, Temperature, Voltage, and Humidity Tests (74 °C)               |                       | Yes    |
| NEMA TS-2 Traffic Controller Assemblies with NTCIP Requirements | TS 2 Section 2.2.8 Vibration - 5-30 Hz, 0.5g, Resonant Frequency Search 1 hour endurance test | Illuminator included. | Yes    |
| NEMA TS-2 Traffic Controller Assemblies with NTCIP Requirements | TS 2 Section 2.2.9 Shock (Impact) Test Half Sine Impulse, 11ms, 10g                           | Illuminator included. | Yes    |
| Mil-Std-810-G, 510.5  | Sand and Dust   |                       | Yes    |
| Mil-Std-810-G, 506.5  | Rain  |                       | Yes    |
| Mil-Std-810-G, 505.5  | Solar Radiation   |                       | Yes    |
| Mil-Std-810-G, 501.5  | High Temperature  |                       | Yes    |
| Mil-Std-810-G, 502.5  | Low Temperature   |                       | Yes    |
| Mil-Std-810-G, 503.5  | Temperature Shock   |                       | Yes    |
| Mil-Std-810-G, 509.5  | Salt Fog  |                       | Yes    |

#### Approvals Safety, EMC and Environmental

| Specific Approval   | Description  | Comments              | Passed        |
|---|--|-----------------------|---------------|
| <b>EMC Europe</b>   |  |                       | <b>Passed</b> |
| Directive 2014/30/EU  | EMC Directive- Electromagnetic compatibility (recast) Text with EEA relevance  | Illuminator included. | Yes           |
| EN 50130-4:2011   | Part 4: Electromagnetic compatibility - Product family standard: Immunity requirements for components of fire, intruder and social alarm systems.                                    | Illuminator included. | Yes           |
| EN 50121-4:2016   | Railway applications   | Illuminator included. | Yes           |
| EN 55032  | Radiated and Conducted Emissions   | Illuminator included. | Yes           |
| EN 61000-4-2  | ESD Susceptibility   | Illuminator included. | Yes           |
| EN 61000-4-3  | Radiated electromagnetic fields  | Illuminator included. | Yes           |
| EN 61000-4-4  | Electrical Fast Transient (EFT) Burst  | Illuminator included. | Yes           |
| EN 61000-4-6  | Conducted Immunity   | Illuminator included. | Yes           |
| <b>EMC USA</b>  |  |                       | <b>Passed</b> |
| CFR 47 FCC part 15 Class A  | Conducted + Radiated Emission based on VERIFICATION procedure  | Illuminator included. | Yes           |
| Mains Voltage Tolerance Test (Brown out supply voltage test)                          | Camera fully operational down to 105V (230 V PSU) and 55V (120V PSU). Below this voltage, the camera is not operational. Camera must be power- cycled for the camera block to reset. | Illuminator included. | Yes           |
| <b>Safety Europe</b>  |  |                       | <b>Passed</b> |
|   | Low Voltage Directive (LVD) - Electrical equipment designed for use within certain voltage limits Text with EEA relevance  | Illuminator included. | Yes           |
| IEC 60950-1:2005 (2nd Edition) + A1:2009<br>EN 60950-1:2006/A11:2009/A1:2010/A12:2011 | Information technology equipment – Safety – Part 1: General requirements   | Illuminator included. | Yes           |
| IEC 62368-1   | Safety standard for Information Technology Equipment and Audio/Video Equipment.  | Illuminator included  | Yes           |
| <b>Safety USA + Canada</b>  |  |                       | <b>Passed</b> |
| UL 60950-1 (2nd edition dated March 27, 2007; revised December 19, 2011)              | UL listing + cUL listing. Information technology equipment – Safety – Part 1: General requirements   | Illuminator included. | Yes           |

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| Specific Approval  | Description                                     | Comments             | Passed |
|--|---|----------------------|--------|
| CAN/CSA-C22.2 No.E60950-1<br>(CSA C22.2 No. 60950-1-07, R2012) |   |                      |        |
| International<br>CISPR 32                                      | Product market with BOSCH supplier code<br>N663 | Illuminator included | Yes    |

| Environmental   |  |  | Passed |
|---|--|--|--------|
| Restriction of Hazardous Substances   | ROHS complaint   | Illuminator and<br>sunshield included. | Yes    |
| Prohibited and declarable substances in<br>products, components, materials and<br>preparations. | Manufacturer's declaration database based<br>on N 2580-1                       | Illuminator and<br>sunshield included. | Yes    |
| IEC 60950-22  | Part 1: General requirements   |  | Yes    |
| UL 60950-22<br>EN 60950-22<br>UL 50E  |  |  | Yes    |
| Condensation testing* (inside glass)  | 25 °C / 50 %RH for 1 hour, 5 °C/50% RH for<br>1 hour, -30°C/50% RH for 1 hour. | Illuminator included.                  | Yes    |
| Defrosting testing*   | 1/8" ice buildup defrosted   |  | Yes    |

\*Not on MIC-7522-Z30x cameras

#### Functional and specification test

| Functional tests description |  | Comments |
|------------------------------|--|----------|
| Camera Performance           | Refer to the appropriate camera datasheet:<br>MIC IP starlight 7100i<br>MIC IP ultra 7100i<br>MIC inteox 7100i - 8MP<br>MIC inteox 7100i - 2MP<br>MIC inteox 7100i - 8MP OC<br>MIC inteox 7100i - 2MP OC |          |
| Illuminator Performance      | Refer to the datasheet for MIC IP 7100i<br>Illuminator.  |          |

The product is produced by a manufacturing organization which is certified on **ISO9001** and **ISO14001** standards.