

RAMA

Street lamp
2000

LIGHTING:

GENERAL DESCRIPTION:

For compact fluorescent lights of 57 or 70 W, or discharge lights of high-pressure sodium vapour, or metallic halides lights (max.150W).

WEIGHT: 8Kg

COVER AND LAMP HOUSING:

Attachment bridle made of grey, blue or brown injected polyamide with fibreglass reinforcement, aluminium reflector and hardened-glass diffuser.

DIFFUSER:

Tempered glass, 4 mm thick.

TECHNICAL SPECIFICATIONS:

| | |
|------------------|--------------------------|
| Lamp | 70W / 100W / 150W HIT-CE |
| Lamp holder | E27 / E40 / E40 |
| System power | 88W / 115W / 167W |
| Light efficiency | 77.64% |
| FHS rating | 0.0% |

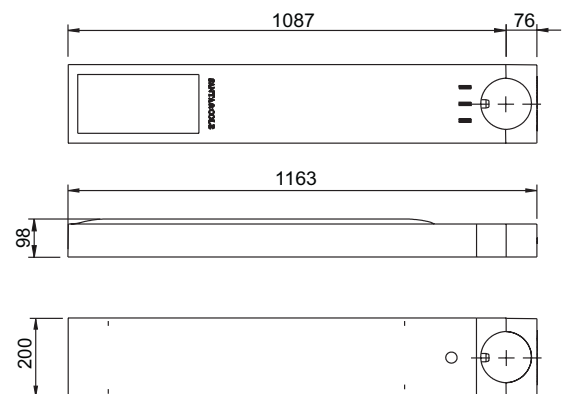
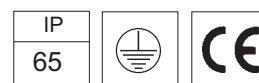
| | |
|------------------|-------------------------|
| Lamp | 70W / 100W /150W HST-MF |
| Lamp holder | E27 / E40 / E40 |
| System power | 83W / 115W / 170W |
| Light efficiency | 71.36% |
| FHS rating | 0.0% |

| | |
|------------------|------------------|
| Lamp | 57W / 70W TC-QEL |
| Lamp holder | GX24q - 5 / 6 |
| System power | 63W / 77W |
| Light efficiency | 58.13% |
| FHS rating | 0.0% |

| | |
|------------------|----------------------|
| Lamp | 50W / 150W HIT-DE-CE |
| Lamp holder | Rx7s |
| System power | 88W / 167W |
| Light efficiency | 77.42% |
| FHS rating | 0.0% |

| | |
|------------------|------------------|
| Lamp | 70W/ 150W HST-DE |
| Lamp holder | Rx7s |
| System power | 83W / 170W |
| Light efficiency | 71.22% |
| FHS rating | 0.0% |

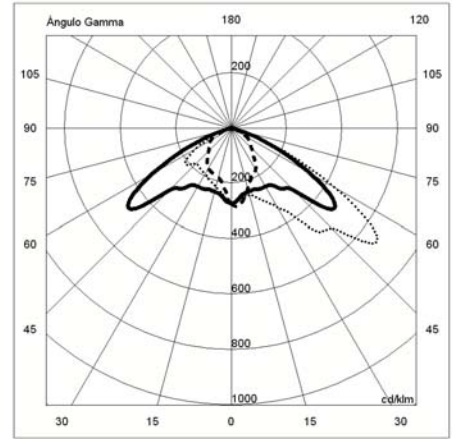
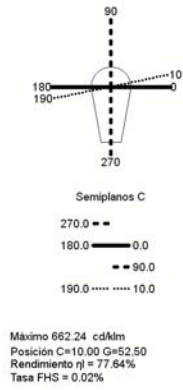
| | |
|--------------|-------------|
| Power supply | 230V - 50Hz |
|--------------|-------------|



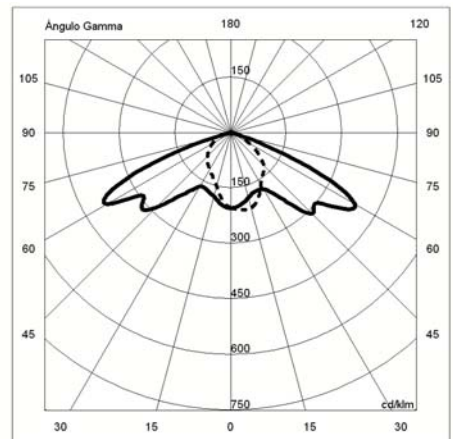
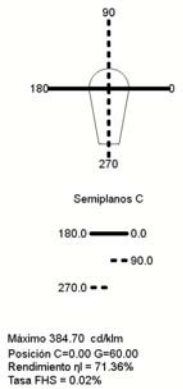
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2000

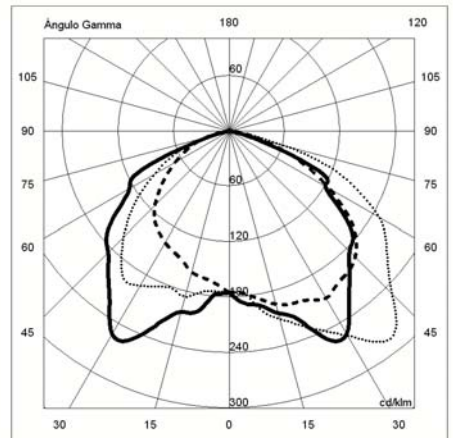
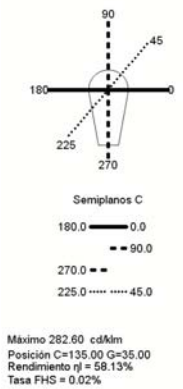
| code | MH lamp | | |
|-------|-----------------|-------------------------|--|
| RAF04 | 70W HIT-CE E27 | 88 W 230 V 50 Hz | |
| RAF05 | 100W HIT-CE E40 | 115 W 230 V 50 Hz | |
| RAF06 | 150W HIT-CE E40 | 167 W 230 V 50 Hz | |



| code | HPSV lamp | | |
|-------|--------------|-------------------------|--|
| RAF04 | 70W HST E27 | 83 W 230 V 50 Hz | |
| RAF05 | 100W HST E40 | 115 W 230 V 50 Hz | |
| RAF06 | 150W HST E40 | 170 W 230 V 50 Hz | |



| code | CF lamp | | |
|-------|------------------------|------------------------|--|
| RAF07 | (*) 57W TC-QEL GX24q-5 | 63 W 230 V 50 Hz | |
| RAF07 | (*) 70W TC-QEL GX24q-6 | 77 W 230 V 50 Hz | |



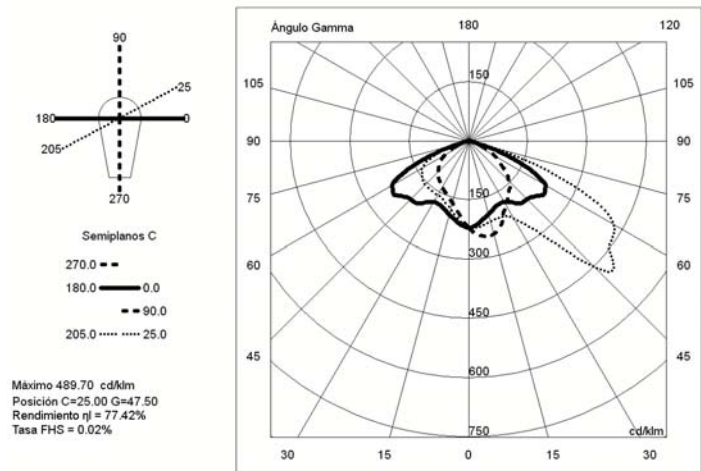
(*) Recommended lamp:
OSRAM DULUX T/E IN

RAMA

Street lamp
2000

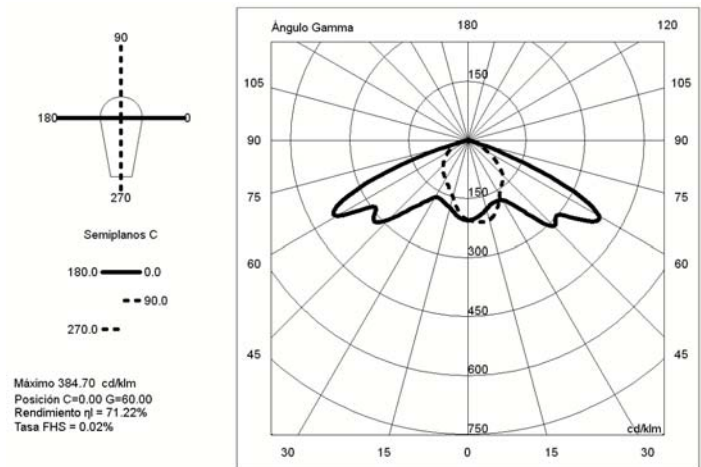
| code | MH lamp | |
|---------|-------------------|------------------------|
| RAF 104 | 70W HIT-DE-CERx7s | 88 W 230 V 50 Hz |

| | | |
|---------|--------------------|-------------------------|
| RAF 106 | 150W HIT-DE-CERx7s | 167 W 230 V 50 Hz |
|---------|--------------------|-------------------------|



| code | HPVS lamp | |
|---------|-----------------|------------------------|
| RAF 104 | 70W HST-DE Rx7s | 83 W 230 V 50 Hz |

| | | |
|---------|------------------|-------------------------|
| RAF 106 | 150W HST-DE Rx7s | 170 W 230 V 50 Hz |
|---------|------------------|-------------------------|



(*) Recommended lamp:
OSRAM DULUX T/E IN

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COLUMNS

GENERAL DESCRIPTION

Tubular column of different diameters and lights(according to refence).
1, 2 or 5 lights can be assembled.

Doble-section columns composed by squared or circular tube in the lower part and circular tube in the superior part.

COLUMN OF 4.7m/ 6,0m/ 6,2m HIGH:

Materials and finishings:

- Ø127 mm column of hot-galvanized steel S275 JR (4.7m and 6.2m).
- Ø127 mm column of hot-galvanized and painted steel S275 JR (4.7m and 6.2m).
- Ø129 mm column of polished stainless steel AISI 304 (4.7m and 6.2m).
- Ø127 mm column of anodized aluminium (4.7m and 6.2m).
- Ø127 mm column of painted aluminium (4.7m and 6.2m).

Doble-section columns:

Doble-section column assembled with 3 DIN 7984 M10x12:

- lower part: squared tube (140x140) or Ø152mm of painted galvanized steel.
- superior part: Ø129mm tube of stainless steel AISI 304.

Lights

1or 2 litghts of same heights can be assembled.
2 lights of different heights can be assembled to 6m and 6.2m columns

COLUMN OF 8.2m HIGH:

Doble-section columns welded or assembled with (3DIN7984 M10x12).

- lower part: Ø152.4m tube of galvanized, or galvanized and painted.
- superior part: Ø127mm tube of galvanized, or galvanized and painted or Ø129mm tube of painted stainless steel AISI 304.

Lights

1 or 2 lights of same heights can be assembled.
2 or 5 lights of different heights can be assembled.



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ANCHORAGE

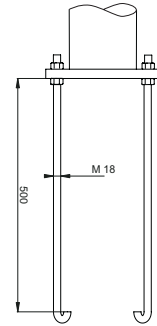
The columns are fixed using a reinforced concrete cube, made on site and anchorage bolts, 20cm below the ground.
The foundation should provide a slot for electrical connection.

GEOMETRICAL CHARACTERISTICS:

Length (m): 0.5
Diameter (mm): (M18)

MATERIALS:

Steel S 235 JR
Yield stress (MPa): 235
Ultimate stress (MPa): 400

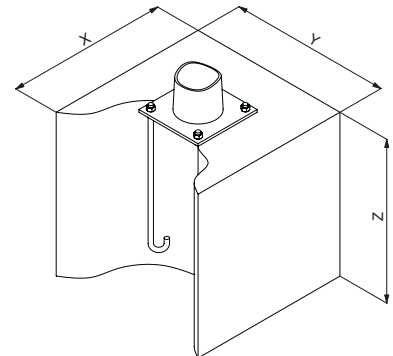


FOUNDATION CUBE

GEOMETRICAL CHARACTERISTICS:

| Columns | X | Y | Z |
|-----------|------|------|------|
| 4.7 | 0.65 | 0.65 | 0.60 |
| 6.0 / 6.2 | 0.80 | 0.80 | 0.70 |
| 8.2 | 0.90 | 0.90 | 0.70 |

(Dimensions in m)



MATERIAL:

Concrete HM-20
Typical resistance: 20 MPa

TERRAIN TYPE:

Terrain type II (according to UNE-EN40-3-1).
Allowable pressure: 1 Kg/cm²

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COLUMN 4.7m HIGH IN STAINLESS STEEL

GENERAL DESCRIPTION:

Ø129mm column made of polished stainless steel (AISI 304)

The columns are fixed using a reinforced concrete cube, made on site and anchorage bolts, 20cm below the ground.
The foundation should provide a slot for electrical connection.

GEOMETRICAL CHARACTERISTICS:

| | |
|---|--------|
| Height (m): | 4.7 |
| Maximum illuminated area (m ²): | 0,0993 |
| Thickness (mm): | 2 |

MATERIALS:

| | |
|--------------------------|-----|
| Stainless steel AISI 304 | |
| Yield stress (MPa): | 295 |

CHARACTERISTICS OF WIND PRESSURE:

| | |
|------------------------------------|-------|
| Reference speed (m/s): | 28 |
| Terrain category: | 1 |
| Wind pressure (N/m ²): | 450.8 |

SAG AT THE END:

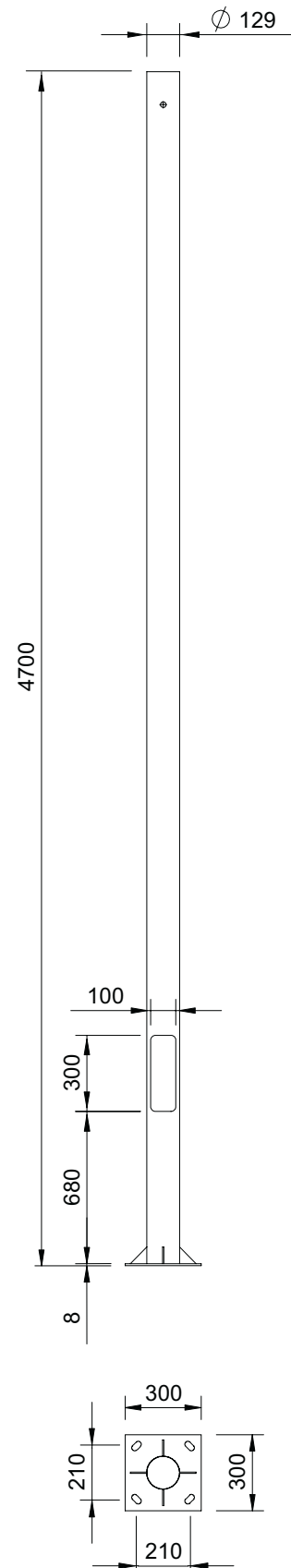
For x L/240
For y L/185

CRITICAL STRESSES:

| | |
|--------------------------|----------------|
| EMBEDMENT SECTION (h=0m) | 1Lum. / 2Lum. |
| Weight (KN): | 0.50 / 0.60 |
| Moment X (KNm): | 2.11 / 2.79 |
| Moment Y (KNm): | 1.69 / 1.63 |
| Wind speed X (KN): | 0.66 / 0.66 |
| Wind speed Y (KN): | 0.77 / 0.92 |
| Twisting moment (KNm): | 0.07 / 0.00 |
| Compound stress: X (MPa) | 68.40 / 66.10 |
| Y (MPa) | 85.40 / 112.60 |

| | |
|--------------------------------|-------|
| SECTION OF OPENING (h = 0.68m) | 1Lum. |
|--------------------------------|-------|

| | |
|--------------------------|------|
| Weight (KN): | 0.45 |
| Moment X (KNm): | 1.67 |
| Moment Y (KNm): | 1.30 |
| Wind speed X (KN): | 0.58 |
| Wind speed Y (KN): | 0.69 |
| Twisting moment (KNm): | 0.07 |
| Ultimate moment Y (KNm): | 3.12 |
| Ultimate moment X (KNm): | 5.01 |
| Ultimate stress (KNm): | 0.95 |



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COLUMN 4.7m HIGH IN GALVANIZED STEEL

GENERAL DESCRIPTION:

Ø127 column made of hot galvanized steel(S 275 JR)

The columns are fixed using a reinforced concrete cube, made on site and anchorage bolts, 20cm below the ground.
The foundation should provide a slot for electrical connection.

GEOMETRICAL CHARACTERISTICS:

| | |
|---|--------|
| Height (m): | 4.7 |
| Maximum illuminated area (m ²): | 0,0993 |
| Thickness (mm): | 3 |

MATERIALS:

| | |
|---------------------|-----|
| Steel S 275 JR | |
| Yield stress (MPa): | 275 |

CHARACTERISTICS OF WIND PRESSURE:

| | |
|------------------------------------|-------|
| Reference speed (m/s): | 28 |
| Terrain category: | 1 |
| Wind pressure (N/m ²): | 450.8 |

SAG AT THE END:

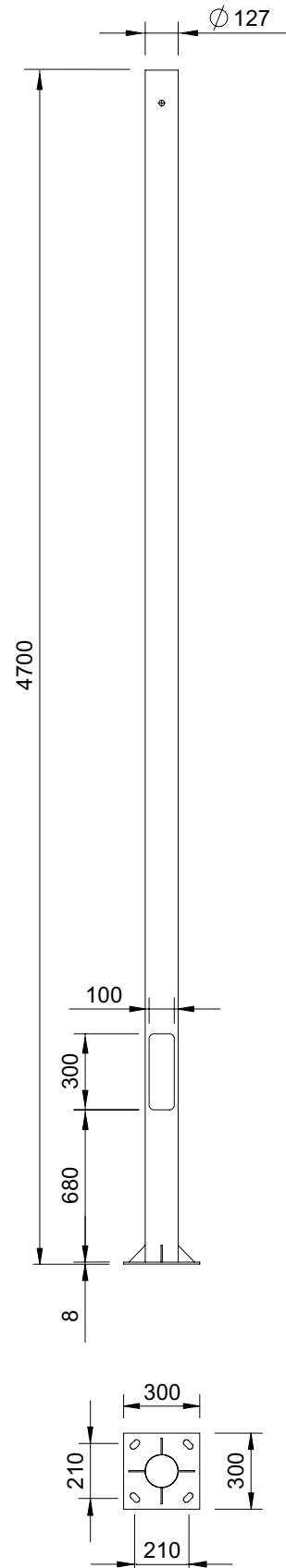
For x L/335
For y L/260

CRITICAL STRESSES:

| | |
|---------------------------------|---------------|
| EMBEDMENT SECTION (h=0m) | 1Lum. / 2Lum. |
| Weight (KN): | 0.68 / 0.79 |
| Moment X (KNm): | 2.11 / 2.79 |
| Moment Y (KNm): | 1.69 / 1.63 |
| Wind speed X (KN): | 0.66 / 0.66 |
| Wind speed Y (KN): | 0.77 / 0.92 |
| Twisting moment (KNm): | 0.07 / 0.00 |
| Compound stress: X (MPa) | 48.30 / 46.70 |
| Y (MPa) | 60.30 / 79.50 |

SECTION OF OPENING (h = 0.68m)

| | |
|--------------------------|------|
| Weight (KN): | 0.61 |
| Moment X (KNm): | 1.67 |
| Moment Y (KNm): | 1.31 |
| Wind speed X (KN): | 0.58 |
| Wind speed Y (KN): | 0.69 |
| Twisting moment (KNm): | 0.07 |
| Ultimate moment Y (KNm): | 5.14 |
| Ultimate moment X (KNm): | 8.23 |
| Ultimate stress (KNm): | 1.41 |



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COLUMN 6,0m HIGH IN STAINLESS STEEL

GENERAL DESCRIPTION:

Ø129mm column made of stainless steel (AISI 304)

The columns are fixed using a reinforced concrete cube, made on site and anchorage bolts, 20cm below the ground.
The foundation should provide a slot for electrical connection.

GEOMETRICAL CHARACTERISTICS:

| | |
|---|--------|
| Height (m): | 6,0 |
| Maximum illuminated area (m ²): | 0,0993 |
| Thickness (mm): | 2 |

MATERIALS:

| | |
|-------------------------|-----|
| Stainless steel AISI304 | |
| Yield stress (MPa): | 295 |

CHARACTERISTICS OF WIND PRESSURE:

| | |
|------------------------------------|-------|
| Reference speed (m/s): | 28 |
| Terrain category: | 1 |
| Wind pressure (N/m ²): | 450.8 |

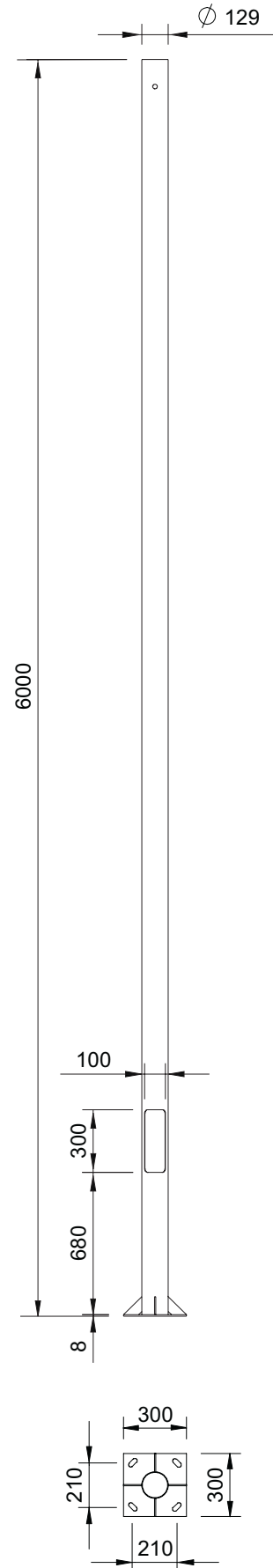
SAG AT THE END:

For x L/335
For y L/260

CRITICAL STRESSES:

| | |
|---------------------------------|-----------------|
| EMBEDMENT SECTION (h=0m) | 1Lum. / 2Lum. |
| Weight (KN): | 0.61 / 0.71 |
| Moment X (KNm): | 3.74 / 4.53 |
| Moment Y (KNm): | 3.00 / 2.95 |
| Wind speed X (KN): | 0.91 / 0.94 |
| Wind speed Y (KN): | 1.05 / 1.21 |
| Twisting moment (KNm): | 0.09 / 0.00 |
| Compound stress: X (MPa) | 121.00 / 119.00 |
| Y (MPa) | 151.00 / 183.00 |

| | |
|---------------------------------------|-------|
| SECTION OF OPENING (h = 0.68m) | 1Lum. |
| Weight (KN): | 0.55 |
| Moment X (KNm): | 3.04 |
| Moment Y (KNm): | 2.39 |
| Wind speed X (KN): | 0.84 |
| Wind speed Y (KN): | 0.98 |
| Twisting moment (KNm): | 0.09 |
| Ultimate moment Y (KNm): | 3.20 |
| Ultimate moment X (KNm): | 5.00 |
| Ultimate stress (KNm): | 0.95 |



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COLUMN 6,0m HIGH IN GALVANIZED STEEL

GENERAL DESCRIPTION:

Ø127 column made of hot galvanised steel (S 275 JR).

The columns are fixed using a reinforced concrete cube, made on site and anchorage bolts, 20cm below the ground.
The foundation should provide a slot for electrical connection.

GEOMETRICAL CHARACTERISTICS:

Height (m): 6,2
Maximum illuminated area (m²): 0,0993
Thickness (mm): 3

MATERIALS:

Stainlees steel AISI304
Yield stress (MPa): 275

CHARACTERISTICS OF WIND PRESSURE:

Reference speed (m/s): 28
Terrain category: 1
Wind pressure (N/m²): 450.8

SAG AT THE END:

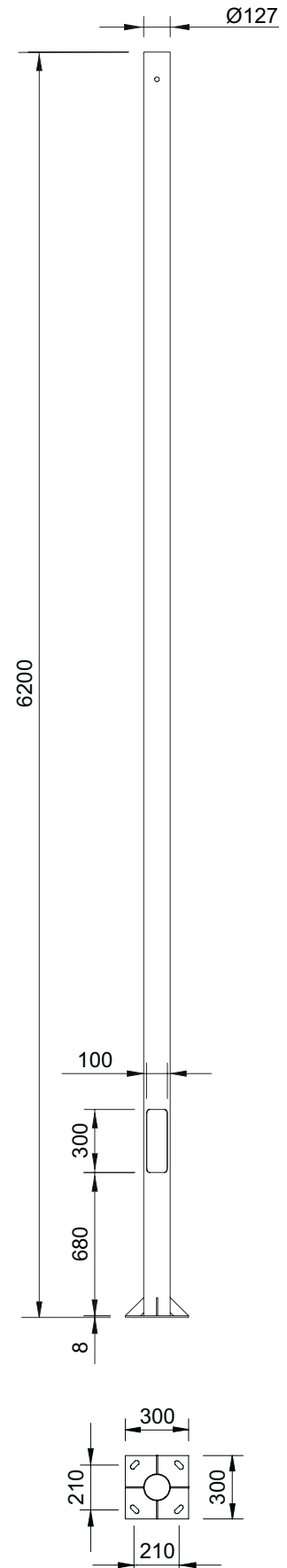
For x L/335
For y L/260

CRITICAL STRESSES:

| | |
|--------------------------|-----------------|
| EMBEDMENT SECTION (h=0m) | 1Lum. / 2Lum. |
| Weight (KN): | 0.84 / 0.94 |
| Moment X (KNm): | 3.74 / 4.53 |
| Moment Y (KNm): | 3.00 / 2.95 |
| Wind speed X (KN): | 0.94 / 0.94 |
| Wind speed Y (KN): | 1.08 / 1.21 |
| Twisting moment (KNm): | 0.09 / 0.00 |
| Compound stress: X (MPa) | 85.40 / 84.20 |
| Y (MPa) | 106.50 / 129.00 |

| | |
|--------------------------------|-------|
| SECTION OF OPENING (h = 0.68m) | 1Lum. |
|--------------------------------|-------|

| | |
|--------------------------|------|
| Weight (KN): | 0.75 |
| Moment X (KNm): | 3.04 |
| Moment Y (KNm): | 2.39 |
| Wind speed X (KN): | 0.84 |
| Wind speed Y (KN): | 0.98 |
| Twisting moment (KNm): | 0.09 |
| Ultimate moment Y (KNm): | 5.10 |
| Ultimate moment X (KNm): | 8.20 |
| Ultimate stress (KNm): | 1.41 |



RAMA

Street lamp
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COLUMN 4.7m / 6.20M HIGH IN ALUMINIUM

GENERAL DESCRIPTION:

Ø127 column of extruded anodized aluminium, the lower part is protected by a plastic cover.

The columns are fixed using a reinforced concrete cube, made on site and anchorage bolts, 20cm below the ground.

The foundation should provide a slot for electrical connection.

WEIGHT

| | |
|----------|---------|
| 4.7 high | 20kg. |
| 6.2 high | 26.3kg. |

COLUMN

Column made of extruded aluminium alloy AW-6060 T6 with anodized finishing.

Anodized finishing protects from corrosion, improves debilitation resistance and electric insulation.

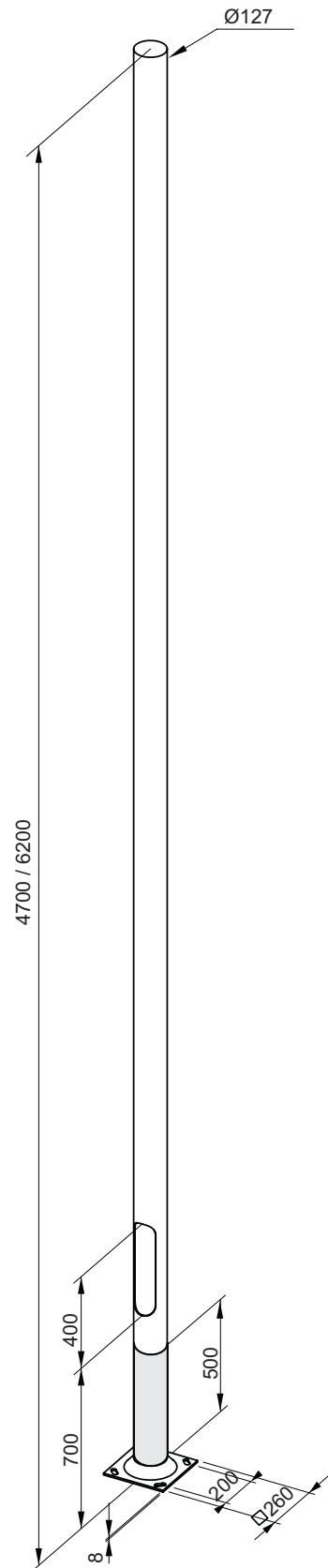
The lower part of the column(500m) is covered by a non porous plastic cover with insulating properties (250µ thickness)

AW-6060 T6 MECHANICAL PROPERTIES

| | |
|--------------------|-----------------------|
| Stretch limit | 150 N/mm ² |
| Breaking strength | 190 N/mm ² |
| HB hardness | 65 HB |
| Minimum elongation | 8 % |

AW-6060 T6 CHEMICAL COMPOSITION

| | |
|----------------|-------------|
| Silicon (Si) | 0.30-0.60 % |
| Steel(Fe) | 0.10-0.30% |
| Copper(Cu) | 0.10% |
| Manganese (Mn) | 0.10% |
| Magnesium(Mg) | 0.35-0.60 % |
| Chrome (Cr) | 0.05% |
| Zinc (Zn) | 0.15% |
| Titanium(Ti) | 0.10% |
| Other element | 0.15% |
| Aluminium (Al) | the rest. |



RAMA

Street lamp
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COLUMN 8,2m HIGHT IN GALVANIZAED STEEL

GENERAL DESCRIPTION:

Doble-section column of galvanized steel (S275JR):

- lower part: $\varnothing 152.4\text{m}$
- superior part: $\varnothing 127\text{mm}$

The columns are fixed using a reinforced concrete cube, made on site and anchorage bolts, 20cm below the ground.
The foundation should provide a slot for electrical connection.

GEOMETRICAL CHARACTERISTICS:

| | |
|---|--------|
| Height (m): | 8,2 |
| Maximum illuminated area (m ²): | 0,0993 |
| Thickness (mm): | 3 |

MATERIALS:

| | |
|---------------------|-----|
| Steel S 275 JR | |
| Yield stress (MPa): | 275 |

CHARACTERISTICS OF WIND PRESSURE:

| | |
|------------------------------------|-------|
| Reference speed (m/s): | 28 |
| Terrain category: | 1 |
| Wind pressure (N/m ²): | 450.8 |

SAG AT THE END:

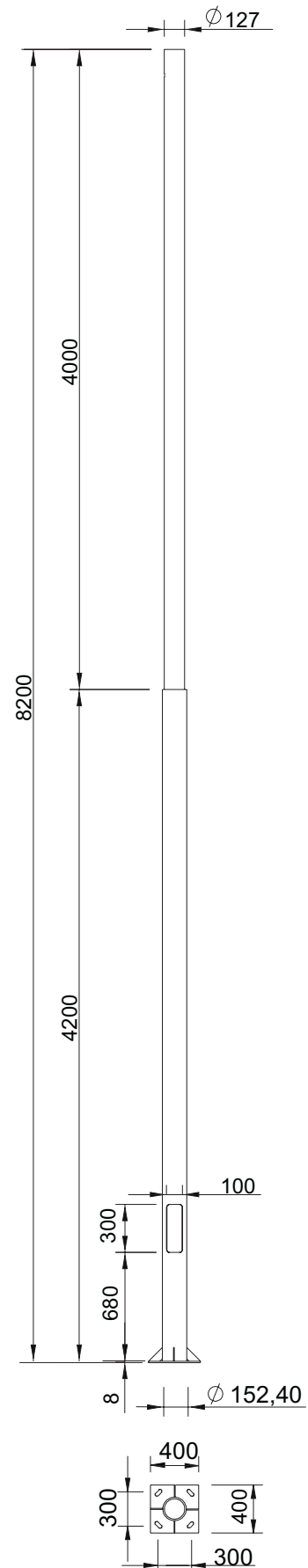
For x L/335
For y L/260

CRITICAL STRESSES:

| | |
|--------------------------|-----------------|
| EMBEDMENT SECTION (h=0m) | 1Lum. / 2Lum. |
| Weight (KN): | 1.22 / 1.33 |
| Moment X (KNm): | 6.14 / 7.76 |
| Moment Y (KNm): | 5.25 / 5.35 |
| Wind speed X (KN): | 1.15 / 1.18 |
| Wind speed Y (KN): | 1.27 / 1.48 |
| Twisting moment (KNm): | 0.09 / 0.00 |
| Compound stress: X (MPa) | 102.70 / 104.70 |
| Y (MPa) | 120.00 / 151.40 |

SECTION OF OPENING (h = 0.68m)

| | |
|--------------------------|-------|
| Weight (KN): | 1.12 |
| Moment X (KNm): | 5.31 |
| Moment Y (KNm): | 4.48 |
| Wind speed X (KN): | 1.07 |
| Wind speed Y (KN): | 1.19 |
| Twisting moment (KNm): | 0.09 |
| Ultimate moment Y (KNm): | 8.39 |
| Ultimate moment X (KNm): | 12.30 |
| Ultimate stress (KNm): | 3.00 |



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COLUMN 8,2m HEIGHT

GENERAL DESCRIPTION:

Doble-section column assembled with 3 DIN 7984 M10x12:

- lower part of painted galvanized steel $\varnothing 152.4\text{mm}$
- superior part of polished stainless steel $\varnothing 129\text{mm}$

The columns are fixed using a reinforced concrete cube, made on site and anchorage bolts, 20cm below the ground.
The foundation should provide a slot for electrical connection.

GEOMETRICAL CHARACTERISTICS:

| | |
|---|--------|
| Height (m): | 8,2 |
| Maximum illuminated area (m ²): | 0,0993 |
| Thickness $\varnothing 219$ (mm): | 4 |
| Thickness $\varnothing 129$ (mm): | 2 |

MATERIALS:

| | |
|---------------------|---------|
| Steel S 275 JR | |
| Yield stress (MPa): | 275/295 |

CHARACTERISTICS OF WIND PRESSURE:

| | |
|------------------------------------|-------|
| Reference speed (m/s): | 28 |
| Terrain category: | 1 |
| Wind pressure (N/m ²): | 450.8 |

SAG AT THE END:

For x L/335
For y L/260

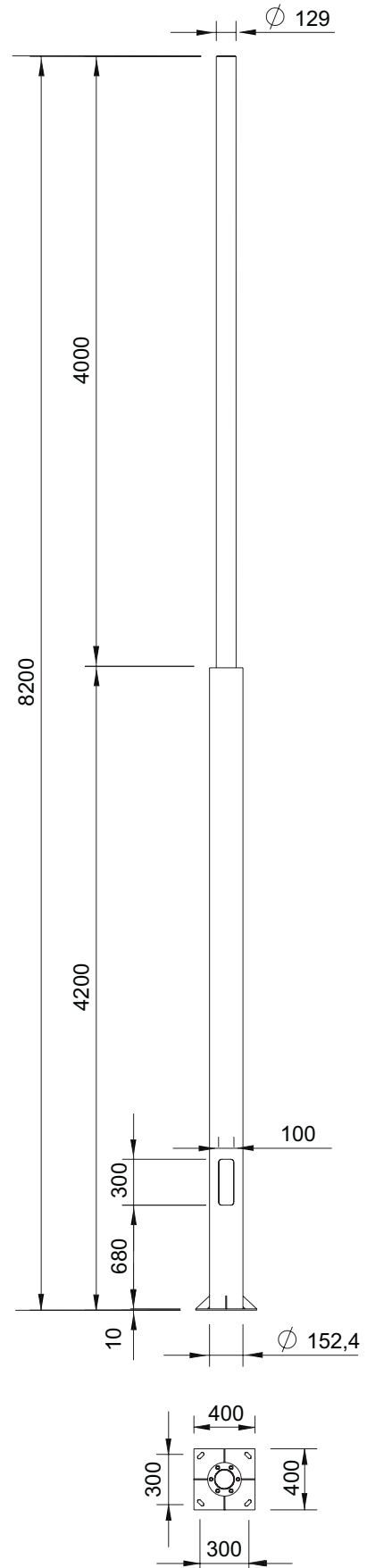
CRITICAL STRESSES:

EMBEDMENT SECTION (h=0m) 5Lum.

| | |
|------------------------|---------|
| Weight (KN): | 1.22 |
| Moment X (KNm): | 6.14 |
| Moment Y (KNm): | 5.25 |
| Wind speed X (KN): | 1.15 |
| Wind speed Y (KN): | 1.27 |
| Twisting moment (KNm): | 0.09 |
| Compound stress: | X (MPa) |
| 102.70 | Y (MPa) |
| 120.00 | |

SECTION OF OPENING (h = 0.68m)

| | |
|--------------------------|-------|
| Weight (KN): | 1.86 |
| Moment X (KNm): | 6.48 |
| Moment Y (KNm): | 6.80 |
| Wind speed X (KN): | 1.60 |
| Wind speed Y (KN): | 1.59 |
| Twisting moment (KNm): | 0.00 |
| Ultimate moment Y (KNm): | 31.00 |
| Ultimate moment X (KNm): | 39.00 |



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WALL ATTACHMENT

GENERAL DESCRIPTION:

Anchorage that allows to fix a RAMA light to vertical surfaces.
A wall bracket of bent AISI 304 stainless steel sheet in sand-finish.

AISI 304 MECHANICAL PROPERTIES

| | | |
|--------------------|-----|-------------------|
| Stretch limit | 210 | N/mm ² |
| Breaking strength | 520 | N/mm ² |
| Minimum elongation | 40 | % |
| HB hardness | 202 | HB |

AISI 304 CHEMICAL COMPOSITION

| | |
|----------------|---------|
| Carbon (C) | 0,08 % |
| Chromium (Cr) | 18-20 % |
| Nickel (Ni) | 8-12 % |
| Manganese (Mn) | 2,00 % |
| Silicon (Si) | 1,00 % |
| Sulphur (S) | 0,03 % |
| Nitrogen (N) | 0,04 % |

