Today’s healthcare environments need lighting fixtures that satisfy a wide range of demanding requirements, from pleasing design to superior optical performance and the ability to meet a variety of environmental and safety criteria.

Kenall has applied its industry-leading expertise in fabricating fixtures for demanding environments to a family of healthcare lighting systems that sets new benchmarks for performance, durability and value; providing solutions for:

- Patient Rooms
- Operating Rooms
- Public Corridors
- Stairwells
- Building Entryways

Whether your project requires fixtures that stand up to the most rigorous cleaning protocols, maintain critical environmental barriers, or light operating rooms effectively without disturbing sensitive electrical equipment, you can specify Kenall with complete confidence.

That’s because Kenall has been dedicated to project success and customer satisfaction for over 40 years, consistently offering the highest quality and best value. In fact, many of our products are covered by Kenall’s Peace of Mind Lifetime Guarantee™, ensuring our fixtures will function as intended for the lifetime of the installation.

Discover the difference healthcare lighting from Kenall can make.
OPERATING ROOM LIGHTING
The industry’s first lighting system to meet MIL Standard 461E with electronic dimming ballasts for T8 and T5HO lamps. The new optical system meets IES RP-29 recommended lighting levels. Also available with green phosphor lamps. NSF Splash Zone listed. Patents pending. See pages 18-25.

PATIENT ROOM LIGHTING
These new architecturally designed multi-function patient room lighting fixtures are offered in two separate optical system designs – one optimized for T8 lamps and the other optimized for T5HO lamps. Available with optional IP65 rated and NSF-49 listed ingress barrier door. NSF Splash Zone listed. See page 5.

UNDERCABINET LIGHTING
The new Stratalume Connects™ series is available as individual fixtures or continuous row lighting systems. The new design with extruded aluminum housings minimizes both installation and maintenance tasks. NSF splash zone listed. See pages 16-17.

THRU WALL STEPLIGHT
Thru wall nightlight or high lumen steplight provides illumination on both sides of a wall. Available with LED and fluorescent lamps. LED version has calibrated brightness level adjustment dial for field adjustability. See pages 8 and 34.

OVER THE SINK LIGHTING
The extruded aluminum housing with die-cast aluminum end caps is both sleek and versatile. Ideal for over the sink, patient room, or corridor and stairwell lighting.

QUARTZ EXAM LIGHT
This 250-watt tungsten halogen system provides powerful exam lighting. Available with symmetrical or asymmetrical optical systems. See page 7.

MRI ROOM LIGHTING
100% aluminum construction will not interfere with powerful MRI equipment. Now available with UL listed DC operation (7.5" size).

METREX™ EXIT SIGNS
Available in single face wall or universal mount, and double face universal mount. IP64 rated and Wet Location listed. Peace of Mind Lifetime Guarantee™ against breakage.
Patient rooms pose a difficult lighting specification challenge, requiring attractive, durable and economical systems capable of multiple illumination functions. Kenall has developed two systems specifically designed to meet these challenges – MedMaster™ and Residence™.

**LIGHTING FOR DIFFERENT TASKS**

Patient rooms require different levels of lighting: general illumination, patient exam lighting, and patient reading.

For ceiling applications, Kenall’s MedMaster series includes individual task specific, or multi-function recessed fixtures.

For wall mount applications, the MedMaster Flip Open system provides ambient, exam, and reading light. The Up/Down (non Flip Open) and the attractive Residence valance system provides indirect ambient and reading light. All three series offer options such as a nightlight, nurse’s chart light, grounded receptacles, and a number of control options.

**THE FINEST QUALITY**

Maintaining the Kenall tradition of quality, only the finest materials are used in these fixtures. All ceiling mounted units feature one-piece, seam welded housings constructed of powder-coated cold rolled steel. Wall mounted units utilize a combination of extruded and die-cast aluminum pieces, and include DR acrylic lenses for unsurpassed durability. These materials make Kenall’s Patient Room fixtures the highest quality of their type in healthcare lighting.

**HIGH PERFORMANCE ILLUMINATION**

The MedMaster ceiling mounted ambient fixtures feature glare-free illumination, producing a comfortable residential feel.

Patient exam fixtures feature illumination levels with plenty of punch. For patient reading, uniform glare-free illumination levels are standard.

Kenall’s MedMaster series combines sound optical design and the finest materials to produce superior photometric performance, meeting IES RP-29-06 requirements for patient room lighting.

**EASY TO CLEAN**

Featuring standard antimicrobial polyester powder coating and a 1,000 hour salt spray tested finish, these systems stand up to the toughest cleaning protocols. Specify the IP65 ingress barrier door – a seal against dust, dirt and moisture – with any ceiling mounted patient room fixture for even easier maintenance.
**MedMaster™ PATIENT ROOM**

**MedMaster™**

SERIES MPCAIE / MPCADE
Ambient/Reading/Exam Light
Ceiling Mount
Nominal 2’x4’

**HOUSING**
- Recessed 1” grid, flange or surface mount
- Antimicrobial 1,000 hour salt spray tested powder coat finish
- 20-gauge cold rolled steel housing with seam welded corners
- 18-gauge cold rolled steel flange
- MPCAIE – Exam compartment shielded by perforated steel with pearlescent acrylic diffuser
- MPCADE – Exam compartment shielded by clear prismatic refractor

**ELECTRICAL**
- MPCAIE – 2 compartments: Ambient (one T5HO lamp) and Exam (two T5HO lamps)
- MPCADE – 2 compartments: Ambient (two T8 lamps) and Exam (two or four T8 lamps)
- Toolless re-lamp capability

**LISTINGS**
- UL and CUL listed for Damp Locations
- UL and CUL Wet Location listed and IP65 Classified with Ingress Barrier

**OPTIONS**
- Ingress barrier door (IP65)
- Interim lighting for generator backup systems
- RFI protection
- LED nightlight
- Integrated dual reading lights for shadowless reading (MR16 quartz halogen)
- Integral low voltage controller

**Low Voltage Controller (LVC)**

**MPCAIE T5HO Version with Ingress Barrier (IB) Option Shown**

**MPCADE T8 Version**

**MPCAIE T5HO Cross Section with Ingress Barrier Door**

**MPCADE T8 Cross Section with Ingress Barrier Door**
MedMaster™ PATIENT ROOM

MedMaster™

SERIES MPC
Ambient/Reading/Exam
Ceiling Mount
Nominal 2'x4'

HOUSING
- Recessed 1” grid, flange or surface mount
- Antimicrobial 1,000 hour salt spray tested powder coat finish
- 20-gauge cold rolled steel housing with seam welded corners
- 18-gauge cold rolled steel flange
- Exam compartment shielded by sliding semi-specular aluminum louver
- Lamp breakage shielding standard

ELECTRICAL
- 3 compartments: Reading (one lamp), Ambient (one or two lamps) and Exam (three or four lamps)
- Designed to accommodate multiple biaxial lamps for maximum efficiency
- Toolless re-lamp capability

LISTINGS
- UL and CUL listed for Damp Locations
- UL and CUL Wet Location listed and IP65 Classified with Ingress Barrier

OPTIONS
- Ingress barrier door (IP65)
- Interim lighting for generator backup systems
- RFI protection
- LED nightlight
- Chart light
- Integral low voltage controller

ADDITIONAL PRODUCT RECOMMENDATIONS (Ingress Barrier Door Option available for all ceiling mount fixtures)

Series MPCAE
Ambient/Exam (2’x4’)
Provides both a soft ambient glow and an exam light from a single fixture.

Series MPC
Reading/Ambient (2’x2’)
Soft ambient and comfortable reading light from a single fixture.

Series MEC
Exam (2’x2’)
Ideal light for examining patients.

Series MAC
Ambient (2’x2’ and 2’x4’)
Comfortable indirect lighting from either a 2’x2’ or 2’x4’ fixture.
Residence™

SERIES MPWVT / MPWVC
Valance Ambient/Reading Light
Wall Mount
Nominal 8”x24”, 8”x36”, 8”x48”

HOUSING
• Choice of traditional or contemporary valance styles
• Extruded aluminum housing
• Antimicrobial 1,000 hour salt spray tested powder coat finish

ELECTRICAL
• Designed to accommodate the latest and most efficient lamps and ballasts – T5, T5HO and T8 lamps
• Quick connect/disconnect circuits
• Modular gear tray attaches to baseplate

LENS
• P12 acrylic lens
• Internal prisms with smooth exterior for even illumination and ease of maintenance

LISTINGS
• UL and CUL listed for Damp Locations

OPTIONS
• Hospital grade grounded outlet
• Electronic dimming ballast for ambient lighting component
• Emergency shut off switch in case of accidental impact
• RFI protection
• Chart lights
• Integral low voltage controller

ADDITIONAL PRODUCT RECOMMENDATIONS

Series MEC
Asymmetric Exam (8”x48” T5HO and 12”x48” T8)
When used in pairs, the asymmetric distribution lights the patient evenly from both sides of the bed. Ingress Barrier Door option available.

Series MEC1212
Quartz Symmetric Exam (12”x12”)
A 250 watt tungsten halogen lamp provides powerful exam lighting.

Series MEC1212
Quartz Asymmetrical Exam (12”x12”)
The asymmetric design provides excellent exam lighting without direct glare.
**MedMaster™ PATIENT ROOM**

**MedMaster™**

**SERIES MPWF**  
Flip Open Ambient/Reading/Exam  
Wall Mount  
Nominal 5"x24", 5"x36", 5"x48"

**HOUSING**  
- Extruded aluminum with die-cast aluminum end caps  
- Antimicrobial 1,000 hour salt spray tested powder coat finish

**ELECTRICAL**  
- Designed to accommodate the latest and most efficient lamps and ballasts – T5, T5HO and T8 lamps  
- Quick connect/disconnect circuits

**LENS**  
- High performance extruded linear DR acrylic lens (50/50 blend) with internal flutes  
- Smooth exterior for ease of maintenance  
- Gently fluted inner surface provides even illumination and reduces glare

**LISTINGS**  
- UL and CUL listed for Damp Locations

**OPTIONS**  
- Hospital grade grounded outlet  
- Electronic dimming ballast for ambient lighting component  
- Emergency shut off switch in case of accidental impact  
- RFI protection  
- Chart lights  
- Integral low voltage controller

**ADDITIONAL PRODUCT RECOMMENDATIONS**

**SoftStep™**

**SERIES MSL**  
Steplight  
Choice of soft low lumen nightlight for patient rooms or high lumen steplight for corridors and pathways. LED option includes field adjustable light level control.

**SERIES MSLD**  
Steplight with Duplex Outlet  
Soft low lumen nightlight for patient rooms or high lumen steplight for corridors and pathways with hospital-grade duplex outlet.

**SERIES MSLT**  
Thru Wall Steplight  
Thru wall nightlight or high lumen steplight provides illumination on both sides of a wall. Calibrated for field adjustable LED light level control.
HOUSING
- Extruded aluminum with die-cast aluminum end caps
- Antimicrobial 1,000 hour salt spray tested powder coat finish

ELECTRICAL
- Designed to accommodate the latest and most efficient lamps and ballasts – T5, T5HO and T8 lamps

LENS
- High performance extruded linear 50% DR acrylic lens with internal flutes
- Smooth exterior for ease of maintenance
- Gently fluted inner surface provides even illumination and reduces glare

LISTINGS
- UL and CUL listed for Damp Locations

OPTIONS
- Hospital grade grounded outlet
- Ground fault outlet
- Electronic dimming ballast
- Emergency shut off switch in case of accidental impact
- RFI protection
- Chart lights
- Rocker switch
- Integral low voltage controller

ADDITIONAL PRODUCT RECOMMENDATIONS

Series MEC
Asymmetric Exam
(8"x48" T5HO and 12"x48" T8)
When used in pairs, the asymmetric distribution lights the patient evenly from both sides of the bed; Ingress Barrier Door option available.

Series MEC1212
Quartz Symmetric Exam
(12"x12")
A 250 watt tungsten halogen lamp provides powerful exam lighting.

Series MEC1212
Quartz Asymmetrical Exam
(12"x12")
The asymmetric design provides excellent exam lighting without direct glare.
TYPICAL CEILING MOUNT LAYOUT
EXAM/AMBIENT/READING (MULTI-FUNCTION)

Distribution Patterns

Exam
Ambient/Reading

PHOTOMETRIC PLAN VIEWS – MPCAIE

Exam (3 T5HO)

Recommended
Avg. fc
50-100
5-10

MedMaster
Avg. fc Produced
74 @ 30° AFF
22 @ 30° AFF

PHOTOMETRIC PLAN VIEWS – MPCADE

Exam (6 F32T8)

Recommended
Avg. fc
50-100
5-10

MedMaster
Avg. fc Produced
73 @ 30° AFF
21 @ 30° AFF

Typical Patient Room

12’ x 12’ Area, 8’6” Mounting Height, 18” Off Head Wall
80/50/20 Room Reflectance, .80 LLF (Source: IESNA RP-29-06)
Catalog No. MPCAIE-X-F54T5HO or MPCADE-X-F32T8

STAT AREA

MPCAIE

Exam
74
48
1.5:1
2.0:1

Ambient
22
13
1.8:1
2.6:1

Ambient at Reading Plane
33
22
1.5:1
2.2:1

MPCADE

Exam
73
50
1.5:1
1.8:1

Ambient
21
13
1.6:1
2.1:1

Ambient at Reading Plane
28
21
1.3:1
1.8:1

Recommended

MedMaster

Avg. fc
Avg. fc Produced

50-100
5-10

50-100
5-10

50-100
5-10

50-100
5-10

AVG/ MAX
MIN
AVG/ MAX
MIN
AVG/ MAX
MIN
AVG/ MAX
MIN

50-100
5-10

Exam Ambient/Reading

Series MPCAIE

Series MPCADE
**Typical Patient Room**

12’ x 12’ Area, 8’6” Mounting Height, 6” Off Head Wall
80/50/20 Room Reflectance, .80 LLF (Source: IESNA RP-29-06)
Catalog No. MPC24-X-55B

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<td>50</td>
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**Distribution Patterns**

- **Exam**
- **Ambient**
- **Reading**

**Recommended MedMaster Avg. fc Avg. fc Produced**

- Exam: 63 @ 30” AFF
- Ambient: 24 @ 30” AFF
- Reading: 24 @ 45°, 47” AFF

**Exam/Ambient (4 Biax/2 Biax)**

**Reading/Ambient (1 Biax/2 Biax)**

**Exam/Ambient/Reading (4 Biax/2 Biax/1 Biax)**
### TYPICAL WALL MOUNT LAYOUT

**Exam/Ambient/Reading**

#### Distribution Patterns
- Exam – Ceiling
- Ambient – Wall
- Reading – Wall

#### Typical Patient Room
- **12'x12'' Area, 6' Mounting Height**
- **80/50/20 Room Reflectance, 80 LLF** (Source: IESNA RP-29-06)
- **Catalog No. MEC848-X-F54T5HO, MPWUD-F32T8**

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**Series MPWUD**

**Series MEC848**

**Recommended**

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**Recommended**

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<td>82</td>
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### PHOTOMETRIC PLAN VIEWS

**Exam (2 T5HO Per Fixture)**

**Ambient (2 F32T8)**

**Reading – 1' x 3' Calc Plane @ 45°, 47” AFF (1 F32T8)**

**Reading/Ambient (1 F32T8/2 F32T8)**

**Exam/Ambient/Reading (2 T5HO/2 F32T8/1 F32T8)**
TYPICAL WALL MOUNT LAYOUT
EXAM/AMBIENT/READING

Series MPWF

Typical Patient Room
12’x12” Area, 6’ Mounting Height
80/50/20 Room Reflectance, .80 LLF (Source: IESNA RP-29-06)
Catalog No. MPWF-F28T5

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Distribution Patterns

Exam  | Ambient  | Reading

PHOTOMETRIC PLAN VIEWS

Exam (2 F28T5/1 F28T5)  

Recommended

 Avg. fc  |  MedMaster  Avg. fc Produced
50-100  |  65 @ 30° AFF

MedMaster  
Avg. fc Produced
34 @ 30° AFF

Reading/Ambient (1 F28T5/2 F28T5)

Recommended

 Avg. fc  |  MedMaster  Avg. fc Produced
5-10   |  13 @ 30° AFF

MedMaster  
Avg. fc Produced
20-50  |  64 @ 45°-47° AFF

Recommended

 Avg. fc  |  MedMaster  Avg. fc Produced
5-10   |  13 @ 30° AFF

MedMaster  
Avg. fc Produced
20-50  |  64 @ 45°-47° AFF
TYPICAL WALL AND CEILING MOUNT LAYOUT
EXAM/AMBIENT/READING

Typical Patient Room
12’ x 12’ Area, 6’ Wall Mounting Height, 8’6” Ceiling Mounting Height
80/50/20 Room Reflectance, .80 LLF (Source: IESNA RP-29-06)
Catalog No. MEC848-X-F54T5HO, MPWV-F32T8

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Distribution Patterns
Exam – Ceiling
Ambient – Wall
Reading – Wall

PHOTOMETRIC PLAN VIEWS

Exam (2 T5HO Per Fixture)

Recommended
Avg. fc
50-100

MedMaster
Avg. fc Produced
61 @ 30” AFF

Ambient (2 F32T8)

Recommended
Avg. fc
5-10

MedMaster
Avg. fc Produced
10 @ 30” AFF

Reading – 1’ x 3’ Calc Plane @ 45°, 47” AFF (2 F32T8)

Recommended
Avg. fc
20-50

MedMaster
Avg. fc Produced
29 @ 45°, 47” AFF

Reading/Ambient (2 F32T8/2 F32T8)

MedMaster
Avg. fc Produced
34 @ 30” AFF

Exam/Ambient/Reading (2 T5HO/2 F32T8/2 F32T8)

MedMaster
Avg. fc Produced
86 @ 30” AFF
TYPICAL WALL AND CEILING MOUNT LAYOUT
EXAM/AMBIENT/READING

Typical Patient Room
12’ x 12’ Area, 6’ Wall Mounting Height, 8’6” Ceiling Mounting Height
80/50/20 Room Reflectance, .80 LLF (Source: IESNA RP-29-06)
Catalog No. MEC22-X-55B, MPWUD-F28T5

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Distribution Patterns
- Exam – Ceiling
- Ambient – Wall
- Reading – Wall

PHOTOMETRIC PLAN VIEWS

Exam (4 Biax)

Recommended
Avg. fc
50-100
MedMaster
Avg. fc Produced
60 @ 30° AFF

Reading/Ambient (4 Biax/2 F28T5)

MedMaster
Avg. fc Produced
73 @ 30° AFF

Reading/Ambient (1 F28T5/2 F28T5)

Recommended
Avg. fc
20-50
MedMaster
Avg. fc Produced
37 @ 45°, 47° AFF

Reading – 1’ x 3’ Calc Plane @ 45°, 47” AFF (1 F28T5)

Recommended
Avg. fc
5-10
MedMaster
Avg. fc Produced
13 @ 30° AFF

Exam/Ambient (4 Biax/2 F28T5)

Recommended
Avg. fc
49-52
MedMaster
Avg. fc Produced
130 @ 30° AFF

Exam/Ambient/Reading (4 Biax/2 F28T5/4 F28T5)

Recommended
Avg. fc
20-50
MedMaster
Avg. fc Produced
37 @ 45°, 47° AFF

Reading – 1’ x 3’ Calc Plane @ 45°, 47” AFF (1 F28T5)

Recommended
Avg. fc
5-10
MedMaster
Avg. fc Produced
13 @ 30° AFF

Exam/Ambient/Reading (4 Biax/2 F28T5/4 F28T5)

Recommended
Avg. fc
49-52
MedMaster
Avg. fc Produced
130 @ 30° AFF

Reading – 1’ x 3’ Calc Plane @ 45°, 47” AFF (1 F28T5)
Kenall’s new Stratalume Connects™ undercabinet lighting is a flexible lighting system that can be installed as individual fixtures or continuous row systems.

The marine-grade extruded aluminum housings come with a standard antimicrobial finish in black, white or silver.

The housings with interlocking injection molded polycarbonate end caps (black or white) are available in two sizes: low profile for LEDs or T5 lamps and deep profile for T8 lamps.

Both sizes are available with solid front, cutoff lenses or wraparound lenses. The smooth 100% DR acrylic exterior lenses are gasketed and snap securely into place.

Installation of the continuous systems does not require opening the internal compartments of the fixtures. The pre-lamped housings mechanically and electrically interface, providing a clean, straightforward system that requires minimal installation time.

Molded interconnect and power cordsets are available in a variety of lengths to connect the fixtures between cabinets or around corners. Separate wiring modules are available for switching, convenience outlets and occupancy sensors.

Maintenance of Stratalume Connects is also quick and simple. The close tolerance lenses are opened without tools for easy relamping and service. The National Sanitation Foundation Splash Zone listing assures the smooth exterior of the fixture is corrosion resistant, toxin free and designed for ease of cleaning.
**STRATALUME Connects™ UNDERCABINET**

---

**STRATALUME Connects™ – SAMPLE PHOTOMETRIC REPORT**

T5 Solid Front
AUCSL
Lamp: One 28 Watt T5 (2900 Lumens)

T5 Wraparound Front
AUCDL
Lamp: One 28 Watt T5 (2900 Lumens)

---

**STRATALUME Connects™ CROSS SECTIONS**

Extruded Housing Cross Section with T5 Lamp or LEDs

---

**STRATALUME Connects™ FEATURES**

**SOLID FRONT**
Cutoff lighting ideal for non-soffit cabinets.

**WRAPAROUND FRONT**
Ideal under soffit cabinets for task and surrounding area lighting.

**LENS**
100% DR acrylic lens diffuses light and provides superior lamp image hiding.

**END CAPS**
Solid, interlocking end caps eliminate light leaks and hide fixture mounting components.

**CONTINUOUS ROW CONNECTIVITY**
Fixtures interlock to create an installer friendly system.

**EXTERNAL MOUNTING FEET**
External mounting feet allow installation without accessing internal compartments.

**POWER CONNECTIONS**
Molded interconnects and power cordsets are available in various lengths to electrically connect fixtures.

**WIRING MODULES**
Separate components house switching, convenience outlets, and motion sensors.

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1020 Lakeside Drive  Gurnee, Illinois 60031  847-360-8200  FAX 847-360-1781  www.kenall.com
LIGHTING THE OPERATING ROOM
Fixtures designed for use in operating rooms must satisfy a large number of demanding lighting and environmental requirements. Kenall’s response to this critical need is Simple Seal™ – a family of fixtures designed to meet the specialized demands of many of the most challenging healthcare applications.

THE THREE ZONES
Operating rooms are comprised of three zones: the immediate surgical area, the secondary surgical area, and the perimeter area. While the immediate surgical area’s specialized lighting instruments are often selected by the surgeons themselves, the facility design team specifies the supplementary fixtures that illuminate the other two zones. That’s where Simple Seal comes in.

STATE-OF-THE-ART ILLUMINATION
Optical systems designed specifically for surgical applications allow Simple Seal to easily meet the latest IES illuminance and contrast ratio recommendations, providing surgical teams with high quality, evenly distributed illumination that allows them to perform their tasks effectively and comfortably for hours at a time.

A NEW BENCHMARK FOR ENVIRONMENTAL PERFORMANCE
Operating room fixtures need to provide more than quality illumination – they’re also key to maintaining an OR’s environmental integrity. This means being toxin free, corrosion resistant, and able to withstand some of the most aggressive cleaning protocols imaginable. They must keep contaminants out of both the fixture and the OR itself while preventing electromagnetic interference from affecting critical surgical and life support equipment.
UNDERSTANDING SUPPLEMENTARY OPERATING ROOM LIGHTING IS CRITICAL TO THE DESIGN OF SURGICAL SUITES.

PERFORMANCE REQUIREMENTS
The following points identify the key performance characteristics required of supplementary lighting systems for operating rooms.

Effective supplementary operating room lighting systems will:
• Maximize lighting uniformity between zones.
• Provide high illuminance levels for Zones 2 and 3.
• Maintain safe levels of radiated and conducted electromagnetic emissions when equipped with electronic ballasts or dimming systems.
• Provide immunity to dangerous radiated and conducted emissions.
• Create a leak-proof barrier between the plenum and operating room.
• Be toxin free, corrosion resistant and easy to clean.

MAXIMIZE LIGHTING UNIFORMITY
All surgical operations occur in one of three zones — (1) the immediate surgical area, (2) secondary surgical area, or (3) perimeter of the room.

The most current IES Recommended Practice (RP-29-06) for hospital lighting states the need for minimal luminance contrast between zones to allow surgical teams to work effectively and in maximum comfort for extended time periods. Simple Seal™ supplementary operating room luminaires feature optical systems designed to achieve maximum luminance uniformity between all three zones.

PROVIDE HIGH ILLUMINANCE LEVELS FOR ZONES 2 & 3
Kenall’s supplementary operating room lighting systems are not only able to produce the high illuminance levels recommended for Zones 2 and 3, they provide the dimming capability long desired by surgical personnel — a capability precluded until now by EMI-based concerns that necessitated the use of far less effective three-step ballasts for illuminance control.

SURGICAL ZONES AND AVERAGE FOOTCANDLE REQUIREMENTS

The chart above shows the average maintained footcandle levels for each surgical zone.

Simple Seal™ fixtures not only meet or exceed the toughest standards in existence for each of these performance areas, they’re also the first of their type to give surgical teams the dimming capabilities they want but haven’t been able to get because of EMI issues. And Simple Seal fixtures have even been verified to prevent leakage in pressurized surgical environments.

Simple Seal: The new standard in supplementary operating room lighting.
MAINTAIN SAFE LEVELS OF RADIATED AND CONDUCTED EMISSIONS

Lighting equipment must not produce emissions that interfere with the performance of other equipment in the operating room.

For many years, military (MIL) standards have been utilized to identify dangerous electromagnetic interference (EMI) and develop testing criteria.

Professional EMI interpretation conducted by a certified, independent test laboratory is necessary to ensure appropriate and unbiased application of MIL standards for fixtures to be used in operating room settings.

Kenall’s Simple Seal™ Supplementary Operating Room Lighting Systems have been tested by EMI professionals and found to be in compliance with MIL Standard 461E. In addition, Simple Seal systems meet the tough European Certification (CE) standards, including IEC60590, that specifically address electrical devices used in operating rooms.

Simple Seal lighting systems meet MIL and CE standards for:

- Conducted Emissions
- Radiated Emissions
- Harmonic Fluctuations
- Voltage Fluctuations

Simple Seal™: The industry’s first lighting system to meet MIL STD 461E and IEC60590 with:

- Dimming Ballasts (T8 and T5HO)
- Electronic Ballasts (T8 and T5HO)
- Magnetic Ballasts
- Hybrid Ballasts

**MIL STD 461E RADIATED EMISSIONS LIMITS TESTING**

Fixtures tested by DLS Electronic Systems with F32T8 lamps and electronic dimming ballasts.

Patent-pending Kenall Simple Seal™ M2SE Series fixture with SureShield™ stainless steel mesh filter:

<table>
<thead>
<tr>
<th>Frequency (Hz)</th>
<th>Limit</th>
<th>Measured Simple Seal Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 MHz</td>
<td>60 dBuV/m</td>
<td>30 dBuV/m</td>
</tr>
<tr>
<td>30 MHz</td>
<td>50 dBuV/m</td>
<td>25 dBuV/m</td>
</tr>
<tr>
<td>100 MHz</td>
<td>40 dBuV/m</td>
<td>20 dBuV/m</td>
</tr>
</tbody>
</table>

Fixture with unreliable conventional silk screened filter:

<table>
<thead>
<tr>
<th>Frequency (Hz)</th>
<th>Limit</th>
<th>Measured Simple Seal Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 MHz</td>
<td>60 dBuV/m</td>
<td>80 dBuV/m</td>
</tr>
<tr>
<td>30 MHz</td>
<td>50 dBuV/m</td>
<td>70 dBuV/m</td>
</tr>
<tr>
<td>100 MHz</td>
<td>40 dBuV/m</td>
<td>60 dBuV/m</td>
</tr>
</tbody>
</table>
PROVIDE IMMUNITY TO DANGEROUS RADIATED AND CONDUCTED EMISSIONS

Simple Seal™ systems have been independently tested and verified to meet CE performance criteria for the following areas of immunity:

• Voltage dips, interruptions, and variations
• Radiated 60Hz magnetic fields from power lines, transformers, and motors
• Electrical fast transient arcing of contacts on nearby power and signal lines
• Surge voltage from lightning
• Radiated electromagnetic fields from walkie-talkies and commercial radio station broadcasts
• Electrostatic discharge
• Conducted radio frequency

CREATE A BARRIER BETWEEN THE PLENUM AND OPERATING ROOM

Simple Seal’s internal components are isolated from the surrounding environment. This isolation protects the environment from heat, sparks, arcing, dirt, dust, moisture, air pressure differences, and other conditions that would adversely affect processes or safety in the room.

In fact, every Simple Seal lighting system carries the UL IP65 rating – a rating that proves the fixture’s dust-tight performance and water jet protection.

BE TOXIN FREE, CORROSION RESISTANT, AND EASY TO CLEAN

Cold rolled steel housings, 1,000 hour salt spray tested anti-microbial finishes, stainless steel fasteners, hole-free seam welded construction, and smooth exterior lenses make Simple Seal operating room lighting fixtures toxin free, easy to clean, and corrosion resistant.

In addition, Kenall’s Simple Seal fixtures have earned the National Sanitation Foundation’s (NSF) listing for use in “Splash Non-Food Zones” – a listing highly applicable to operating room environments.

See page 40 for Simple Seal™ supplementary operating room lighting system ordering information.
M2SE OPERATING ROOM INSET DOOR SERIES

WHAT'S NEW:
• Standard antimicrobial finish
• Green phosphor lamp option available
• Swing-out arms now standard

Housing
• One-piece seam welded housing consistently sealed to one-piece, seam welded housing flange
• Sealed swing-out arms
• Stainless steel mesh screen restricts radiated EMI

Fasteners
• Compression set studs eliminate leaks

Lens Frame
• One-piece continuous lens frame gasket ledge with non-porous closed cell gasketing eliminates gaps
• Extruded lens frame secured by aircraft cables and stainless steel flat head fasteners

Optical System
• Field directable reflectors
• Asymmetrical reflectors control optics for high efficiency
• Easy to clean smooth exterior lens

Finish
• Antimicrobial finish standard
• 1,000 hour salt spray tested finish resists corrosion

Listings
• UL and CUL listed for Wet Locations
• UL Classified IP65
• IEC 60590
• Military Standards MIL-STD-461E, MIL-STD-462 and MIL-STD-463 with dimming, electronic, magnetic, and hybrid ballasts
• NSF listed for Splash Non-Food Zones
• Pressurized NSF-49 listed
• Patents Pending
OPERATING ROOMS: EXAMPLE FIXTURE CONFIGURATIONS

M2SE OPERATING ROOM INSET DOOR SERIES

ROW CONFIGURATION
Example row configuration recommended ceiling cutout

L-CONFIGURATION
Example L-configuration recommended ceiling cutout

SQUARE CONFIGURATION
Example square configuration recommended ceiling cutout

JOINER BAND DETAIL
The joiner band maintains the integrity of the seal between the room and the plenum when row mounting fixtures. Included when specifying row mounted applications.
### 4-LAMP SYSTEM TYPICAL LAYOUTS

#### Typical Surgical Suite 1
26' x 25' Area, 9' Mounting Height
90/60/20 Room Reflectance, .8 LLF (Source: IESNA RP-29-06)
Catalog No. M2SEFI24-4-F32T8

<table>
<thead>
<tr>
<th>STAT AREA</th>
<th>AVG FC</th>
<th>MAX FC</th>
<th>MIN FC</th>
<th>AVG/MIN</th>
<th>MAX/MIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone 1 @ 3' AFF</td>
<td>220</td>
<td>223</td>
<td>217</td>
<td>1.0:1</td>
<td>1.0:1</td>
</tr>
<tr>
<td>Zone 2 @ 3' AFF</td>
<td>168</td>
<td>232</td>
<td>81</td>
<td>2.0:1</td>
<td>3.0:1</td>
</tr>
<tr>
<td>Zone 3 @ 3' AFF</td>
<td>73</td>
<td>149</td>
<td>36</td>
<td>2.1:1</td>
<td>4.2:1</td>
</tr>
</tbody>
</table>

Zone 1 Immediate surgical area
Zone 2 Secondary surgical area
Zone 3 Perimeter of the room

#### Typical Surgical Suite 2
26' x 25' Area, 9' Mounting Height
90/60/20 Room Reflectance, .8 LLF (Source: IESNA RP-29-06)
Catalog No. M2SEFI24-4-F32T8

<table>
<thead>
<tr>
<th>STAT AREA</th>
<th>AVG FC</th>
<th>MAX FC</th>
<th>MIN FC</th>
<th>AVG/MIN</th>
<th>MAX/MIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone 1 @ 3' AFF</td>
<td>212</td>
<td>213</td>
<td>211</td>
<td>1.0:1</td>
<td>1.0:1</td>
</tr>
<tr>
<td>Zone 2 @ 3' AFF</td>
<td>165</td>
<td>210</td>
<td>94</td>
<td>2.0:1</td>
<td>2.0:1</td>
</tr>
<tr>
<td>Zone 3 @ 3' AFF</td>
<td>77</td>
<td>122</td>
<td>41</td>
<td>1.9:1</td>
<td>3.0:1</td>
</tr>
</tbody>
</table>

Zone 1 Immediate surgical area
Zone 2 Secondary surgical area
Zone 3 Perimeter of the room

<table>
<thead>
<tr>
<th>Zone</th>
<th>Recommended fc</th>
<th>Simple Seal Avg. fc Produced</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>200-300</td>
<td>220</td>
</tr>
<tr>
<td>2</td>
<td>100-125</td>
<td>168</td>
</tr>
<tr>
<td>3</td>
<td>40-60</td>
<td>73</td>
</tr>
</tbody>
</table>

Note: Layouts are examples only. Alternate layout information available upon request.
6-LAMP SYSTEM TYPICAL LAYOUTS

Typical Surgical Suite 1
26’ x 25’ Area, 9’ Mounting Height
90/60/20 Room Reflectance, 8 LFF (Source: IESNA RP-29-06)
Catalog No. M2SEFI24-6-F32T8

<table>
<thead>
<tr>
<th>STAT AREA</th>
<th>AVG FC</th>
<th>MAX FC</th>
<th>MIN FC</th>
<th>AVG/ MIN</th>
<th>MAX/ MIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone 1 @ 3’ AFF</td>
<td>288</td>
<td>300</td>
<td>277</td>
<td>1.0:1</td>
<td>1.0:1</td>
</tr>
<tr>
<td>Zone 2 @ 3’ AFF</td>
<td>264</td>
<td>337</td>
<td>123</td>
<td>2.0:1</td>
<td>3.0:1</td>
</tr>
<tr>
<td>Zone 3 @ 3’ AFF</td>
<td>101</td>
<td>221</td>
<td>46</td>
<td>2.0:1</td>
<td>5.0:1</td>
</tr>
</tbody>
</table>

Zone 1 Immediate surgical area
Zone 2 Secondary surgical area
Zone 3 Perimeter of the room

Typical Surgical Suite 2
26’ x 25’ Area, 9’ Mounting Height
90/60/20 Room Reflectance, 8 LFF (Source: IESNA RP-29-06)
Catalog No. M2SEFI24-6-F32T8

<table>
<thead>
<tr>
<th>STAT AREA</th>
<th>AVG FC</th>
<th>MAX FC</th>
<th>MIN FC</th>
<th>AVG/ MIN</th>
<th>MAX/ MIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone 1 @ 3’ AFF</td>
<td>285</td>
<td>293</td>
<td>276</td>
<td>1.0:1</td>
<td>1.0:1</td>
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<tr>
<td>Zone 2 @ 3’ AFF</td>
<td>248</td>
<td>305</td>
<td>147</td>
<td>2.0:1</td>
<td>2.0:1</td>
</tr>
<tr>
<td>Zone 3 @ 3’ AFF</td>
<td>106</td>
<td>212</td>
<td>50</td>
<td>2.0:1</td>
<td>4.0:1</td>
</tr>
</tbody>
</table>

Zone 1 Immediate surgical area
Zone 2 Secondary surgical area
Zone 3 Perimeter of the room

Note: Layouts are examples only. Alternate layout information available upon request.
The Millenium™ series brings timeless architectural design, high performance illumination and legendary durability to healthcare settings traditionally equipped with uninspired lighting.

**PERFORMANCE & STYLE**

Historically lit by fixtures with poor distribution and excessive glare, Millenium creates well-lighted stairwells and corridors, enhancing them with its architectural styling. The series is available in ADA-compliant round, oval, and linear shapes.

**UNSURPASSED QUALITY**

Premium marine grade aluminum backplates, injection-molded polycarbonate lenses, custom reflector systems, tamperproof stainless steel fasteners, and closed-cell gaskets are just some of the reasons Kenall’s Millenium series has been so successful in some of the most rugged applications. They’re so tough, in fact, they carry Kenall’s Peace of Mind Lifetime Guarantee™.

Millenium’s UL IP64 classification confirms that dust, dirt, bugs or moisture can’t enter the fixture, also making them ideal for exterior applications. The use of state-of-the-art lamps and ballasts ensure energy-efficient operation for years to come.

**TOUGH & DURABLE**

Millenium is designed to go into unsupervised settings – making it ideal for stairwells and public corridors. Its superior construction ensures that Millenium will withstand the harshest punishment from cleaning, maintenance, or intentional abuse. Millenium Stretch™ even earned the demanding NSF listing for use in a “Splash Non-Food Zone.”

Beautiful enough for refined public corridors yet tough enough for unsupervised stairwells, Millenium fixtures deliver great lighting wherever they’re used.
**MILLENIUM™**

**Housing**
- Die-cast marine grade aluminum
- Integral ballast heat sink
- Integral gasket channel
- One-piece closed cell "O" ring gasket
- 1,000 hour salt spray tested finish

**Electrical**
- Designed to accommodate the latest and most efficient lamps and ballasts
- U.V. shielded metal halide lamps

**Reflector**
- 92% reflectivity

**Lens Base – polycarbonate**
- Injection molded
- U.V. resistant material
- Close tolerance mating with baseplate
- Integral gasket channel for lens
- Concealed stainless steel tamper-proof fastener
- One-piece closed cell "O" ring gasket
- 1,000 hour salt spray tested finish

**Lens – polycarbonate**
- Injection molded
- U.V. resistant material
- Lens conceals lockup fastener

**Eyelid – polycarbonate**
- Injection molded
- U.V. resistant material
- Close tolerance and secure mating with lens
- 1,000 hour salt spray tested finish

**Listings**
- UL and CUL listed for Wet Locations
- UL Classified IP64
- U.S. Patent No. 6,042,251

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**ADDITIONAL PRODUCT RECOMMENDATIONS**

**Rough-house®**
- Round
- Center Band
- Single Band
- Double Band

---

**ONE YEAR GUARANTEE**

Kenall will replace Rough-house® series lenses if rendered inoperable due to rough handling or accidental abuse for one year from the original installation.
MILLENIUM™ STRETCH

Housing
- Marine grade aluminum
- Choice of flat or rounded die-cast aluminum end caps
- Integral gasket channels
- ADA compliant
- Specific lengths for T8 and T5 lamps
- 1,000 hour salt spray tested finish

Electrical
- Designed to accommodate the latest and most efficient lamps and ballasts – T8, T8HO, T5 and T5HO lamps
- Shock-resistant sockets with internal locking collar to ensure positive lamp retention

Lens
- Choice of extruded polycarbonate or high impact acrylic
- Choice of clear or pearlescent lens
- Internal linear prisms with smooth exterior

Listings
- UL and CUL listed for Wet Locations
- UL Classified IP64 (ceiling mount)
- U.S. Patent No. 6,984,055

Colors
In addition to standard Matte Black, Matte White and Light Grey, Millenium Stretch is offered in custom colors. Specify RAL number or supply color chip.

End caps are marine grade die-cast aluminum with a 1,000 hour salt spray tested finish.

End caps feature internal knockouts for Surface Conduit or Wiremold™ 500/700.

Custom Color Joiner Bands
(Option CCJB) are ideal for identifying departments, corridors, floors and security areas for all public access buildings.

Stretch is UL listed as “suitable for use as raceway.” Both the 8” and 12” wide series can be utilized for standard single raceway or optional double raceway applications.

Lifetime Guarantee™
Kenall high abuse luminaires are designed and built to take exceptional physical punishment. When installed according to our instructions, Kenall will repair or replace any fixture rendered inoperable due to physical abuse for the product life of the original installation.

ADDITIONAL PRODUCT RECOMMENDATIONS

Nova™  Sheriff™  Rough-house®
SUGGESTED CORRIDOR LAYOUT

12’ x 50’ Area, 7’ Mounting Height
80/50/20 Room Reflectance, .80 LLF (Source: IES Handbook)
Catalog No. MR17FL-P-32P-2

<table>
<thead>
<tr>
<th>AREA</th>
<th>AVG FC</th>
<th>MAX FC</th>
<th>MIN FC</th>
<th>AVG/ MIN</th>
<th>MAX/ MIN</th>
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<tbody>
<tr>
<td>Floor</td>
<td>24</td>
<td>27</td>
<td>19</td>
<td>1.3:1</td>
<td>1.4:1</td>
</tr>
</tbody>
</table>

SUGGESTED STAIRWELL LAYOUT

12’ x 50’ Area, 7’ Mounting Height
80/50/20 Room Reflectance, .80 LLF (Source: IES Handbook)
Catalog No. MLHA1248-PP-2-32

<table>
<thead>
<tr>
<th>AREAS</th>
<th>AVG FC</th>
<th>MAX FC</th>
<th>MIN FC</th>
<th>AVG/ MIN</th>
<th>MAX/ MIN</th>
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<tbody>
<tr>
<td>Floor</td>
<td>25</td>
<td>30</td>
<td>12</td>
<td>2.0:1</td>
<td>2.5:1</td>
</tr>
<tr>
<td>Middle Stair to 1st Landing</td>
<td>33</td>
<td>36</td>
<td>28</td>
<td>1.2:1</td>
<td>1.3:1</td>
</tr>
<tr>
<td>Landing @ door to 1st Floor</td>
<td>30</td>
<td>40</td>
<td>26</td>
<td>1.1:1</td>
<td>1.6:1</td>
</tr>
</tbody>
</table>

Stairway Areas
80/50/20 Room Reflectance, .80 LLF (Source: IES Handbook)
Catalog No. MLHA1248-PP-2-32

<table>
<thead>
<tr>
<th>AREAS</th>
<th>AVG FC</th>
<th>MAX FC</th>
<th>MIN FC</th>
<th>AVG/ MIN</th>
<th>MAX/ MIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floor</td>
<td>22</td>
<td>27</td>
<td>10</td>
<td>2.2:1</td>
<td>2.7:1</td>
</tr>
<tr>
<td>Middle Stair to 1st Landing</td>
<td>27</td>
<td>29</td>
<td>24</td>
<td>1.1:1</td>
<td>1.2:1</td>
</tr>
<tr>
<td>Landing @ door to 1st Floor</td>
<td>30</td>
<td>33</td>
<td>26</td>
<td>1.1:1</td>
<td>1.3:1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Zone</th>
<th>Recommended fc</th>
<th>Avg. fc Produced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stairwell</td>
<td>10-20</td>
<td>29</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Zone</th>
<th>Recommended fc</th>
<th>Avg. fc Produced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stairwell</td>
<td>10-20</td>
<td>26</td>
</tr>
</tbody>
</table>
Style, durability and lighting performance make Millenium™ the ideal choice for a variety of healthcare settings. A choice of ADA-compliant shapes and sizes and UL listings for both damp and wet locations allows specifiers to finally maintain a pleasing and consistent design theme throughout the facility—indoors and out.

HIGH PERFORMANCE ILLUMINATION

With the best performing optical systems in their product category, Millenium fixtures provide excellent illumination for hospital, clinic, and medical office entrances and are perfectly suited to perimeter lighting applications.

Offered in a variety of lamp and ballast combinations, Millenium can provide primary, supplementary or accent lighting for exterior walls or under canopies, enhancing the appearance and safety of exterior locations. Specified with optional integral emergency batteries, Millenium makes a beautiful alternative to unappealing traditional emergency lighting.

FIXTURES THAT ENDURE

Millenium fixtures are designed and manufactured to maintain their good looks through just about any punishment that nature—or people—can dish out. A track record almost a decade long in some of the most difficult environments is testament to its endurance and design integrity.

They feature heavy duty, marine grade die-cast aluminum backplates, and polycarbonate or high-impact acrylic lenses—the toughest available. They also carry UL’s IP65 classification, which means bugs, dirt, moisture, and environmental debris won’t get inside, so they’ll look great even without internal cleaning.

And in the unlikely event that a Millenium lens or housing becomes damaged or is rendered inoperable, we’ll replace it for free. That’s Kenall’s Peace of Mind Lifetime Guarantee™.
**Housing**
- All non-corrosive construction
- 1,000 hour salt spray tested polyester powder coat finish (clear anodized finish also available)
- Die-formed marine grade aluminum baseplate
- TIG welded seams

**Electrical**
- Available with incandescent, compact fluorescent, biaxial, linear fluorescent, HID, and LED lamps
- All ballasts are high power factor

**Reflector**
- Full aluminum reflectors (92% reflectivity)

**Lens**
- High impact, high performance pearlescent, 100% DR acrylic lens provides lamp protection and efficient light diffusion

**Lens Frame/Cross Bars**
- Heavy duty extruded marine grade aluminum frame with .25" thick cross bars

**Listings**
- UL and CUL listed for Wet Locations
- UL Classified IP65
- U.S. Patent No. D525,386
- U.S. Patent No. D526,082
- U.S. Patent No. 7,029,139

**BAR CONFIGURATIONS**
Cross bar and new vertical bar configurations are available in more than a dozen combinations and widths. Crossbars are slot fitted and welded to lens frame for strength and durability. Optional .25" thick cross bars provide added strength.

**RANGE OF OPTIONS**
A variety of material and fabrication options are available to meet specific design criteria. In addition, optional LED packages are available with lumen output comparable to 20-watt incandescent lamps.

The modular and scalable FreeScale™ series allows a consistent and properly proportioned lighting scheme throughout the facility.
MILENNIUM™ WALL MOUNT HID HIGH PERFORMANCE

Lateral Distribution – MR17WP
The MR17WP produces a wide lateral light distribution with a 55° cutoff.

Forward Throw Distribution – MR17NP
The MR17NP produces a forward throw light distribution with a 72° cutoff.

MILENNIUM™ CEILING MOUNT HID HIGH PERFORMANCE

Rectangular Distribution – MR17RP
The MR17RP produces high levels of uniform lighting and will withstand physical and elemental abuse.

Square Distribution – MR17SP
The MR17SP, with a 150-watt pulse start metal halide system, is very efficient and produces consistent color.

WALL & CEILING PRODUCT INFORMATION

Housing
- Die-cast marine grade aluminum
- Integral ballast heat sink
- Integral gasket channel
- Four threaded conduit entryways
- One-piece closed cell "O" ring gasket

Electrical
- Designed to accommodate the latest and most efficient lamps and ballasts
- U.V. shielded metal halide lamps

Reflector
- specular aluminum

Lens Base
- Injection molded polycarbonate
- U.V. resistant material
- Close tolerance mating with baseplate
- Integral gasket channel for lens
- Concealed and tamperproof stainless steel fastener
- One-piece closed cell "O" ring gasket

Lens
- Injection molded polycarbonate
- U.V. resistant material
- Lens conceals lockup fastener

Eyelid
- Injection molded polycarbonate
- U.V. resistant material
- Close tolerance and secure mating with lens

Listings
- UL and CUL listed for Wet Locations
- UL Classified IP64
SUGGESTED ENTRYWAY LAYOUT

Typical Entryway
40’ x 25’ Area, 12’ Mounting Height
.72 LLF (Source: IESNA RP-33-99)
Catalog No. MR17RP-100M-1, FS812RD-50M-1

<table>
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<tr>
<th>STAT AREA</th>
<th>AVG</th>
<th>MAX</th>
<th>MIN</th>
<th>AVG/MIN</th>
<th>MAX/MIN</th>
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<tr>
<td>0’ AFF</td>
<td>8</td>
<td>14</td>
<td>4</td>
<td>2.0:1</td>
<td>3.4:1</td>
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SUGGESTED PERIMETER LAYOUT

Typical Perimeter
Walkway Area, 12’ Mounting Height
.72 LLF (Source: IESNA RP-33-99)
Catalog No. MR17WP-150M-1

<table>
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<th>MIN</th>
<th>AVG/MIN</th>
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<tr>
<td>Building Corner (0’ AFF)</td>
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<td>10</td>
<td>1</td>
<td>5.0:1</td>
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COMPLEMENTARY PRODUCTS

STEPLIGHTS  Kenall’s SoftStep™ Steplight is ideal for low level patient room or high lumen corridor applications. Available with a full face, slotted face or internal louver, and compact fluorescent or LED lamps. LED system available in a choice of colors with a calibrated brightness level adjustment dial for field adjustability. Hospital grade duplex outlet and new thru-wall options available.

MRI LIGHTING  100% aluminum construction will not interfere with powerful MRI equipment. Now available with UL listed DC operation (7.5” size).

OVER THE SINK LIGHTING  The extruded aluminum housing with die-cast aluminum end caps is both sleek and versatile. Ideal for over the sink, patient room, or corridor and stairwell lighting.

QUARTZ EXAM LIGHT  This 250-watt tungsten halogen system provides powerful exam lighting. Available with symmetrical or asymmetrical optical systems.

DARKROOM SAFELIGHTS  Available in one, two or three compartment models. High quality filtering lenses available in a variety of colors.

METREX™ EXIT SIGNS  Available in single face wall or universal mount, and double face universal mount. IP64 rated and Wet Location listed. Peace of Mind Lifetime Guarantee™ against breakage.

LOW VOLTAGE CONTROLLER (LVC)  The Low Voltage Control interface module allows effortless lighting control by patient and staff for up to three loads, including three-way control for up to two loads.
### SPECIFYING INFORMATION: PATIENT ROOMS

**Series Type** MedMaster™

<table>
<thead>
<tr>
<th>Mounting Options</th>
<th>Lamp Qty</th>
<th>Lamp Type</th>
<th>Voltage</th>
<th>Other Options</th>
<th>Accessory</th>
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<tr>
<td>S Surface</td>
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<td>54</td>
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<tr>
<td>F Flange</td>
<td></td>
<td>34T5HO</td>
<td>277, 347</td>
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<tr>
<td>G Grid</td>
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| **Series Type** MedMaster™

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<td>32T8</td>
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<td>G Grid</td>
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<td>50B F50TT Biax</td>
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| **Series Type** MedMaster™

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### SPECIFYING INFORMATION: PATIENT ROOMS

#### Series Type MedMaster™ MPC22

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<td>F Flange</td>
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<td>120V</td>
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<td>G Grid (1&quot;)</td>
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#### Series Type MedMaster™ MAC22

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<tr>
<td>G Grid (1&quot;)</td>
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<td>G Grid (1&quot;)</td>
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#### Series Type MedMaster™ MEC22

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<th>Voltage</th>
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<td>F Flange</td>
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<td>G Grid (1&quot;)</td>
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#### Series Type MedMaster™ MEC8

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<tbody>
<tr>
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<td>Install Frame (Flange only)</td>
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<td>F Flange</td>
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<td>G Grid (1&quot;)</td>
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<td>80</td>
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### Ceiling Mount

- **Nominal 2’x2’**
- **Exam**
- **Nominal 2’x4’**
- **Reading/Ambient**
- **Nominal 8”x48”, 8”x60”**

---

*IB Option available with piano hinge (HD) or aircraft cables (AC)*
## SPECIFYING INFORMATION: PATIENT ROOMS

### MedMaster™ MEC12

<table>
<thead>
<tr>
<th>Series Type</th>
<th>Length</th>
<th>Mounting Options</th>
<th>Lamp Qty</th>
<th>Lamp Type</th>
<th>Voltage</th>
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<tr>
<td>MEC12</td>
<td>48'</td>
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<td>F28T5</td>
<td>120 120 Volts</td>
<td>IB* Ingress Barrier (IP65)</td>
<td>IF Install Frame (Flange only)</td>
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<td></td>
<td></td>
<td>F Flange</td>
<td>2</td>
<td>F32T8</td>
<td>277 277 Volts</td>
<td>RF Radio Frequency Filter</td>
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<tr>
<td></td>
<td></td>
<td>G Grid ('1')</td>
<td></td>
<td>FS</td>
<td>347 347 Volts</td>
<td>FS Fuse &amp; Holder</td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td>RSB</td>
<td></td>
<td>RSB Rapid Start Electronic Ballast</td>
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**Series Type MedMaster™ MEC1212**

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<td>RF Radio Frequency Filter</td>
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<td>FS Fuse &amp; Holder</td>
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<td>LNM* Chart Light – White Light LED</td>
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<td>TN** Chart Light – 5/7/9 Watt PL</td>
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<td>PC Pull Chain (4 Position)</td>
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<td></td>
<td></td>
<td></td>
<td>ES Emergency Shut-Off Switch</td>
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<td></td>
<td></td>
<td>LVC Low Voltage Controller</td>
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<td>(Consult factory for switching options)</td>
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<td>RSB Rapid Start Electronic Ballast</td>
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**Series Type MedMaster™ MPWF**

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<th>Lens Type</th>
<th>Lamping Configuration</th>
<th>Lamp Qty</th>
<th>Lamp Type</th>
<th>Ballast Qty</th>
<th>Circuit Qty</th>
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<th>Options</th>
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<tbody>
<tr>
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<td>22</td>
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<td>1 One Lamp</td>
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<td></td>
<td>21</td>
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<td>12</td>
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**Series Type MedMaster™ MPWUD**

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<tr>
<td>MPWUD</td>
<td>22</td>
<td>CP Clear</td>
<td>2 up 2 down</td>
<td>1</td>
<td>F14T5</td>
<td>1 One Lamp</td>
<td>120 120 Volts</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>CP Prismatic</td>
<td>1 up 1 down</td>
<td>1</td>
<td>F17T8</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>12</td>
<td>CC Frost</td>
<td>1 up 1 down</td>
<td>1</td>
<td>F34T5HO</td>
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<td></td>
<td>11</td>
<td>CC Acrylic</td>
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<td>1</td>
<td>F28T5</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>10</td>
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<td>1</td>
<td>F21T5</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>9</td>
<td>CC Frost</td>
<td>0 up 2 down</td>
<td>1</td>
<td>F25T8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>CC AM</td>
<td>0 up 2 down</td>
<td>1</td>
<td>F21T5</td>
<td></td>
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<tr>
<td></td>
<td>7</td>
<td>CC AM</td>
<td>0 up 2 down</td>
<td>1</td>
<td>F25T8</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>CC AM</td>
<td>0 up 2 down</td>
<td>1</td>
<td>F21T5</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>5</td>
<td>CC AM</td>
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<td>1</td>
<td>F25T8</td>
<td></td>
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<tr>
<td></td>
<td>4</td>
<td>CC AM</td>
<td>0 up 2 down</td>
<td>1</td>
<td>F21T5</td>
<td></td>
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<td>3</td>
<td>CC AM</td>
<td>0 up 2 down</td>
<td>1</td>
<td>F25T8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>CC AM</td>
<td>0 up 2 down</td>
<td>1</td>
<td>F21T5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>CC AM</td>
<td>0 up 2 down</td>
<td>1</td>
<td>F25T8</td>
<td></td>
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<td></td>
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</tbody>
</table>
### SPECIFYING INFORMATION: PATIENT ROOMS

#### Residence™
**MPWF**

- **Wall Mount**
- **Traditional Valance**
- **Reading/Ambient**
- **Nominal 8”x24”, 8”x36”, 8”x48”**

<table>
<thead>
<tr>
<th>Series Type</th>
<th>Length</th>
<th>Finish</th>
<th>Lamping Configuration</th>
<th>Lamp Type</th>
<th>Ballast Type</th>
<th>Circuit Qty</th>
<th>Voltage Options</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residence™</td>
<td>24’</td>
<td>MW Matte White Antimicrobial</td>
<td>2 Up 2 Down</td>
<td>Length 2’</td>
<td>3 Up 3 Down</td>
<td>2 One 2 Two</td>
<td>120 240/277 Volts</td>
<td>HGO Hospital Grade Grounded Outlet</td>
</tr>
<tr>
<td></td>
<td>36’</td>
<td>MW Matte White Antimicrobial</td>
<td>2 Up 2 Down</td>
<td>Length 2’</td>
<td>3 Up 3 Down</td>
<td>2 One 2 Two</td>
<td>120 240/277 Volts</td>
<td>PEL 1000 Minimum Lumen Battery Pack (32°F)</td>
</tr>
<tr>
<td></td>
<td>48’</td>
<td>CC Custom Color Antimicrobial</td>
<td>2 Up 2 Down</td>
<td>Length 2’</td>
<td>3 Up 3 Down</td>
<td>2 One 2 Two</td>
<td>120 240/277 Volts</td>
<td>DB Electronic Dimming Ballast (Ambient Lamps)</td>
</tr>
</tbody>
</table>

#### Series Type
**Residence™ MPWVC**

- **Wall Mount**
- **Contemporary Valance**
- **Reading/Ambient**
- **Nominal 8”x24”, 8”x36”, 8”x48”**

<table>
<thead>
<tr>
<th>Series Type</th>
<th>Length</th>
<th>Finish</th>
<th>Lamping Configuration</th>
<th>Lamp Type</th>
<th>Ballast Type</th>
<th>Circuit Qty</th>
<th>Voltage Options</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residence™</td>
<td>24’</td>
<td>MW Matte White Antimicrobial</td>
<td>2 Up 2 Down</td>
<td>Length 2’</td>
<td>3 Up 3 Down</td>
<td>2 One 2 Two</td>
<td>120 240/277 Volts</td>
<td>HGO Hospital Grade Grounded Outlet</td>
</tr>
<tr>
<td></td>
<td>36’</td>
<td>MW Matte White Antimicrobial</td>
<td>2 Up 2 Down</td>
<td>Length 2’</td>
<td>3 Up 3 Down</td>
<td>2 One 2 Two</td>
<td>120 240/277 Volts</td>
<td>PEL 1000 Minimum Lumen Battery Pack (32°F)</td>
</tr>
<tr>
<td></td>
<td>48’</td>
<td>CC Custom Color Antimicrobial</td>
<td>2 Up 2 Down</td>
<td>Length 2’</td>
<td>3 Up 3 Down</td>
<td>2 One 2 Two</td>
<td>120 240/277 Volts</td>
<td>DB Electronic Dimming Ballast (Ambient Lamps)</td>
</tr>
</tbody>
</table>

*See Specification Sheet for Options restrictions.*
### SPECIFYING INFORMATION: PATIENT ROOMS

#### Series Type: SoftStep™

<table>
<thead>
<tr>
<th><strong>Faceplate Material</strong></th>
<th><strong>Faceplate Finish</strong></th>
<th><strong>Lens</strong></th>
<th><strong>Lamp Type</strong></th>
<th><strong>Voltage</strong></th>
<th><strong>Fasteners</strong></th>
<th><strong>Accessory</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>18 Gauge CRS Brushed SS</td>
<td>Low Lumen</td>
<td>120 Volts</td>
<td>Low Lumen LED</td>
<td>120 Volts</td>
<td>1 Torsion Springs</td>
<td>1 Torx Head w/Center pin</td>
</tr>
<tr>
<td>18 Gauge Type 304 SS Brushed</td>
<td>Low Lumen</td>
<td>277 Volts</td>
<td>Low Lumen LED</td>
<td>277 Volts</td>
<td>2 Torsion Springs</td>
<td>2 Torx Head w/Center pin</td>
</tr>
<tr>
<td>G48/Matte White Antimicrobial</td>
<td>Low Lumen</td>
<td>120 Volts</td>
<td>Low Lumen LED</td>
<td>120 Volts</td>
<td>1 Torsion Springs</td>
<td>1 Torx Head w/Center pin</td>
</tr>
<tr>
<td>Matte White</td>
<td>Low Lumen</td>
<td>277 Volts</td>
<td>Low Lumen LED</td>
<td>277 Volts</td>
<td>2 Torsion Springs</td>
<td>2 Torx Head w/Center pin</td>
</tr>
<tr>
<td>Matte Black</td>
<td>Low Lumen</td>
<td>120 Volts</td>
<td>Low Lumen LED</td>
<td>120 Volts</td>
<td>1 Torsion Springs</td>
<td>1 Torx Head w/Center pin</td>
</tr>
<tr>
<td>DB Dark Bronze</td>
<td>Low Lumen</td>
<td>277 Volts</td>
<td>Low Lumen LED</td>
<td>277 Volts</td>
<td>2 Torsion Springs</td>
<td>2 Torx Head w/Center pin</td>
</tr>
<tr>
<td>Warm Satin</td>
<td>Low Lumen</td>
<td>120 Volts</td>
<td>Low Lumen LED</td>
<td>120 Volts</td>
<td>1 Torsion Springs</td>
<td>1 Torx Head w/Center pin</td>
</tr>
<tr>
<td>P335/72 Sandblasted</td>
<td>Low Lumen</td>
<td>277 Volts</td>
<td>Low Lumen LED</td>
<td>277 Volts</td>
<td>2 Torsion Springs</td>
<td>2 Torx Head w/Center pin</td>
</tr>
<tr>
<td>Cool Satin</td>
<td>Low Lumen</td>
<td>120 Volts</td>
<td>Low Lumen LED</td>
<td>120 Volts</td>
<td>1 Torsion Springs</td>
<td>1 Torx Head w/Center pin</td>
</tr>
<tr>
<td>P334/72 Sandblasted</td>
<td>Low Lumen</td>
<td>277 Volts</td>
<td>Low Lumen LED</td>
<td>277 Volts</td>
<td>2 Torsion Springs</td>
<td>2 Torx Head w/Center pin</td>
</tr>
<tr>
<td>Grey</td>
<td>Low Lumen</td>
<td>120 Volts</td>
<td>Low Lumen LED</td>
<td>120 Volts</td>
<td>1 Torsion Springs</td>
<td>1 Torx Head w/Center pin</td>
</tr>
<tr>
<td>IV Ivory</td>
<td>Low Lumen</td>
<td>277 Volts</td>
<td>Low Lumen LED</td>
<td>277 Volts</td>
<td>2 Torsion Springs</td>
<td>2 Torx Head w/Center pin</td>
</tr>
</tbody>
</table>

*Available with Internal Louver (L) only*

#### Low Wall Mount

- Step Light
- Nominal 3"x9"

#### Thru Wall Mount

- Step Light
- Nominal 5"x9"

---

**SoftStep™**

[Diagram]

**Low Wall Mount**

- Step Light with Duplex Outlet
- Nominal 6"x9"
### SPECIFYING INFORMATION: OPERATING ROOMS

**SimpleSeal™ M2SE**

<table>
<thead>
<tr>
<th>Series Type</th>
<th>Series</th>
<th>Size</th>
<th>Qty</th>
<th>Lamp Type</th>
<th>Ballast Type</th>
<th>Lighting Levels</th>
<th>Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>SI Surface Inset</td>
<td>1/4</td>
<td>1’x4’</td>
<td>2</td>
<td>One (1’x4’ and 2’x2’ only)</td>
<td>Magnetic E5 (T8)</td>
<td>One</td>
<td>120/120 Volts</td>
</tr>
<tr>
<td>GI Grid Inset</td>
<td>22</td>
<td>2’x2’</td>
<td>3</td>
<td>Three (F55TT only)</td>
<td>Magnetic ES (T8)</td>
<td>Two</td>
<td>277/277 Volts</td>
</tr>
<tr>
<td>R Flange Inset</td>
<td>24</td>
<td>2’x4’</td>
<td>4</td>
<td>Four (2’x2’ and 2’x4’ and 2’x4’ only)</td>
<td>Electronic Dimming Ballast</td>
<td>Three</td>
<td>277/277 Volts</td>
</tr>
</tbody>
</table>

#### Door Frame Options

- 2F 18 Ga CRS Painted (STD)
- 2H 20 Ga CRS/MLP Micro Linear Prism (STD)
- 2S 20 Ga Type 304 SS
- 2H5 20 Ga Type 304 SS
- 2H5 20 Ga Type 304 SS
- 2H5 20 Ga Type 304 SS
- PAH .050” Painted Aluminum

#### Housing/Flange Options

- AF Anodized Aluminum
- PAH Painted Aluminum
- SF 18 Ga Type 304 SS Brushed
- SH 20 Ga Type 304 SS
- SH 20 Ga Type 304 SS
- SH 20 Ga Type 304 SS
- PAH .050” Painted Aluminum

#### Lens Options

- MLP Micro Linear Prism (STD)
- SL Specified Lens

#### Other Options

- B One-Lamp Indoor Battery Pack (32°F)
- P1 Fuse & Holder
- H1 Sealed Wireway
- HD Hinged Door (w/o NSF listing)
- GL Green Phosphor Lamp(s)
  (One – 1’x4’, Two – 2’x4’)

*See Specification Sheets for Other Options available.*
### SPECIFYING INFORMATION: COMPLEMENTARY PRODUCTS

#### Series Type MRIA6

<table>
<thead>
<tr>
<th>Lamp Qty</th>
<th>Lamp Type*</th>
<th>Voltage</th>
<th>Reflector Finish</th>
<th>Lens Options***</th>
<th>Accessories</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 One Lamp</td>
<td>60W Incandescent</td>
<td>120 Volts</td>
<td>CS Semi-Specular</td>
<td>C73 3/2&quot; Tempered Glass</td>
<td>FS Fuse &amp; Holder</td>
</tr>
<tr>
<td></td>
<td>75W Incandescent</td>
<td>120 Volts</td>
<td>Low Iridescent (STD)</td>
<td>FF Fresnel</td>
<td>BH Aluminum Bar</td>
</tr>
<tr>
<td></td>
<td>100W Incandescent</td>
<td>120 Volts</td>
<td>STR Straw</td>
<td>CG Champagne Gold</td>
<td>MB Micro-Baffle</td>
</tr>
<tr>
<td></td>
<td>150W Incandescent</td>
<td>120 Volts</td>
<td>GO Gold</td>
<td>WT Wheat</td>
<td>WMT Matte White Trim</td>
</tr>
<tr>
<td></td>
<td>200W Incandescent</td>
<td>120 Volts</td>
<td>UM Umber</td>
<td>FG Focusing Lens</td>
<td>AC Accent Cone</td>
</tr>
<tr>
<td></td>
<td>* Lamp Base A19/Fmed only</td>
<td></td>
<td></td>
<td>** All Lens Options are 100 Watt Max.</td>
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</table>

#### Series Type MRIA7

<table>
<thead>
<tr>
<th>Lamp Qty</th>
<th>Lamp Type*</th>
<th>Voltage</th>
<th>Reflector Finish</th>
<th>Lens Options***</th>
<th>Accessories</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 One Lamp</td>
<td>60W Incandescent</td>
<td>120 Volts</td>
<td>CS Semi-Specular</td>
<td>C73 3/2&quot; Tempered Glass</td>
<td>FS Fuse &amp; Holder</td>
</tr>
<tr>
<td></td>
<td>75W Incandescent</td>
<td>120 Volts</td>
<td>Low Iridescent (STD)</td>
<td>FF Fresnel</td>
<td>BH Aluminum Bar</td>
</tr>
<tr>
<td></td>
<td>100W Incandescent</td>
<td>120 Volts</td>
<td>STR Straw</td>
<td>CG Champagne Gold</td>
<td>MB Micro-Baffle</td>
</tr>
<tr>
<td></td>
<td>150W Incandescent</td>
<td>120 Volts</td>
<td>GO Gold</td>
<td>WT Wheat</td>
<td>WMT Matte White Trim</td>
</tr>
<tr>
<td></td>
<td>200W Incandescent</td>
<td>120 Volts</td>
<td>UM Umber</td>
<td>FG Focusing Lens</td>
<td>AC Accent Cone</td>
</tr>
<tr>
<td></td>
<td>* Lamp Base A19/Fmed only</td>
<td></td>
<td></td>
<td>** All Lens Options are 100 Watt Max.</td>
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</table>

#### Series Type MDRM

<table>
<thead>
<tr>
<th>Compartment</th>
<th>Voltage</th>
<th>Filters</th>
<th>Options</th>
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<tbody>
<tr>
<td>1 One Compartment</td>
<td>120 Volts</td>
<td>OA Greenish-Yellow</td>
<td>TP Tamper Proof</td>
</tr>
<tr>
<td>2 Two Compartments</td>
<td></td>
<td>OC Light Amber</td>
<td></td>
</tr>
<tr>
<td>3 Three Compartments</td>
<td></td>
<td>1 Red</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1A Light Red</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 Dark Red</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 Dark Green</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6B Brown</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>7B Green</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>13 Amber</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>GBX2Red (Blue &amp; Green Sensitive)</td>
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</tbody>
</table>

#### Series Type MedMaster™ MWUD

<table>
<thead>
<tr>
<th>Length</th>
<th>Finish</th>
<th>Lamping Configuration</th>
<th>Lamp Type*</th>
<th>Ballast Type</th>
<th>Circuit Qty</th>
<th>Voltage</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>24&quot;</td>
<td>MW AM Matte White (STD)</td>
<td>2 Up 2 Down</td>
<td>14 PM5T5</td>
<td>EB &lt;20% THD</td>
<td>1 One</td>
<td>120 120 Volts</td>
<td>HGO Hospital Grade Grounded Outlet</td>
</tr>
<tr>
<td>36&quot;</td>
<td>AM Matte Back</td>
<td>2 Up 1 Down</td>
<td>17 PM177</td>
<td>PB &lt;10% THD</td>
<td>2 Two</td>
<td>277 277 Volts</td>
<td>GR Ground Fault Outlet</td>
</tr>
<tr>
<td>48&quot;</td>
<td>SL AM Silver Clear</td>
<td>1 Up 1 Down</td>
<td>24 F34F5SHO</td>
<td>SR Specified Ballast</td>
<td></td>
<td>347 347 Volts</td>
<td>EL One-Lamp Emergency</td>
</tr>
<tr>
<td></td>
<td>CC AM Custom Color Prismatic</td>
<td>0 Up 2 Down</td>
<td>21 F215</td>
<td>RSB Rapid Start Ballast</td>
<td></td>
<td></td>
<td>RF Radio Frequency Filter</td>
</tr>
<tr>
<td></td>
<td>AM=Antimicrobial</td>
<td>1 Up 0 Down</td>
<td>25 F25ST</td>
<td></td>
<td></td>
<td>FS Fuse &amp; Holder</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 Up 0 Down</td>
<td>4&quot; Length</td>
<td></td>
<td></td>
<td>PC Pull Chain (2 Position)</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>32 F32ST</td>
<td></td>
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<td>SW Rocker Switch (1 per circuit)</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>54 F54T5SHO</td>
<td></td>
<td></td>
<td></td>
<td>TR Tamper Resistant Post-Grip Fastener</td>
<td></td>
</tr>
</tbody>
</table>

* See Specification Sheet for Lamp Type restrictions

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Ceiling Mount
MRI Room Light
Nominal 6" Round

Ceiling Mount
MRI Room Light
Nominal 7.5" Round

Ceiling Mount
Darkroom Safe Light
Nominal 11"x14", 11"x23", 11"x34"
### SPECIFYING INFORMATION: COMPLEMENTARY PRODUCTS

<table>
<thead>
<tr>
<th>Series Type</th>
<th>Stratalume™</th>
<th>Length/ Lamps</th>
<th>Ballast Type</th>
<th>Voltage</th>
<th>Options</th>
<th>Accessory</th>
</tr>
</thead>
<tbody>
<tr>
<td>UCSL</td>
<td>UCSL Undercabinet Single 1.1” Profile</td>
<td>12: 12.31” one F8T5</td>
<td>EB Electronic Ballast</td>
<td>120 277 Volts</td>
<td>BW: Baking Distribution Lens</td>
<td>CPA* Cord &amp; Plug with Wiring Kit</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>120 Volts only</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>21: 21.5” one F13T5</td>
<td></td>
<td></td>
<td></td>
<td><strong>120 Volts only</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>22: 21.5” one F14T5</td>
<td></td>
<td></td>
<td></td>
<td><strong>120 Volts only</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>24: 24.5” one F13T5</td>
<td></td>
<td></td>
<td></td>
<td><strong>120 Volts only</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>62: 62.5” one F13T5</td>
<td></td>
<td></td>
<td></td>
<td><strong>120 Volts only</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>42: 42.5” two F13T5</td>
<td></td>
<td></td>
<td></td>
<td><strong>120 Volts only</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>14: 14.2” one F8T5</td>
<td></td>
<td></td>
<td></td>
<td><strong>120 Volts only</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>22: 22.5” one F13T5</td>
<td></td>
<td></td>
<td></td>
<td><strong>120 Volts only</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>25: 25.5” one F4T5S</td>
<td></td>
<td></td>
<td></td>
<td><strong>120 Volts only</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>27: 27” one F2T5S</td>
<td></td>
<td></td>
<td></td>
<td><strong>120 Volts only</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>36: 36” one F8T5</td>
<td></td>
<td></td>
<td></td>
<td><strong>120 Volts only</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>37: 37” one F2T5</td>
<td></td>
<td></td>
<td></td>
<td><strong>120 Volts only</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>48: 48” one F2T5S</td>
<td></td>
<td></td>
<td></td>
<td><strong>120 Volts only</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>48: 48” one F2T5S</td>
<td></td>
<td></td>
<td></td>
<td><strong>120 Volts only</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>60: 60” one F3T5S</td>
<td></td>
<td></td>
<td></td>
<td><strong>120 Volts only</strong></td>
</tr>
</tbody>
</table>

### Series Type: Stratalume Connects™

<table>
<thead>
<tr>
<th>Series Type</th>
<th>Stratalume Connects™</th>
<th>Installation Type</th>
<th>Finish</th>
<th>Length/ Lamps</th>
<th>Ballast Type</th>
<th>Voltage</th>
<th>Options</th>
<th>Accessory</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUCLD</td>
<td>AUCLD Undercabinet</td>
<td>Individual Mount</td>
<td>MW Matte</td>
<td>14” one F18T7</td>
<td>EB Electronic Ballast</td>
<td>120 Volts</td>
<td><strong>120 Volts</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Solid Front</td>
<td>5 Series Mount</td>
<td>MB Matte</td>
<td>17” one F18T7</td>
<td></td>
<td></td>
<td></td>
<td><strong>120 Volts</strong></td>
</tr>
<tr>
<td></td>
<td>T5 Profile</td>
<td></td>
<td>SL Matte</td>
<td>24” one F18T7</td>
<td></td>
<td></td>
<td></td>
<td><strong>120 Volts</strong></td>
</tr>
<tr>
<td></td>
<td>AUCLD Undercabinet</td>
<td></td>
<td>CCW Matte</td>
<td>30” one F18T7</td>
<td></td>
<td></td>
<td></td>
<td><strong>120 Volts</strong></td>
</tr>
<tr>
<td></td>
<td>Wrapped Diffuser</td>
<td></td>
<td>Color White</td>
<td>62” one F18T7</td>
<td></td>
<td></td>
<td></td>
<td><strong>120 Volts</strong></td>
</tr>
<tr>
<td></td>
<td>T5 Profile</td>
<td></td>
<td>Color Black</td>
<td>14” one F18T7</td>
<td></td>
<td></td>
<td></td>
<td><strong>120 Volts</strong></td>
</tr>
<tr>
<td></td>
<td>AUCLD Undercabinet</td>
<td></td>
<td>CCB Matte</td>
<td>14” one F18T7</td>
<td></td>
<td></td>
<td></td>
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<tr>
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<td></td>
<td></td>
<td><strong>120 Volts</strong></td>
</tr>
<tr>
<td></td>
<td>T5 Profile</td>
<td></td>
<td>Ends Caps</td>
<td>14” one F18T7</td>
<td></td>
<td></td>
<td></td>
<td><strong>120 Volts</strong></td>
</tr>
<tr>
<td></td>
<td>AUCLD Undercabinet</td>
<td></td>
<td>AM = Antimicrobial</td>
<td>14” one F18T7</td>
<td></td>
<td></td>
<td></td>
<td><strong>120 Volts</strong></td>
</tr>
<tr>
<td></td>
<td>Wrapped Diffuser</td>
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<td></td>
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<td><strong>120 Volts</strong></td>
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<td>T5 Profile</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>120 Volts</strong></td>
</tr>
</tbody>
</table>

### Series Type: Stratalume Connects™

<table>
<thead>
<tr>
<th>Series Type</th>
<th>Stratalume Connects™</th>
<th>Installation Type</th>
<th>Finish</th>
<th>Length/ Lamps</th>
<th>Ballast Type</th>
<th>Voltage</th>
<th>Options</th>
<th>Accessory</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUCDD</td>
<td>AUCDD Undercabinet</td>
<td>Individual Mount</td>
<td>MW Matte</td>
<td>14” one F18T7</td>
<td>EB Electronic Ballast</td>
<td>120 Volts</td>
<td><strong>120 Volts</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Solid Front</td>
<td>5 Series Mount</td>
<td>MB Matte</td>
<td>17” one F18T7</td>
<td></td>
<td></td>
<td></td>
<td><strong>120 Volts</strong></td>
</tr>
<tr>
<td></td>
<td>T8 Profile</td>
<td></td>
<td>SL Matte</td>
<td>24” one F18T7</td>
<td></td>
<td></td>
<td></td>
<td><strong>120 Volts</strong></td>
</tr>
<tr>
<td></td>
<td>AUCDD Undercabinet</td>
<td></td>
<td>CCW Matte</td>
<td>30” one F18T7</td>
<td></td>
<td></td>
<td></td>
<td><strong>120 Volts</strong></td>
</tr>
<tr>
<td></td>
<td>Wrapped Diffuser</td>
<td></td>
<td>Color White</td>
<td>62” one F18T7</td>
<td></td>
<td></td>
<td></td>
<td><strong>120 Volts</strong></td>
</tr>
<tr>
<td></td>
<td>T8 Profile</td>
<td></td>
<td>Color Black</td>
<td>14” one F18T7</td>
<td></td>
<td></td>
<td></td>
<td><strong>120 Volts</strong></td>
</tr>
<tr>
<td></td>
<td>AUCDD Undercabinet</td>
<td></td>
<td>CCB Matte</td>
<td>14” one F18T7</td>
<td></td>
<td></td>
<td></td>
<td><strong>120 Volts</strong></td>
</tr>
<tr>
<td></td>
<td>Wrapped Diffuser</td>
<td></td>
<td>Color Black</td>
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<td></td>
<td></td>
<td></td>
<td><strong>120 Volts</strong></td>
</tr>
<tr>
<td></td>
<td>T8 Profile</td>
<td></td>
<td>Ends Caps</td>
<td>14” one F18T7</td>
<td></td>
<td></td>
<td></td>
<td><strong>120 Volts</strong></td>
</tr>
<tr>
<td></td>
<td>AUCDD Undercabinet</td>
<td></td>
<td>AM = Antimicrobial</td>
<td>14” one F18T7</td>
<td></td>
<td></td>
<td></td>
<td><strong>120 Volts</strong></td>
</tr>
<tr>
<td></td>
<td>Wrapped Diffuser</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>120 Volts</strong></td>
</tr>
<tr>
<td></td>
<td>T8 Profile</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>120 Volts</strong></td>
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</table>

### Series Type: Stratalume Connects™

<table>
<thead>
<tr>
<th>Series Type</th>
<th>Stratalume Connects™</th>
<th>Installation Type</th>
<th>Finish</th>
<th>Length/ LED Power</th>
<th>Voltage</th>
<th>Options</th>
<th>Accessory</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUCLLED</td>
<td>AUCLLED Undercabinet</td>
<td>Individual Mount</td>
<td>MW Matte</td>
<td>12” 13 – 12 Watts</td>
<td>120 Volts</td>
<td><strong>120 Volts</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Solid Front</td>
<td>5 Series Mount</td>
<td>MB Matte</td>
<td>18” 18.5 – 18 Watts</td>
<td></td>
<td></td>
<td><strong>120 Volts</strong></td>
</tr>
<tr>
<td></td>
<td>LED</td>
<td></td>
<td>SL Matte</td>
<td>24” 24 – 24 Watts</td>
<td></td>
<td></td>
<td><strong>120 Volts</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CCW Matte</td>
<td>30” 29.5 – 30 Watts</td>
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<td></td>
<td><strong>120 Volts</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Color White</td>
<td>62” 60.5 – 62 Watts</td>
<td></td>
<td></td>
<td><strong>120 Volts</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Color Black</td>
<td>14” 13 – 12 Watts</td>
<td></td>
<td></td>
<td><strong>120 Volts</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CCB Matte</td>
<td>14” 13 – 12 Watts</td>
<td></td>
<td></td>
<td><strong>120 Volts</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Color Black</td>
<td>14” 13 – 12 Watts</td>
<td></td>
<td></td>
<td><strong>120 Volts</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ends Caps</td>
<td>14” 13 – 12 Watts</td>
<td></td>
<td></td>
<td><strong>120 Volts</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>AM = Antimicrobial</td>
<td>14” 13 – 12 Watts</td>
<td></td>
<td></td>
<td><strong>120 Volts</strong></td>
</tr>
<tr>
<td></td>
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</tr>
</tbody>
</table>

---

**Series:** Bulkhead Mount
**Finish:** Matte White
**Power:** 130 Volts
**Options:** **120 Volts only**

---

**Series:** Architectural Under Cabinet
**Length:** 1.1”
**Ballast:** Electronic
**Options:** **120 Volts only**

---

**Series:** Architectural Under Cabinet
**Length:** 1.25”
**Ballast:** Electronic
**Options:** **120 Volts only**

---

**Series:** Architectural Under Cabinet
**Length:** 1.25”
**Ballast:** Electronic
**Options:** **120 Volts only**

---

**Series:** Architectural Under Cabinet
**Length:** 1.25”
**Ballast:** Electronic
**Options:** **120 Volts only**
Fixtures for use in Food Processing, Handling & Preparation

Kenall lighting fixtures for use in food processing, handling and preparation areas have been investigated and listed by the National Sanitation Foundation (NSF) as conforming to the requirements in their criteria C2.

The purpose of criteria C2 is to ensure that equipment located in a food storage, handling, or preparation area will not compromise the sanitation requirements for those areas. Equipment listed to criteria C2 has been evaluated as to its corrosion resistance, cleanability and exposed material.

Specifically, exposed materials shall withstand normal wear, the corrosive action of foods, beverages, and cleaning compounds, and the material itself shall not impart an odor, color, taste, or toxic material to any food that would come in contact with it.

Within this category, NSF defines the surfaces of equipment as Food Contact or Non-Food Contact surfaces. Food Contact surfaces are further divided into areas as Food Zone, Splash Zone, and Non-Food Zone, with Food Zone requirements being the most stringent and Non-Food Zone being the least stringent.

A subcategory of Food Zone equipment is Non-Contact, i.e. equipment in the Food Zone but not normally in contact with the food.

Splash Zones (SN)

Kenall has two levels of fixture construction depending on the area where the fixtures are being installed.

Our SN type construction is listed for use in Splash Zones and Non Food Zones. All exposed sheet metal will be painted CRS, painted aluminum, or anodized aluminum. Fasteners will be stainless steel, and lenses can be acrylic, polycarbonate or tempered glass, all with prisms on inside.

Food Zones (FN)

The higher level of construction is our FN type construction for Food Zone/Non-Food Contact. Fixtures in this category are physically located in food preparation and handling areas but do not come in contact with the food under normal conditions. All exposed sheet metal will be painted CRS, painted aluminum, or anodized aluminum. Paint must meet U.S. Code of Federal Regulations, Title 21 to be used in this application. Fasteners will be stainless steel and removable without the use of a tool (thumbscrew type) and the outer exposed lens must be an FDA approved Food Grade polycarbonate material.

Kenall cannot recommend which level of construction is suitable for your specific application as the final decision will rest with the local inspector.
Limitations of Wet & Hosedown Ratings – UL Standards

UL standards for "wet" type ratings only offer a wet location rating, which simulates an outdoor rain condition. UL standards for a type 4 or NEMA 4 "hosedown" rating uses a 1 inch diameter nozzle on a fire hose delivering 65 gallons of water per minute. Various conditions exist where a fixture requires a rating better than a wet location label but not NEMA 4. These conditions typically exist in washdown applications where hose directed water or cleaning agents will be directed at the fixture.

Benefits of Ingress Protection Ratings – IEC Standards

The IP water rating of "5," described in IEC Standard 529, provides an intermediate step between the rain rating and the NEMA 4 rating. It also provides an internationally accepted standard which can be used to evaluate fixtures or any other electrical equipment, and the test can be performed by an independent third party testing agency for verification. Underwriters Laboratories in Northbrook, Illinois investigates products and tests to the IEC standard.

Dust-tight Protection

An additional test criterion that can be applied to fixtures is the ability to exclude solid matter. The IP solid rating of "6" (IP_6) means the fixture will be dust tight. The specified test requires that the fixture be placed in a circulating talc atmosphere for 3 hours. The particle size of the talc is a range of one to 75 microns and the fixture is placed under negative pressure in an attempt to draw the talc into the fixture. No talc shall be found inside the fixture after this test.

The Importance of Recognized Standards & Independent Testing

Other lighting manufacturers that claim a hosedown rating other than NEMA or IP are not testing to recognized standards and cannot have the tests confirmed or audited by an independent outside testing agency. Beware of statements such as "Tested to 75psi at 1 inch." No reference is made to the volume of water that is leaving the nozzle and impacting the product. In fact, high nozzle pressures typically have low water volumes because the nozzle is restricting the flow of water causing the pressure in the hose to increase, minimizing the amount of water leaving the nozzle.

Regardless of the hose pressure, any water volume less than 3.3 gal/minute is less severe than the IP_5 test. The most relevant characteristics are the diameter of the nozzle and the flow rate of the water.

The following chart shows the test characteristics for various Standards.

### IP STANDARDS CHARACTERISTICS

<table>
<thead>
<tr>
<th>Rating</th>
<th>Standard</th>
<th>Nozzle Dia</th>
<th>Flow Rate</th>
<th>Distance</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP_5</td>
<td>IEC 529/598</td>
<td>0.2 inches</td>
<td>3.3 gal/min</td>
<td>8-10 ft</td>
<td>15 min</td>
</tr>
<tr>
<td>NEMA4</td>
<td>NEMA 250</td>
<td>1.0 inches</td>
<td>65 gal/min</td>
<td>10-12 ft</td>
<td>5 min</td>
</tr>
<tr>
<td>Marine</td>
<td>UL 595</td>
<td>1.0 inches</td>
<td>115 gal/min</td>
<td>10 ft</td>
<td>5 min</td>
</tr>
</tbody>
</table>

Simple Seal Ratings

Kenall’s Simple Seal line of hosedown rated products are approved by UL and CUL for IP ratings according to IEC Standard 529.

What are IEC Standards?

IEC Standards are international standards that many European countries adopt as their national standard. North America has traditionally adopted UL standards as the source for standards. U.S. product manufacturers designed their products to IEC standards initially for sale overseas but are finding them increasingly useful here in North America.
### IP65

#### Degrees of protection indicated by the *first* characteristic numeral

<table>
<thead>
<tr>
<th>Numeral</th>
<th>Short Description</th>
<th>Brief details of objects which will be &quot;excluded&quot; from the enclosure</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Non-protected</td>
<td>No special protection</td>
</tr>
<tr>
<td>1</td>
<td>Protected against solid objects greater than 50 mm</td>
<td>A large surface of the body, such as a hand (but no protection against deliberate access). Solid objects exceeding 50 mm in diameter.</td>
</tr>
<tr>
<td>2</td>
<td>Protected against solid objects greater than 12 mm</td>
<td>Fingers or similar objects not exceeding 80 mm in length. Solid objects exceeding 12 mm in diameter.</td>
</tr>
<tr>
<td>3</td>
<td>Protected against solid objects greater than 2.5 mm</td>
<td>Tools, wires, etc., of diameter or thickness greater than 2.5 mm. Solid objects exceeding 2.5 mm in diameter.</td>
</tr>
<tr>
<td>4</td>
<td>Protected against solid objects greater than 1.0 mm</td>
<td>Wires or strips of thickness greater than 1.0 mm. Solid objects exceeding 1.0 mm in diameter</td>
</tr>
<tr>
<td>5</td>
<td>Dust-protected</td>
<td>Ingress of dust is not totally prevented but dust does not enter in sufficient quantity to interfere with satisfactory operation of the equipment</td>
</tr>
<tr>
<td>6</td>
<td>Dust-tight</td>
<td>No ingress of dust</td>
</tr>
</tbody>
</table>

#### Degrees of protection indicated by the *second* characteristic numeral

<table>
<thead>
<tr>
<th>Numeral</th>
<th>Short Description</th>
<th>Brief details of objects which will be &quot;excluded&quot; from the enclosure</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Non-protected</td>
<td>No special protection</td>
</tr>
<tr>
<td>1</td>
<td>Protected against dripping water</td>
<td>Dripping water (vertically falling drops) shall have no harmful effect</td>
</tr>
<tr>
<td>2</td>
<td>Protected against dripping water when tilted up to 15°</td>
<td>Vertically dripping water shall have no harmful effect when the enclosure is tilted at any angle up to 15° from its normal position</td>
</tr>
<tr>
<td>3</td>
<td>Protected against spraying water</td>
<td>Water falling as a spray at an angle up to 60° from the vertical shall have no harmful effect.</td>
</tr>
<tr>
<td>4</td>
<td>Protected against splashing water</td>
<td>Water splashed against the enclosure from any direction shall have no harmful effect.</td>
</tr>
<tr>
<td>5</td>
<td>Protected against water jets</td>
<td>Water projected by a nozzle against the enclosure from any direction shall have no harmful effects</td>
</tr>
<tr>
<td>6</td>
<td>Protected against heavy seas</td>
<td>Water from heavy seas or water projected in powerful jets shall not enter the enclosure in harmful quantities.</td>
</tr>
<tr>
<td>7</td>
<td>Protected against the effects of imersion</td>
<td>Ingress of water in a harmful quantity shall not be possible when the enclosure is immersed in water under defined conditions of pressure and time.</td>
</tr>
</tbody>
</table>
| 8       | Protected against submersion | The equipment is suitable for continuous submersion in water under conditions which shall be specified by the manufacturer.  
**NOTE** – Normally, this will mean that the equipment is hermetically sealed. However with certain types of equipment it can mean that water can enter but only in such a manner that it produces no harmful effects. |
Lighting Fixtures & Pressurized Environments

Large numbers of R&D, high-tech manufacturing and medical facilities contain areas in which environmental isolation and the prevention of cross-contamination are critical. Applications such as cleanrooms and surgical suites must be kept free of external contaminants while others, such as infectious disease isolation areas and R&D bio-containment spaces must prevent contaminants from escaping.

The need for environmental isolation in these areas is so critical that air pressure is used as a buffer against contamination. Positive pressure is employed where the introduction of foreign matter causes contamination, while negative pressure creates a barrier to contaminant egress where containment is the critical issue.

When anything – including a lighting fixture – penetrates the ceiling, it creates the potential for contaminant leakage. Consequently, luminaires must be free of openings through which contaminants can pass or that could result in a reduction of pressure. Simply put, a key performance requirement for lighting fixtures in pressurized environments is the ability to prevent leakage.

Leakage Prevention Standard

Unlike the European Community, there is no mandatory U.S. standard specific to luminaire leakage in pressurized applications. There is, however, a widely accepted leakage standard developed by the National Sanitation Foundation (NSF) in conjunction with the American National Standards Institute (ANSI) that can be effectively applied to light fixtures: NSF-49-2004a “Class II (Laminar Flow) Biosafety Cabinetry”.

Testing for stringent compliance at the same level and under the procedures prescribed in NSF-49-2004a determines the fixture’s ability to restrict the passage or penetration of contaminants in one or more directions when subjected to the prescribed pressure level. In short, it measures a fixture’s resistance to leakage in pressurized environments.

The test is performed using a special air-tight chamber containing a pressure plenum fabricated to simulate the type of ceiling surface to which the fixture will be mounted. The plenum is pressurized to the prescribed level and sealed; pressure readings are then recorded on a water gauge at five minute intervals. In order to comply with NSF-49-2004a levels, the fixture must be able to maintain two inches of pressure, plus or minus 10%, for 30 minutes.

Positive Pressure Applications

Cleanrooms

As spaces defined by their level of cleanliness, cleanrooms require lighting fixtures capable of supporting the highest levels of environmental integrity. Only by selecting a fixture that has been tested according to the methods outlined above can the specifier be certain it is free of gaps or holes through which contaminants can enter the space and have the design features and mechanical integrity – both within the fixture itself and at its points of contact with the ceiling – to maintain the target pressure level.

In addition, a fixture’s performance relative to cleanroom class requirements can be easily determined through a second test performed in conjunction with the NSF-49-2004a emulated test. This procedure, CRS-CCCS-GR229, or the Cleanliness Class Compatibility Study, measures the fixture’s ability to seal out, and not produce, airborne particles as small as 0.1 micrometer.

While specifiers have traditionally used Federal Standard 209E (Airborne Particulate Cleanliness Classes in Clean Rooms and Clean Zones) to define cleanroom classifications, the International Standards Organization (ISO) has now developed a new cleanroom rating system. The chart on the left below provides a comparison of ISO and Federal Standard 209E ratings; the chart to its right identifies the number of particles per cubic meter, by micrometer size, for each ISO cleanroom classification.

It’s important to note that although a manufacturer may claim a fixture has been tested within a certain class of cleanroom, this neither means the fixture has been tested according to accepted procedures nor that it meets the performance requirements of the intended application without, at a minimum, application of the two tests referenced above.

continued next page
**Hospitals**

Hospitals contain a variety of areas, including surgical suites, patient rooms and ICUs, that are similar to cleanrooms in that they use positive pressure as a barrier against contaminant ingress. Fixtures that comply with prescribed pressure testing are able to meet the leakage prevention requirements for these applications – for both contaminant ingress and the maintenance of target pressure levels – with a wide safety margin.

**Negative Pressure Applications**

Major breakthroughs in the biological and microbiological sciences have created new processes and requirements for bio-containment in both healthcare and scientific research facilities. Responding to growing needs for increasingly more effective containment techniques, bio-containment cabinet manufacturers have rapidly advanced in recent years, with a number of technologies and techniques now being applied to other equipment as well as to larger and more complex areas and environments.

Because these cabinets employ negatively pressurized interiors to provide the most effective bio-containment possible, they must be free of any holes, gaps, or other openings that could allow leakage compromising the effectiveness of the cabinet’s negative pressure-based contamination barrier. From this perspective, bio-containment cabinets have leakage-based performance requirements equivalent to those of lighting fixtures used in larger pressurized environments.

In essence, the requirements of lighting fixtures are the same whether the environment is negatively or positively pressurized, meaning that a fixture meeting the leakage prevention levels required in the NSF-49-2004a standard will be equally effective in either scenario.

**Research Facilities**

Several varieties of biological and chemical research labs require negative pressure barriers in order to contain dangerous organisms and chemicals, making them highly appropriate applications for fixtures conforming to the leakage prevention levels specified in NSF-49-2004a.

**Healthcare Facilities**

In hospitals and other healthcare facilities containing areas where patients infected with highly contagious or communicable diseases are isolated for treatment, as well as those for patients under observation and being tested for infections from dangerous organisms, are insulated from the outside world by negative pressure barriers and therefore require fixtures conforming to the referenced levels of performance in NSF-49-2004a.

**Independent Testing**

Testing a fixture for compliance with the leakage performance standards in NSF-49-2004a should only be performed by an independent testing lab with the certification, knowledge, experience and highly specialized equipment required to perform the test properly and accurately.

**Simple Seal Performance Results**

Independent laboratory tests have verified that Kenall Simple Seal fixtures comply with the performance levels specified in NFS-49-2004a and therefore provide an extra margin of protection against leakage for all intended applications.
Where is EMI a Concern?

Electromagnetic Interference (EMI) has long been a critical concern in scientific and healthcare facilities where it can cause the malfunction of life support and monitoring systems, surgical devices, and other electrically sensitive medical and scientific equipment. In recent years, concern over EMI has become widespread due to its potential impact on communications, security systems, manufacturing equipment, and a variety of sensitive electronic devices.

Limitations of Required EMI Standards

Unlike the European Community, the United States has no comprehensive standard for lighting-based EMI. Because high-frequency electronic ballasts operate within radio, television and other established communications bandwidths, the Federal Communications Commission (FCC) issues standards for Electromagnetic Compatibility (EMC) between certain devices as well as maximum radiated electromagnetic emissions levels for some equipment, including electronic ballasts.

FCC listings do not, however, provide a standard for fluorescent lamps – also radiators of EMI – or for complete luminaires. Further, the FCC does not issue standards for conducted emissions. The Food & Drug Administration (FDA) issues EMC standards for certain medical devices operating outside the FCC’s jurisdiction, but these standards typically do not apply to light fixtures.

Military Standard 461E

The most comprehensive, widely recognized and acknowledged domestic EMI standard is Military Standard (MIL STD) 461E, a mandatory standard for military hospitals and other EMI-sensitive military facilities and a voluntary standard for public and private facilities applications. MIL STD testing measurements cover both radiated and conducted emissions in addition to maximum allowable amounts of emitted energy based on both frequency range and field strength.

The MIL STD 461E testing procedures and requirements appropriate to light fixtures are found under Navy and Air Force Limits for Electronic Devices, with the specific testing information for conducted emissions outlined in CE 102-1 and for radiated emissions in RE 102-4. While both are designed to emulate worst case operating conditions, both the test procedures and the standards themselves are logical and reasonable.

Because MIL STD 461E standards are harder to meet than either the FCC or European Community standards, luminaires meeting them pose the lowest possible likelihood of causing EMI-related problems.

The Importance of Appropriate Standards & Government Certified Labs

There are some particularly important things to consider when evaluating or specifying fixtures for EMI sensitive applications.

First, in order to make sure the tests have been performed correctly and with procedural exactness, verify that the testing laboratory is accredited by either the National Institute of Standards and Technology (NIST) or the U.S. Dept. of Commerce (DOC).

Second, check to see that electromagnetic emissions have been measured from an application distance of one meter, as some labs incorrectly take these measurements from as far as 10 meters from the source.

Third, do not accept any manufacturer’s assurance that because the luminaire’s ballast carries an FCC listing, it meets safety requirements, since the ballast is only one potential source of EMI.

Simple Seal™ Fixtures & EMI

Kenall Simple Seal fixtures have been tested and proven to be in compliance with MIL STD 461E by an independent laboratory (DLS Electronic Systems, Inc.) accredited by both NIST and the U.S. DOC. Copies of test reports are available from Kenall.