General Description

The PolyTrough 1800 is a roof and ground-mountable parabolic trough collector developed for:

- High performance up to 250°C outlet temperature
- Ease of installation
- Flexible configurations
- Efficient shipping in ISO compliant containers
- Low cost per kWh delivered

The solar heat is used in thermal applications such as:

- Industrial processes (steam, water or oil)
- Solar cooling systems
- Organic Rankine Cycles (ORC) for power generation
- Desalination

Technical Data for the Base Module

<table>
<thead>
<tr>
<th>Geometry</th>
<th>Aperture area: 36.9 m²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Aperture width: 1.845 m</td>
</tr>
<tr>
<td></td>
<td>Length: 20.9 m</td>
</tr>
<tr>
<td></td>
<td>Height: 1.75 m</td>
</tr>
<tr>
<td></td>
<td>Focal length: 0.65 m</td>
</tr>
<tr>
<td></td>
<td>Rim angle: 71°</td>
</tr>
<tr>
<td>Concentration ratio: 54 (geometric)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight of complete module: 1,100 kg (30 kg/m² aperture area)</td>
</tr>
</tbody>
</table>
Performance Modelling
Annual thermal yield of an installed collector field is calculated by NEP Solar on a project specific basis with sophisticated and validated hourly simulation models. Certified performance measurement results and Solar Keymark Certification (based on European standard series EN 12975) are in preparation.

Energy Performance

**Nominal Thermal Performance**

- **Thermal Efficiency**: ~60% at 200°C mean collector temperature and 1000 W/m² DNI. Collector efficiency curves for a range of DNI radiation are shown below.
- **Nominal Output**: 22.2 kW per collector module or 0.60 kW per m² in nominal conditions and 200°C mean collector temperature.

**Annual Yield**
Annual yield depends on site and project characteristics and will be modelled by NEP Solar upon client request.

Note: These diagrams are results of numerical simulations. They are not based on any experimental data.
# Technical Data for the PolyTrough 1800

## Component Details

### Components of the Base Module

<table>
<thead>
<tr>
<th>Reflective Segment (16 segments per module)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Length:</strong> 1250 mm</td>
</tr>
<tr>
<td><strong>Width:</strong> 1845 mm (projected aperture)</td>
</tr>
<tr>
<td><strong>Depth:</strong> 16 mm</td>
</tr>
</tbody>
</table>

**Materials:** Aluminium mirror with self-supporting sandwich structure.

**Mirror:** Coated highly reflective and weather resistant aluminium reflector.

**Projected Mirror Area:** 4.61 m² per segment (8 segments per module)

**Reflectivity (DIN 5036-1 and -3):**
- Degree of total light reflection (Rho) >=93%
- Degree of solar reflection (AM 1.5) >=89%

### Torque Tube

| **Length:** 5 m segments (4 torque tube segments per collector) |
|**Diameter:** Large diameter manufactured tube. Carries the bending and the torsional load efficiently. |

**Materials:** Steel torque tube, with speciality anti-corrosion coating.

### Support Structure

**Mounting Stands:** Mounting stand assemblies support the torque tube and contain bearings to allow torque tube rotation.

**Materials:** Steel, hot dip galvanised.

### Tracking System

**Motor Drive:** Brushless DC motor.

**Motor Drive reduction:** Direct coupled planetary gearbox.

**Reduction Gearbox:** Direct drive slew gearbox.

**Controller:** Industry standard specialised solar tracking module with network to Master Control System.

**Tracking Logic:** Algorithm based high precision tracking system. Independent tracking per collector module with individual configuration. Any collector axis orientation is allowed.

### Receiver

**Absorber Tube:** Diameter 34 mm by 1.5 mm wall thickness by 2.5 m lengths; fully welded.

**Pressure Rating:** 96 bar at 200°C

**Material:** 1.4307 (EN1088) Stainless Steel tubing [AISI 304L] with mirror polished finish.

**Selective Coating:** Black chrome.

**Cover:** Diameter 56 mm borosilicate glass tube with 2.5 mm wall thickness by 2.5 m lengths with seals and breather to eliminate condensation and dust.
## Additional Components

### Additional Components per Basic Module

#### Measurement and Control Technology

**Temperature Sensors:** Industrial RTD temperature sensor at outlet end of each module’s receiver tube. Temperature sensors used during commissioning to balance flow and during operation to protect against stagnation and over-temperature.

#### Isolation and Safety Valves

Bleed valve on receiver tube to remove entrapped air.

Customer to supply ball type shut-off valve and globe or DRV (depending on size and layout of field) valve per module to isolate each module and balance the flow through the rows during commissioning.

### Additional Components in each Field

#### Master Control System

Proprietary collector field master controller for autonomous operation of the solar field according to temperature, flow and heat demand from the client system. Interface with client control system through industry standard protocols.