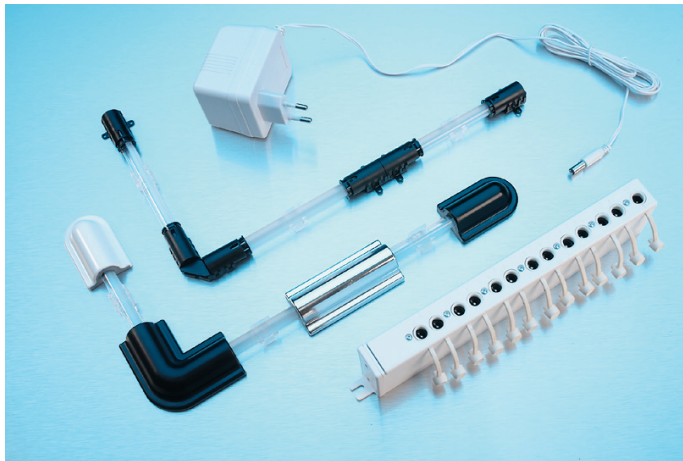




- M-Tubes from optoelectronic innovators Mentor GmbH deliver many of the properties of fluorescent or cold cathode technologies but have all of the advantages of LEDs.
- Either standard or hi-brightness LED-sourced light is input at each end of a crystal-clear light guide tube (both rigid and flexible versions are available). A printed reflective strip along the length of the tube delivers even, diffused and targeted light.
- There are no “hot spots” of lights as found with LED strips.
- M-Tubes are suitable for multiple applications including:-
  - Architecture - stairs and edges, emergency lighting, ambience / decorative lighting, cove lighting, lift doors etc.
  - Industrial electronics - switchgear cabinet illumination, service light, danger signals etc.
  - Household - illumination and backlighting of all kinds.
  - Automotive and marine - light curtains, signal lights, contour illumination , ambience/decorative lighting.
- The light guide tubes can be up to 700mm in length and either 6mm or 10mm diameter.
- Service life of around 50,000 hours to 50% brightness compares with typical tungsten bulb life of around 1,000 hours.
- Brightness level of a 548mm ultra-white hi-brightness M-Tube is 250lx compared with 307lx from a typical 10W 500mm fluorescent tube.
- Energy-efficient with minimal heat generation - in terms of cost per KWh, the hi-brightness version is 63% cheaper than fluorescent tube and 94% cheaper than tungsten bulbs (approximate).
- Service life is unaffected by on/off actuations.
- Immediate full luminosity (no warm-up).
- Impervious to extremes of temperature - operating range -40°C to +70°C.
- Available in red, green, blue and up to three Kelvins of white. RGB available on special order.
- Dimmability of all LEDs and RGB colour control are possible using alternative power sources (not supplied).

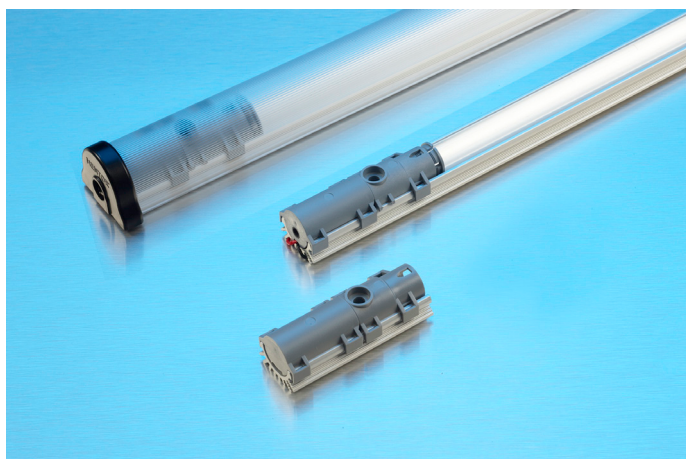
## Standard LEDs



- Standard LEDs for lower brightness illumination
- Available in a modular system

| Image                                                                                                                        | Order Code               | Mftrs. List No. | Description                                |
|------------------------------------------------------------------------------------------------------------------------------|--------------------------|-----------------|--------------------------------------------|
|                                                                                                                              | <a href="#">177-3048</a> | 1320.0610       | Ø6mm light guide (100mm long)              |
|                                                                                                                              | <a href="#">177-3049</a> | 1320.0630       | Ø6mm light guide (300mm long)              |
|                                                                                                                              | <a href="#">177-3050</a> | 1320.0650       | Ø6mm light guide (500mm long)              |
|                                                                                                                              | <a href="#">177-3051</a> | 1320.0670       | Ø6mm light guide (700mm long)              |
|                                                                                                                              | <a href="#">177-3052</a> | 1320.1010       | Ø10mm light guide (100mm long)             |
|                                                                                                                              | <a href="#">177-3053</a> | 1320.1030       | Ø10mm light guide (300mm long)             |
|                                                                                                                              | <a href="#">177-3054</a> | 1320.1050       | Ø10mm light guide (500mm long)             |
|                                                                                                                              | <a href="#">177-3055</a> | 1320.1070       | Ø10mm light guide (700mm long)             |
|                                                                                                                              | <a href="#">177-3046</a> | 1320.0002       | Split sleeve for Ø6mm M-Tube               |
|                                                                                                                              | <a href="#">177-3047</a> | 1320.0004       | Split sleeve for Ø10mm M-Tube              |
| <b>Note:-</b> Used to connect the light guide to the M-Tube LED housing. One split sleeve is required for every LED housing. |                          |                 |                                            |
|                                                                                                                              | <a href="#">177-3071</a> | 1321.1200       | • M-Tube housing with red std LED          |
|                                                                                                                              | <a href="#">177-3072</a> | 1321.1400       | ○ M-Tube housing with white 3,500K std LED |
|                                                                                                                              | <a href="#">177-3073</a> | 1321.1500       | ○ M-Tube housing with white 5,600K std LED |
|                                                                                                                              | <a href="#">177-3074</a> | 1321.1600       | • M-Tube housing with blue std LED         |
|                                                                                                                              | <a href="#">177-3075</a> | 1321.1800       | • M-Tube housing with green std LED        |
|                                                                                                                              | <a href="#">177-3076</a> | 1321.1201       | • M-Tube coupler with red std LED          |
|                                                                                                                              | <a href="#">177-3077</a> | 1321.1401       | ○ M-Tube coupler with white 3,500K std LED |
|                                                                                                                              | <a href="#">177-3078</a> | 1321.1501       | ○ M-Tube coupler with white 5,600K std LED |
|                                                                                                                              | <a href="#">177-3079</a> | 1321.1601       | • M-Tube coupler with blue std LED         |
|                                                                                                                              | <a href="#">177-3080</a> | 1321.1801       | • M-Tube coupler with green std LED        |

| Image | Order Code               | Mftrs. List No. | Description                                                                                                                       |
|-------|--------------------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------|
|       | <a href="#">177-3081</a> | 1321.1202       | • M-Tube corner housing with red std LED                                                                                          |
|       | <a href="#">177-3083</a> | 1321.1402       | ○ M-Tube corner housing with white 3,500K std LED                                                                                 |
|       | <a href="#">177-3084</a> | 1321.1502       | ○ M-Tube corner housing with white 5,600K std LED                                                                                 |
|       | <a href="#">177-3085</a> | 1321.1602       | • M-Tube corner housing with blue std LED                                                                                         |
|       | <a href="#">177-3086</a> | 1321.1802       | • M-Tube corner housing with green std LED                                                                                        |
|       | <a href="#">177-3056</a> | 1320.0011       | M-Tube end shade - Black<br>One plug 1320.0200 for Ø6mm or 1320.0400 for Ø10mm is required for each end shade.                    |
|       | <a href="#">177-3058</a> | 1320.0012       | M-Tube coupler shade - Black<br>Two plugs 1320.0200 for Ø6mm or 1320.0400 for Ø10mm are required for each coupler shade.          |
|       | <a href="#">177-3059</a> | 1320.0013       | M-Tube corner shade - Black<br>Two plugs 1320.0200 for Ø6mm or 1320.0400 for Ø10mm are required for each corner shade.            |
|       | <a href="#">177-3060</a> | 1320.0200       | Plug for Ø6mm M-Tube                                                                                                              |
|       | <a href="#">177-3061</a> | 1320.0400       | Plug for Ø10mm M-Tube                                                                                                             |
|       | <a href="#">177-3062</a> | 1320.0020       | Fastening device for Ø6mm M-Tube                                                                                                  |
|       | <a href="#">177-3063</a> | 1320.0040       | Fastening device for Ø10mm M-Tube                                                                                                 |
|       | <a href="#">177-3064</a> | 1321.1000       | Terminal box - use to connect power to up to 12 LED housings (six double-ended M-Tubes).                                          |
|       | <a href="#">177-3065</a> | 1321.0100       | M-Tube power supply extension cable (3m)                                                                                          |
|       | <a href="#">177-3066</a> | 1321.0010       | M-Tube terminal box to LED extension cable (3m)                                                                                   |
|       | <a href="#">177-3067</a> | 1321.0020       | M-Tube terminal box to LED extension cable (5m)                                                                                   |
|       | <a href="#">177-3068</a> | 1321.0030       | M-Tube terminal box to LED extension cable (10m)                                                                                  |
|       | <a href="#">177-3087</a> | 1321.2001       | M-Tube System Basic including AC/DC adapter (for use with one double-ended M-Tube).                                               |
|       | <a href="#">177-3088</a> | 1321.2002       | M-Tube System Basic (supplementary). Up to two of these can be added to 1321.2002 to power a total of three double-ended M-Tubes. |



- The Dragon LEDs used in Hi-Brightness M-Tubes deliver an impressive intensity of illumination whilst still retaining the benefits of low-energy and longevity.
- An aluminium profile regulates the thermo-management of these powerful LEDs, whilst at the same time acting as a reflector and an elegant design feature.
- As well as fully assembled units with sockets for power-in, unusual design requirements are accommodated for by the availability of modular components incorporating stranded wires for attachment to suitable power sources.

| Image                                                                                                                                                                                              | Order Code               | Mfrs. List No. | Description                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|----------------|-------------------------------------|
| <b>Modular</b>                                                                                                                                                                                     |                          |                |                                     |
| M-Tube Hi-Brightness LED and Housing (32.6mm alu) single module with stranded wire and split sleeve for Ø10mm flexible or rigid M-Tube light guides (one required for each unit.)                  |                          |                |                                     |
|                                                                                                                                                                                                    | <a href="#">177-3089</a> | 1322.1300      | ☼ Ultra-white (6,500K) Hi-Bright    |
|                                                                                                                                                                                                    | <a href="#">177-3090</a> | 1322.1400      | ○ Warm-white (3,500K) Hi-Bright     |
|                                                                                                                                                                                                    | <a href="#">177-3091</a> | 1322.1500      | ○ Standard-white (5,600K) Hi-Bright |
|                                                                                                                                                                                                    | <a href="#">177-3092</a> | 1322.1600      | ● Blue Hi-Bright                    |
|                                                                                                                                                                                                    | <a href="#">177-3093</a> | 1322.1800      | ● Green Hi-Bright                   |
|                                                                                                                                                                                                    | <a href="#">177-3095</a> | 1322.1200      | ● Red Hi-Bright                     |
| M-Tube Hi-Brightness LED and Housing (63.1mm alu) single module with DC/DC converter, stranded wire and split sleeve for Ø10mm flexible or rigid M-Tube light guides (one required for each unit.) |                          |                |                                     |
|                                                                                                                                                                                                    | <a href="#">177-3096</a> | 1322.1301      | ☼ Ultra-white (6,500K) Hi-Bright    |
|                                                                                                                                                                                                    | <a href="#">177-3097</a> | 1322.1401      | ○ Warm-white (3,500K) Hi-Bright     |
|                                                                                                                                                                                                    | <a href="#">177-3098</a> | 1322.1501      | ○ Standard-white (5,600K) Hi-Bright |
|                                                                                                                                                                                                    | <a href="#">177-3099</a> | 1322.1601      | ● Blue Hi-Bright                    |
|                                                                                                                                                                                                    | <a href="#">177-3101</a> | 1322.1801      | ● Green Hi-Bright                   |
|                                                                                                                                                                                                    | <a href="#">177-3102</a> | 1322.1201      | ● Red Hi-Bright                     |
|                                                                                                                                                                                                    | <a href="#">177-3052</a> | 1320.1010      | Ø10mm light guide (100mm long)      |
|                                                                                                                                                                                                    | <a href="#">177-3053</a> | 1320.1030      | Ø10mm light guide (300mm long)      |
|                                                                                                                                                                                                    | <a href="#">177-3054</a> | 1320.1050      | Ø10mm light guide (500mm long)      |
|                                                                                                                                                                                                    | <a href="#">177-3055</a> | 1320.1070      | Ø10mm light guide (700mm long)      |

## Hi Brightness LEDs

| Image                                                                                                  | Order Code                             | Mfrs. List No. | Description                               |
|--------------------------------------------------------------------------------------------------------|----------------------------------------|----------------|-------------------------------------------|
|                                                                                                        | <a href="#">177-3062</a>               | 1320.0020      | Fastening device for Ø6mm M-Tube          |
|                                                                                                        | <a href="#">177-3063</a>               | 1320.0040      | Fastening device for Ø10mm M-Tube         |
| <b>Complete Hi-Brightness units with aluminium profiles, DC/DC converters and female plug sockets.</b> |                                        |                |                                           |
| <b>448.3 mm long aluminium profile</b>                                                                 |                                        |                |                                           |
|                                                                                                        | <a href="#">177-3103</a>               | 1322.1320      | ☼ Ultra-white (6,500K) Hi-Bright LEDs     |
|                                                                                                        | <a href="#">177-3104</a>               | 1322.1420      | ○ Warm-white (3,500K) Hi-Bright LEDs      |
|                                                                                                        | <a href="#">177-3105</a>               | 1322.1520      | ○ Std-white (5,600K) Hi-Bright LEDs       |
|                                                                                                        | <a href="#">177-3106</a>               | 1322.1220      | ● Red Hi-Bright LEDs                      |
|                                                                                                        | <a href="#">177-3107</a>               | 1322.1620      | ● Blue Hi-Bright LEDs                     |
|                                                                                                        | <a href="#">177-3108</a>               | 1322.1820      | ● Green Hi-Bright LEDs                    |
|                                                                                                        | <b>548.3 mm long aluminium profile</b> |                |                                           |
|                                                                                                        | <a href="#">177-3109</a>               | 1322.1330      | ☼ Ultra-white (6,500K) Hi-Bright LEDs     |
|                                                                                                        | <a href="#">177-3110</a>               | 1322.1430      | ○ Warm-white (3,500K) Hi-Bright LEDs      |
|                                                                                                        | <a href="#">177-3111</a>               | 1322.1530      | ○ Std-white (5,600K) Hi-Bright LEDs       |
|                                                                                                        | <a href="#">177-3113</a>               | 1322.1230      | ● Red Hi-Bright LEDs                      |
|                                                                                                        | <a href="#">177-3114</a>               | 1322.1630      | ● Blue Hi-Bright LEDs                     |
|                                                                                                        | <a href="#">177-3115</a>               | 1322.1830      | ● Green Hi-Bright LEDs                    |
|                                                                                                        | <b>748.3 mm long aluminium profile</b> |                |                                           |
|                                                                                                        | <a href="#">177-3116</a>               | 1322.1340      | ☼ Ultra-white (6,500K) Hi-Bright LEDs     |
|                                                                                                        | <a href="#">177-3117</a>               | 1322.1440      | ○ Warm-white (3,500K) Hi-Bright LEDs      |
|                                                                                                        | <a href="#">177-3118</a>               | 1322.1540      | ○ Std-white (5,600K) Hi-Bright LEDs       |
|                                                                                                        | <a href="#">177-3119</a>               | 1322.1240      | ● Red Hi-Bright LEDs                      |
|                                                                                                        | <a href="#">177-3120</a>               | 1322.1640      | ● Blue Hi-Bright LEDs                     |
|                                                                                                        | <a href="#">177-3121</a>               | 1322.1840      | ● Green Hi-Bright LEDs                    |
|                                                                                                        | <b>948.3 mm long aluminium profile</b> |                |                                           |
|                                                                                                        | <a href="#">177-3122</a>               | 1322.1350      | ☼ Ultra-white (6,500K) Hi-Bright LEDs     |
|                                                                                                        | <a href="#">177-3123</a>               | 1322.1450      | ○ Warm-white (3,500K) Hi-Bright LEDs      |
|                                                                                                        | <a href="#">177-3125</a>               | 1322.1550      | ○ Std-white (5,600K) Hi-Bright LEDs       |
|                                                                                                        | <a href="#">177-3126</a>               | 1322.1250      | ● Red Hi-Bright LEDs                      |
|                                                                                                        | <a href="#">177-3127</a>               | 1322.1650      | ● Blue Hi-Bright LEDs                     |
|                                                                                                        | <a href="#">177-3128</a>               | 1322.1850      | ● Green Hi-Bright LEDs                    |
|                                                                                                        | <a href="#">177-3129</a>               | 1322.0020      | Diffuser cover with end caps (450mm long) |
|                                                                                                        | <a href="#">177-3130</a>               | 1322.0030      | Diffuser cover with end caps (550mm long) |
|                                                                                                        | <a href="#">177-3131</a>               | 1322.0040      | Diffuser cover with end caps (750mm long) |
|                                                                                                        | <a href="#">177-3132</a>               | 1322.0050      | Diffuser cover with end caps (950mm long) |
|                                                                                                        | <a href="#">177-3133</a>               | 1322.1000      | AC/DC adapter for HB M-Tubes              |
|                                                                                                        | <a href="#">177-3134</a>               | 1322.0100      | Power supply extension (3m)               |

## Standard LEDs

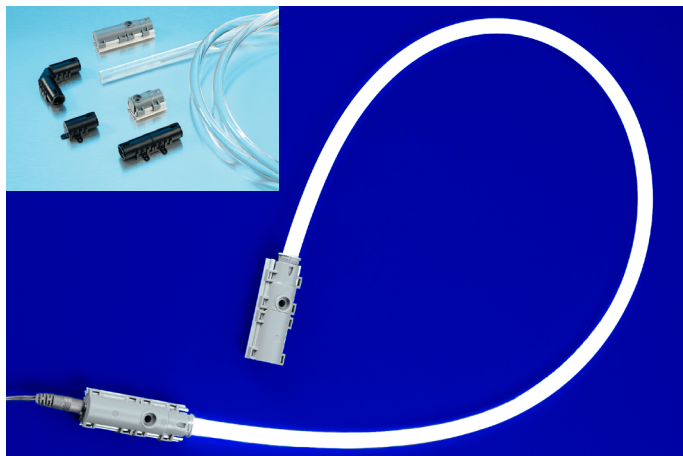
### Stranded Wire Version

| Image                                                                              | Order Code               | Mftrs. List No. | Description                         |
|------------------------------------------------------------------------------------|--------------------------|-----------------|-------------------------------------|
|    | <a href="#">178-1949</a> | 1320.1000       | M-TUBE HOUSING, STD, WIRED, EMPTY   |
|                                                                                    | <a href="#">178-1950</a> | 1320.1200       | M-TUBE HOUSING, STD, WIRED, RED     |
|                                                                                    | <a href="#">178-1951</a> | 1320.1400       | M-TUBE HOUSING, STD, WIRED, WRM WHT |
|                                                                                    | <a href="#">178-1952</a> | 1320.1500       | M-TUBE HOUSING, STD, WIRED, WHT     |
|                                                                                    | <a href="#">178-1953</a> | 1320.1600       | M-TUBE HOUSING, STD, WIRED, BLUE    |
|                                                                                    | <a href="#">178-1954</a> | 1320.1800       | M-TUBE HOUSING, STD, WIRED, GREEN   |
|                                                                                    | <a href="#">178-1955</a> | 1320.1900       | M-TUBE HOUSING, STD, WIRED, RGB     |
|  | <a href="#">178-1956</a> | 1320.1001       | M-TUBE COUPLER, STD, WIRED, EMPTY   |
|                                                                                    | <a href="#">178-1957</a> | 1320.1201       | M-TUBE COUPLER, STD, WIRED, RED     |
|                                                                                    | <a href="#">178-1958</a> | 1320.1401       | M-TUBE COUPLER, STD, WIRED, WRM WHT |
|                                                                                    | <a href="#">178-1961</a> | 1320.1501       | M-TUBE COUPLER, STD, WIRED, WHT     |
|                                                                                    | <a href="#">178-1962</a> | 1320.1601       | M-TUBE COUPLER, STD, WIRED, BLUE    |
|                                                                                    | <a href="#">178-1963</a> | 1320.1801       | M-TUBE COUPLER, STD, WIRED, GREEN   |
|                                                                                    | <a href="#">178-1964</a> | 1320.1901       | M-TUBE COUPLER, STD, WIRED, RGB     |

| Image                                                                              | Order Code               | Mftrs. List No. | Description                        |
|------------------------------------------------------------------------------------|--------------------------|-----------------|------------------------------------|
|  | <a href="#">178-1965</a> | 1320.1002       | M-TUBE CORNER, STD, WIRED, EMPTY   |
|                                                                                    | <a href="#">178-1966</a> | 1320.1202       | M-TUBE CORNER, STD, WIRED, RED     |
|                                                                                    | <a href="#">178-1967</a> | 1320.1402       | M-TUBE CORNER, STD, WIRED, WRM WHT |
|                                                                                    | <a href="#">178-1968</a> | 1320.1502       | M-TUBE CORNER, STD, WIRED, WHT     |
|                                                                                    | <a href="#">178-1969</a> | 1320.1602       | M-TUBE CORNER, STD, WIRED, BLUE    |
|                                                                                    | <a href="#">178-1970</a> | 1320.1802       | M-TUBE CORNER, STD, WIRED, GREEN   |

## Flexible Light Guides

use with Standard or Hi-Brightness LEDs



- Simply order these flexible light guides instead of rigid ones to add a twist to your lighting solutions!
- Compatible with both the standard LED and Hi-Brightness LED modules, flexible M-Tubes works on the same principle as rigid ones. LED-sourced light is input at each end and a printed reflective strip ensures even distribution of diffused light along the tube's length.
- There are no "hot spots" of lights as found with LED strips. Low-energy and longevity features remain the same as rigid M-Tubes.
- Choose standard LEDs for a mood-setting glow or hi-brightness LEDs for more intense illumination (dimmability is possible).

| Image                                                                               | Order Code                                                                                                                                                                                               | Mftrs. List No. | Description                             |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------|
|  | <a href="#">177-3135</a>                                                                                                                                                                                 | 1320.0631       | Ø6mm flexible light guide (300mm long)  |
|                                                                                     | <a href="#">177-3137</a>                                                                                                                                                                                 | 1320.0651       | Ø6mm flexible light guide (500mm long)  |
|                                                                                     | <a href="#">177-3138</a>                                                                                                                                                                                 | 1320.0671       | Ø6mm flexible light guide (700mm long)  |
|                                                                                     | <b>Note:-</b> Hi Brightness LED housings are supplied with split sleeves for Ø10mm rigid or flexible light guides. For other combinations of size/LED types, split sleeves should be ordered separately. |                 |                                         |
|                                                                                     | <a href="#">177-3139</a>                                                                                                                                                                                 | 1320.1031       | Ø10mm flexible light guide (300mm long) |
|                                                                                     | <a href="#">177-3140</a>                                                                                                                                                                                 | 1320.1051       | Ø10mm flexible light guide (500mm long) |
|                                                                                     | <a href="#">177-3141</a>                                                                                                                                                                                 | 1320.1071       | Ø10mm flexible light guide (700mm long) |
|  | <a href="#">177-3062</a>                                                                                                                                                                                 | 1320.0020       | Fastening device for Ø6mm M-Tube        |
|                                                                                     | <a href="#">177-3063</a>                                                                                                                                                                                 | 1320.0040       | Fastening device for Ø10mm M-Tube       |

- Flexible M-Tubes can easily be bent into the desired shape and location and are secured by means of transparent holders.
- Potential applications are limitless but include the illumination of round objects, mirrors, displays, advertising, vending machines, curved staircases etc.