




Quality Tools for Smart Cleaning

A close-up photograph of a solar panel cleaning tool. The tool consists of a long, black and yellow telescopic handle connected to a yellow brush head. The brush head is positioned on a solar panel, which is part of a larger array on a roof. The background shows a clear blue sky and green trees.

Professional Cleaning of Solar Panels



Quality Tools for Smart Cleaning



ENVIRONMENTALLY FRIENDLY: Gentle and efficient cleaning with Pure Water and the Unger nLite®-System

nLite® and nLite® HydroPower is the chemistry free and environmentally friendly cleaning system for all solar systems!

EASY TO USE

with Pure Water Filters, Poles,
Goosenecks and Brushes



What is Pure Water?

It's water in its purest form, physically processed to remove the minerals that would otherwise lead to limescale spots and streaks. Such impurities are referred to as TDS (total dissolved solids) and are measured in ppm (parts per million).

The water is considered 100% demineralised (pure) when TDS is 0 ppm.

How does the cleaning effect work?

- Water always tries to have a balanced mineral content.
- By filtering the water all minerals are removed. The water takes them back from the dirt of the cleaned surface.
- When rinsing with water, the dirt runs down.
- The surface remains streakfree.
- You only need one cleaning step. The surface cleans by itself without residues.

What to consider when cleaning a PV-/Solar System?

- Avoid large temperature differences between water and surface.
- Especially in summer, the modules are very hot.
- The temperature difference between water and module surface should not be higher than 20°C.

What systems for water filtration are available?

- Reverse-Osmosis (RO) and Deionisation (DI).
- The difference is the frequency of use, the amount of needed water and the investment and maintenance cost.



WATERFILTER SYSTEMS:

DEIONISATION (DI)

The water is fed through ion exchange resin which attracts and removes the dissolved solids from water, producing a high purity water that's generally similar to distilled water. Deionization removes 100 % of the dissolved solids, producing very high quality water. Relatively inexpensive initial investment. All generated water can be consumed. Mobile for immediate set up.



FEATURES:

- 100% Pure Water production
- Without electrical power. Can independent be used everywhere
- High water production per hour, depending on water pressure

PURCHASE RECOMMENDATION:

- You are using the system rather sporadic
- You clean mainly smaller objects
- Handiness is more important than high performance

REVERSE OSMOSIS (RO)

The water passes through a membrane, which retains some of the water and most of the dissolved solids.

The purified water that passes through the membrane is called the "permeate".

RO can reduce the total dissolved solids content in water by app. 95-98 %.

Relatively high initial investment but nearly no maintenance cost.

Mobile for immediate set up.



FEATURES:

- 100% Pure Water by additional resin filter
- High Pure Water Output (app. 60%)
- High water production per hour (about 250l per person at HydroPower RO XXL (2 persons possible), about 350l/h at R030, about 700l/h at R060S)
- High Power Pump

PURCHASE RECOMMENDATION:

- You use the system regularly (every 1-2 days)
- You mainly clean large surfaces and a high water flow is required.
- For complete independence from tap water and at high water demand we recommend the mobile trailer HydroPower RO XXL with a large tank and a powerful RO filter system.



CONVENIENT AND SECURE: No ladders needed!

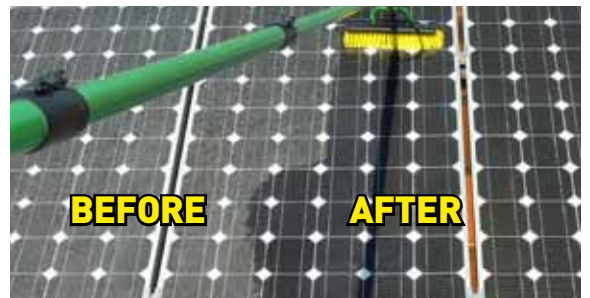
Optimal reach of solar panels through telescopic poles!



- The cleaning of solar panels becomes quick, easy and effective with the nLite®-system.
- Without using ladders or cranes and even without walking on the roofs.
- The modules can be cleaned in no time.
- The cleaning results are immediately visible and the solar output already rises considerably during the cleaning itself.



- Cleaning directly from the roof possible (please consider the work safety conditions).
- Recommendation: modular or telescopic poles (e.g. nLite® or HiFlo™ Advance).



- At hard to reach roofs a lift can be used.
- This should basically be avoided due to high cost.
- Telescopic poles provide the best handling at this usage.

- Immediately visible cleaning results
- Quick and easy removal of dirt.



WATERFED POLES

Several pole systems are available which differ in weight, function and price.

nLite®: modular telescopic poles, very flexible, easy to use and extendable. Solid aluminium pole or super light HiModulus Carbon fibre pole. 4 more material qualities are available.

HiFlo™ Advance: Glassfibre telescopic poles with clamp system for quick change of length.

nLite® ULTRA HI MODULUS CARBON FIBRE



- Telescopic Pole: Master 4 sections (6,63 m), Extension 2 sections (3,41m)
- Ultimate rigidity, super light
- Professional nLite®-technology
- Perfect for cleaning up to 20 m height

nLite® ALUMINIUM



- Telescopic Pole: Master 4 sections (6,00m or 4,50m), Extension 2 sections (3,00m)
- Extreme rigidity
- Professional nLite®-technology
- Perfect for cleaning up to 9 m height

More nLite® poles and many accessories available. Please ask for the Unger product catalogue.

HiFlo™ ADVANCE



- Durable glassfibre/carbonfibre telescopic pole
- Easy one hand operation with clamps
- Inner hose
- Perfect for cleaning up to 16 m height
- Different lengths available. More details see backpage

HiFlo™ CONTROL

Instant water flow control at the pole

- Fits onto the base sections of the pole
 - Hose fits inside the switch, under the lever
 - Adjust or shut off the water flow completely with one quick lever motion
 - Fits any poles Ø 20–70mm
 - Fits hoses external Ø 8 and 9mm
- # TMOOV



EFFICIENT: Significant increased performance!

To maintain the value and for a constant energy output regular cleaning is necessary!

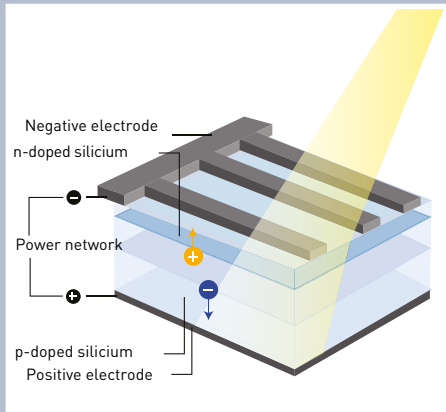


Fig. 1: Functional principle

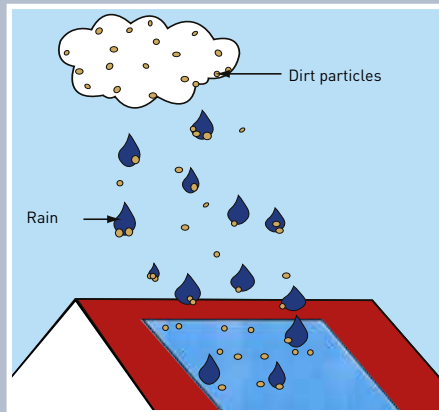


Fig. 2: Soilage

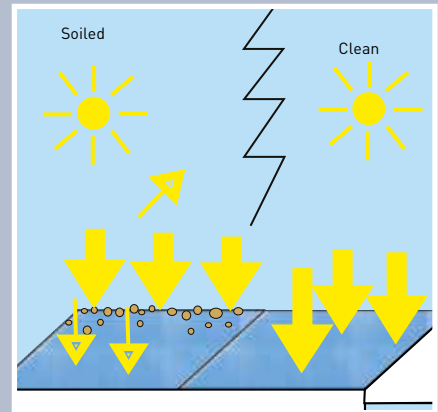
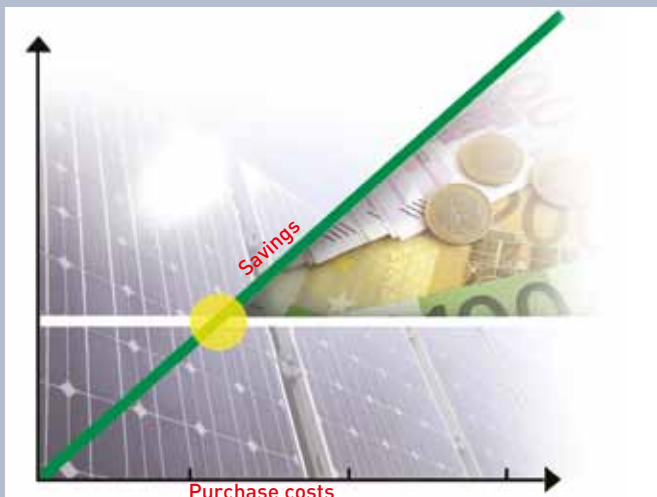


Fig. 3: Reduced incidence of light

- The self-cleaning effect through wind and rain is not sufficient to maintain the performance of a PV / solar module constant.
- Even with stronger inclination angles soil remains back, either on the surface or on the frame of the module.
- In the first year performance losses are seen and after 2-3 years they can already reach approximately 14%, which is confirmed by official studies.
- Soilage is primarily dust, cob webs, industrial, pollen, bird droppings, etc.
- For cleaning the right time is crucial. New modules should be cleaned at least after 2 years.
- The other intervals depend on the type of soil and location. Ideally, organise the cleaning in the spring (after pollination) and autumn (after harvest time).

Efficient – Saving right from the beginning!



The purchasing costs of the nLIt^e® system amortize themselves – depending on the size and the frequency of usage of the solar panels – within a very short period of time.

Saving of time due to easy and quick cleaning as well as the increased solar output due to the now possible shorter cleaning intervals lead to major savings.

The high-quality manufacturing of nLIt^e® results in long durability and low maintenance costs.



WATERFED BRUSHES

Superlight UNGER Brushes are designed to get into the smallest corners and effectively lift dirt from the surfaces with scrubbing action. Depending on the cleaning task, you can choose from universally applicable rectangular shaped brush or radius brush, designed for easy cleaning of sills and other angled objects.



Especially at farms the solar output can be increased due to the high soilage by dust and dirt.

SOLAR BRUSHES

nLite® Solar Radius Brush



- Superlight
- Flexible jet positions
- Soft and hard bristles
- Angled backing, for big surfaces
- Available in 27-60cm

HiFlo™ Solarbrush „Soft“



- Two jet positions
- Soft bristles.
- Best cleaning power
- Available in 27cm

RADIUS & SPECIAL BRUSHES

HiFlo™ Radiusbrushes



- Two jet positions
- Soft and hard bristles available
- Ideal for sills, corners and frames
- Available in 27cm

HiFlo™ Nylonbrush



- Two jet positions
- Medium hard bristles
- Good scrubbing power
- Available in 27 and 40 cm

nLite® Boarshair Brush



- Flexible jet positions
- Soft, natural bristles
- Best cleaning power
- Available in 27 and 40 cm



The nLite® System is particularly effective on mixed glass / solar facades.



Extremely quick and easy cleaning of modules in residential areas.

GOOSENECKS

- Optimal for hard to reach areas.
- Available as standard aluminium adapter or super light nLite® Carbon-Adapter.

Aluminium
(very robust)



Plastic
(adjustable)



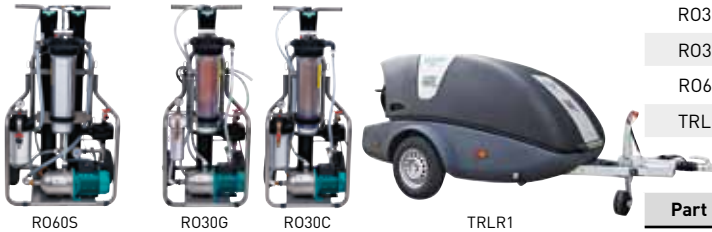
Carbon (nLite®)
(super light)



nLite® PV-/Solar-Cleaning System Product Overview

PURE WATER FILTER

RO-System (Reverseosmosis):



R060S

R030G

R030C

TRLR1

Part No.	l/h	Extra-Filter	Membrane	Usage
R030G	app. 350	Resin	single	Standard
R030C	app. 350	Chlorine+Resin	single	If chlorine is in water
R060S	app. 700	Chlorine (big)	double	High Performance
TRLR1	app. 250	Resin	single	Work independent

DI-System (Resin filter):



DI12x

DI24x

DI48x

Part No.	Resin Bags	Height	Equipment	Output*
DI48C	4	116 cm	Cart	1.490 l - 6.360 l
DI48W	4		Wheels	
DI24C	2	59 cm	Cart	670l -3140 l
DI24W	2		Wheels	
DI24T	2	Base	260 l-1570 l	
DI12W	1	Wheels		
DI12T	1	Base		

*depending on water hardness

WATER FED POLES

nLite® System:

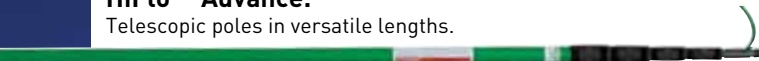
Telescopic poles, modular extendable.



More nLite®-poles and accessories are available. Ask for the Unger Product Catalogue

HiFlo™ Advance:

Telescopic poles in versatile lengths.



Further pole lengths (2,80m #FT28G, and 5,20m #FT52G available)

Part No.	Material	Version	Max. height	Weight
UH67G	Ultra HiMod	Master	20m	1,5 kg
UH35G	Ultra HiMod	Extension	20m	0,7 kg
AN60G	Aluminium	Master 6m	9m	2,0 kg
AN45G	Aluminium	Master 4,50m	9m	1,6 kg
AN30G	Aluminium	Extension 3,00m	9m	1,1 kg
FT40G	Glasfibre	Telescopic	4,00m	1,5 kg
FT70G	Glasfibre	Telescopic	7,00m	3,0 kg
FT84G	Glasfibre	Telescopic	8,40m	3,6 kg

WATERFED BRUSHES



nLite®

HiFlo™

HiFlo™

CarbonTec

nLite® natural bristles

More UNGER brushes are available. Ask for the Unger Product Catalogue

Part No.	Version	Width	Bristles	Jets
NL27Y	nLite® Solar	27 cm	Soft & Hard	4
NL40Y	nLite® Solar	40 cm	Soft & Hard	8
NL60Y	nLite® Solar	60 cm	Soft & Hard	12
FTSOY	HiFlo™ Solar	27 cm	Soft	2
FTR27	HiFlo™ Angle	27 cm	Soft	2
FBR27	HiFlo™ Angle	27 cm	Hard	2
CT27A	HiFlo™ CarbonTec	27 cm	Hard	2
NLE40	nLite® Natural	40 cm	Soft	8

GOOSENECKS

nLite® MultiLink: (light & solid, carbon fibre)



Plastic Angleadapter: (adjustable)



HiFlo™ MultiLink: (solid aluminium)



Part No.	Version	Length	Weight	Material
NLG20	nLite® short	20 cm	96 g	Carbon
NLG30	nLite® long	30 cm	102 g	Carbon
FTGOS	Gooseneck	15 cm	50 g	Plastic
FTMGS	HiFlo™ short	36 cm	190 g	Aluminium
FTMGL	HiFlo™ long	47 cm	200 g	Aluminium
FTPLS	HiFlo™ straight	25 cm	130 g	Aluminium

Product images may differ.
No responsibility accepted for accuracy; subject to change without notice.