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SLECI INSTALLATION MANUAL

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Project

MED-WET

Deliverable Leader

Robert-Schmidt-Institut der Hochschule Wismar University of Applied Sciences, Technology,
Business and Design
Philipp-Müller-Straße 14
23966 Wismar
Germany

Authors

Dipl.-Ing. Jan Siering, Prof. Dr.-Ing Harald Hansmann

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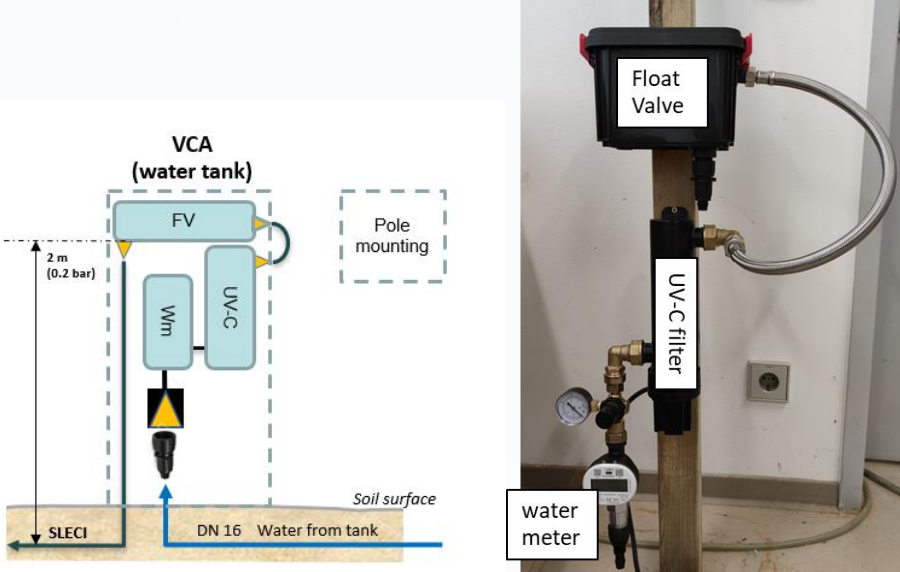

1. Introduction








“SLECI” technology (Self-regulating, Low Energy, Clay based Irrigation) is a self-regulating subsurface irrigation technique that uses the actual suction force of the surrounding soil for regulation of the system’s water release. Its concept, production and installation are simple and thus adaptable to rural environments saving on water and energy. Water is transported via clay tubes which have a higher suction tension than the applied hydraulic pressure, so the surface of the clay tubes stays damp.

The SLECI is a simple, clay-based, self-regulating invention that can increase crop production while saving on water and energy.

2. The SLECI System

1. Components of the SLECI-System

| No. | Part | Sketch/Photo |
|-----|---|--|
| A | <p>Vertical Control Assembly (VCA)</p> <p>Including</p> <ul style="list-style-type: none"> • water meter • Float valve • UV-C filter • inlet valve <p>With compression fittings</p> <ul style="list-style-type: none"> • to DN 16 pressure water • to DN 16 SLECI main line |  <ul style="list-style-type: none"> • designed for a pressure supply connection of more than 0.4 bar • maximum pressure connection: 3.5 bar • optional UV-C filter can be included • <i>not included</i>: water tank, DN 16 / 20 hoses, mounting pole |
| B | <p>PE-hose 6 x 4 mm</p> <p>connectable for SLECI elements</p> |  |

| | | |
|---|---|---|
| C | <p>SLECI-elements <i>Type A: branch-line (single-ended & open end)</i></p> <p><i>t-barbs 6-6-6 mm</i></p> |  |
| D | <p>Connectors SLECI</p> <p>connectable tube size:</p> <ul style="list-style-type: none"> • 6 x 4 mm • DN 16 mm <p><i>connection of the main line to SLECI lines</i></p> |  <p>t-barb 6-6-6mm T-barb 16-6-16 mm straight-way 6-6 mm</p> |
| F | <p>Endcaps</p> <p>connectable tube size:</p> <ul style="list-style-type: none"> • 6 x 4 mm |  |
| G | <p>Cable ties/ Endcaps</p> | <p>a) End closing DN 16 hoses or 6 mm hoses</p> <p>b) Fastening VCA to the vertical pole</p>  |
| H | <p>Mounting device for the VCA</p> | <p>Fastening Float Valve (FV)</p>  |
| I | <p>Digital pressure gauge</p> |  |
| J | <p>Water meter for Drip</p> |  |

| | | |
|---|---------------------------|---|
| K | Punching and cutting tool |  |
|---|---------------------------|---|

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2. SLECI element connection

The SLECI system includes two installation variants

- Type A: Clay emitters are connected to the main lines via branch lines
- Type B: Clay emitters are connected in a row (trenches required)

This manual contains type A. In this variant, the emitters are positioned in drill holes near the shoot axis of the plant (Fig. 1). The main pipe is on the ground surface or also buried (recommended). This system can be operated with a tank or a pressure water supply. This is a low-pressure system. Therefore, the installation of a pressure reducer (VCA, see chapter 3) is necessary.

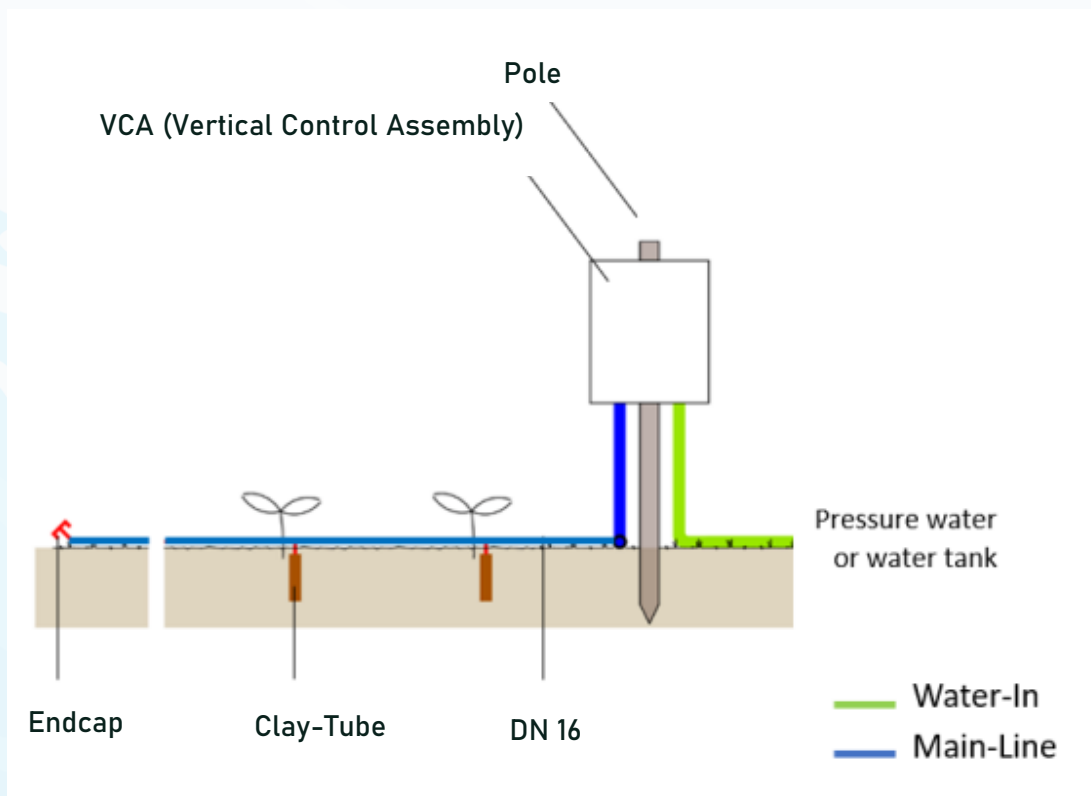


Figure 1: SLECI system Type A schematically

Option 1 – push in method

The core of the systems is the SLECI element consisting of a clay tube adapted to the individual conditions (type of crops and type of soil) and a preassembled connector to 6 mm hoses on one side. In order to push the connector into the main line, we recommend piercing a small hole in the main hose.

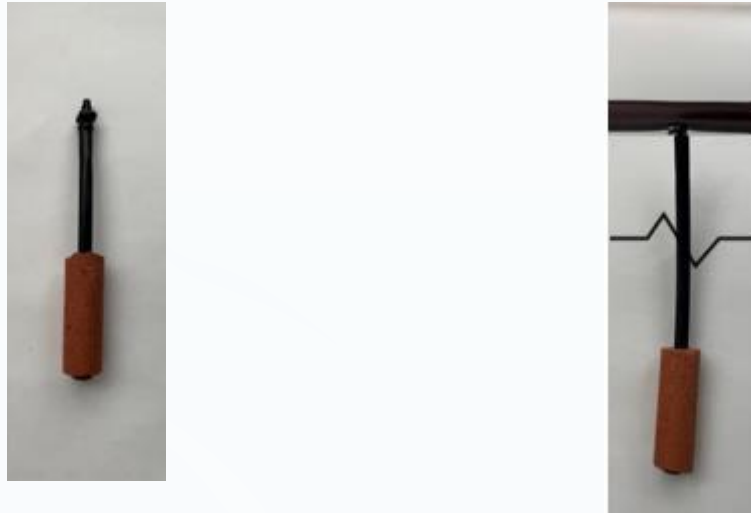


Figure 2: SLECI element (type A; single ended) SLECI elements will be connected to the 16 mm main by the appropriate branch line 6 mm extension

Option 2 – T-barb

The core of the systems is the SLECI element consisting of a clay tube adapted to the individual conditions (type of crops and type of soil) open end for assembly with a T-barb (16-6-16 mm) to the DN 16 main line



Figure 3: SLECI element (type A; single ended), open end SLECI elements will be connected to the 16 mm main line by T-barbs

Option 3 – SLECI ring installation

The core of the systems is the SLECI element consisting of a SLECI elements arranged in a ring by 6-6-6 mm t-barbs.

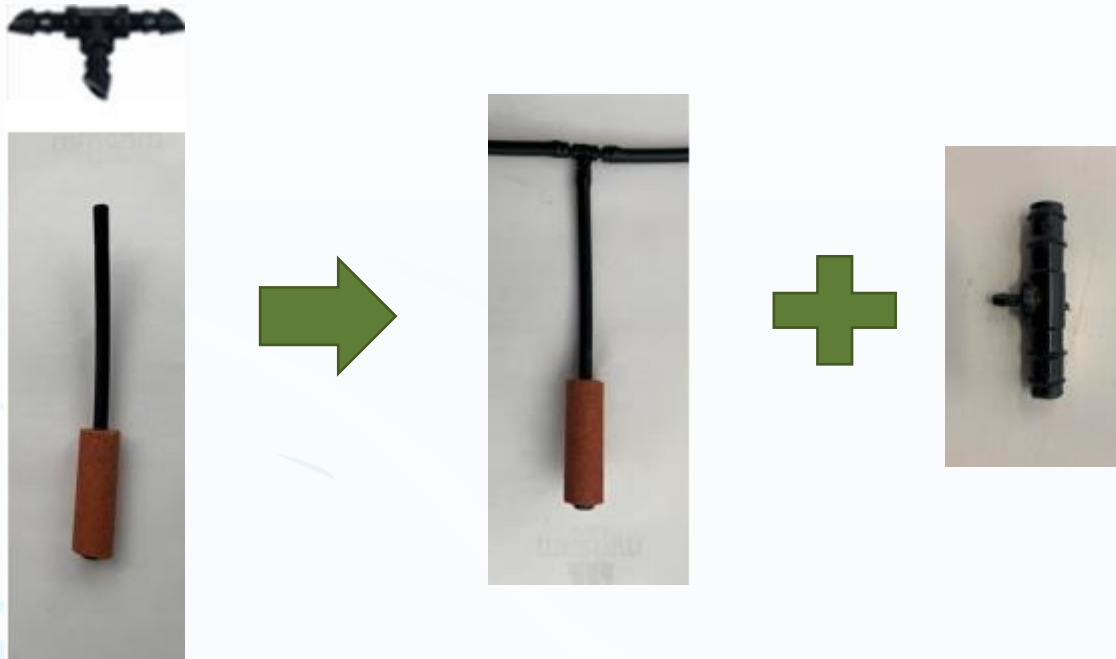


Figure 4: Connection Method of a SLECI-ring installation

The SLECI-elements (type A; single ended) will be connected to a SLECI ring of SLECI elements linked with 6-6-6 mm t-barbs. The SLECI rings will then be connected to the 16 mm main line by 16-6-16 mm T-barbs.

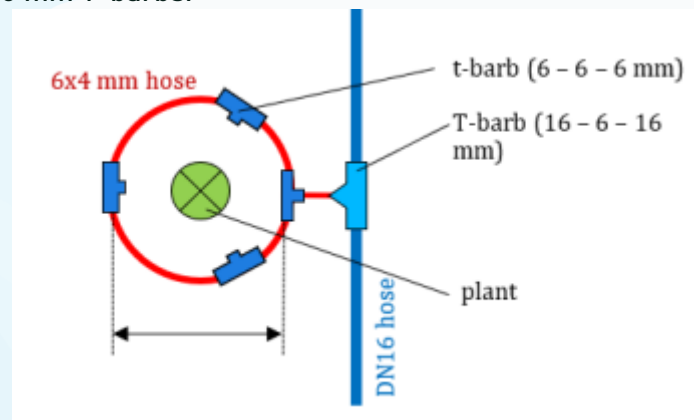


Figure 5: Schematic representation of the SLECI ring installation

3. VCA Vertical Control Assembly

The VCA is the interface between the irrigation water supply line and the main irrigation line. It contains a digital water meter, a Float valve (that has to be adjusted in height of 2.0 m above average depth level of the SLECI line) and a water meter. The VCA reduces the pre-pressure to 0.2 bar. If the water being used is already at a height of 2 m, installing the float valve is not necessary. However, it should be considered that the clay emitters should have an internal pressure of a maximum of 0.4 bar.

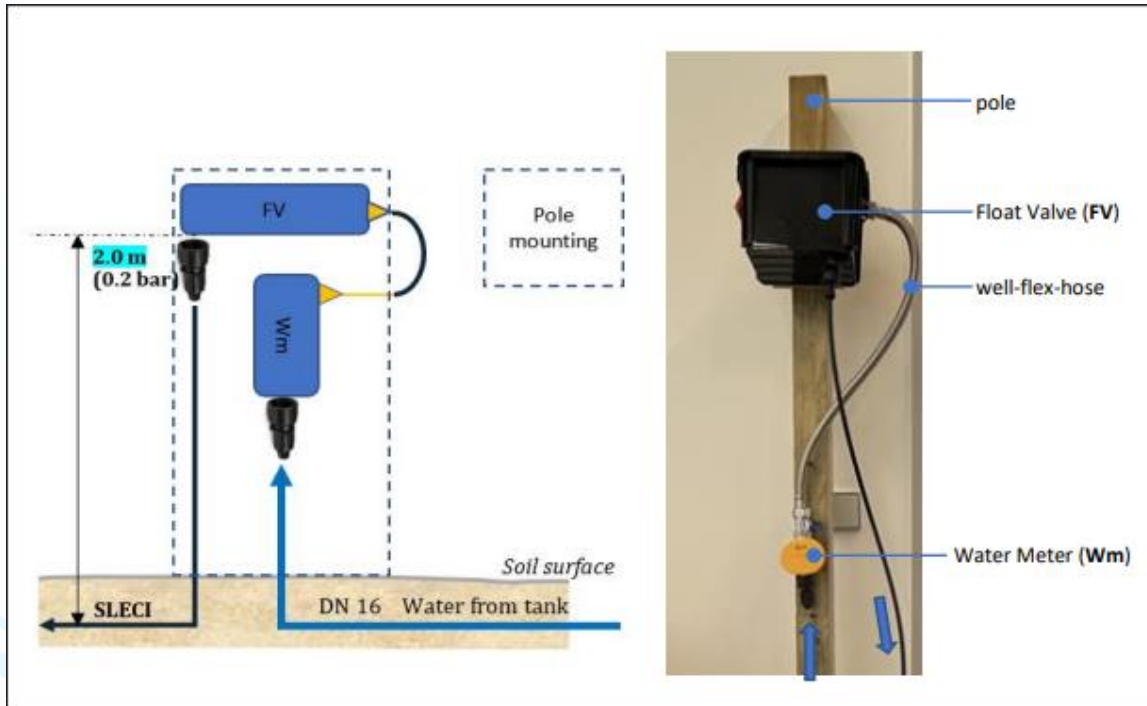


Figure 6: Schematic representation of the VCA

Irrigation Water supply:

The inlet of the VCA has to be connected on the field to the irrigation water supply unit, a water line connected to a water tank.

Position of the water tank:

Distance to VCA: < 5 m

Bottom level of the water tank: > 2 m

Water filters

The irrigation water has to be filtered at the entrance of the water tank by:

- a sand filter
- 50 micron mesh filter
- 1 micron mesh filter

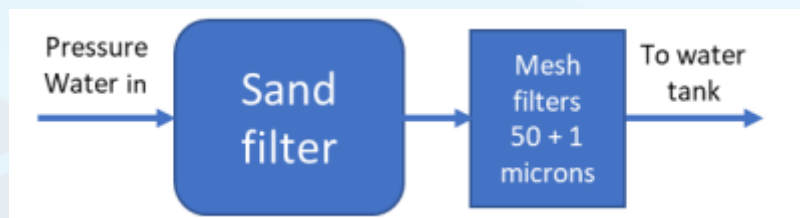


Figure 7: filter system recommended

4. Irrigation Plan & SLECI-Kit

The Irrigation Plan includes an overview of the rows of plants to be irrigated (Fig. 8). The following parameters are determined:

- ✓ crop type & number
- ✓ number of crop rows
- ✓ numbers of plants per row
- ✓ water reservoir: tank or pressure water supply
- ✓ required hose lengths of the main lines
 - distances between the crops
 - distances between the rows
- ✓ needed additional parts to ensure the VCA connection

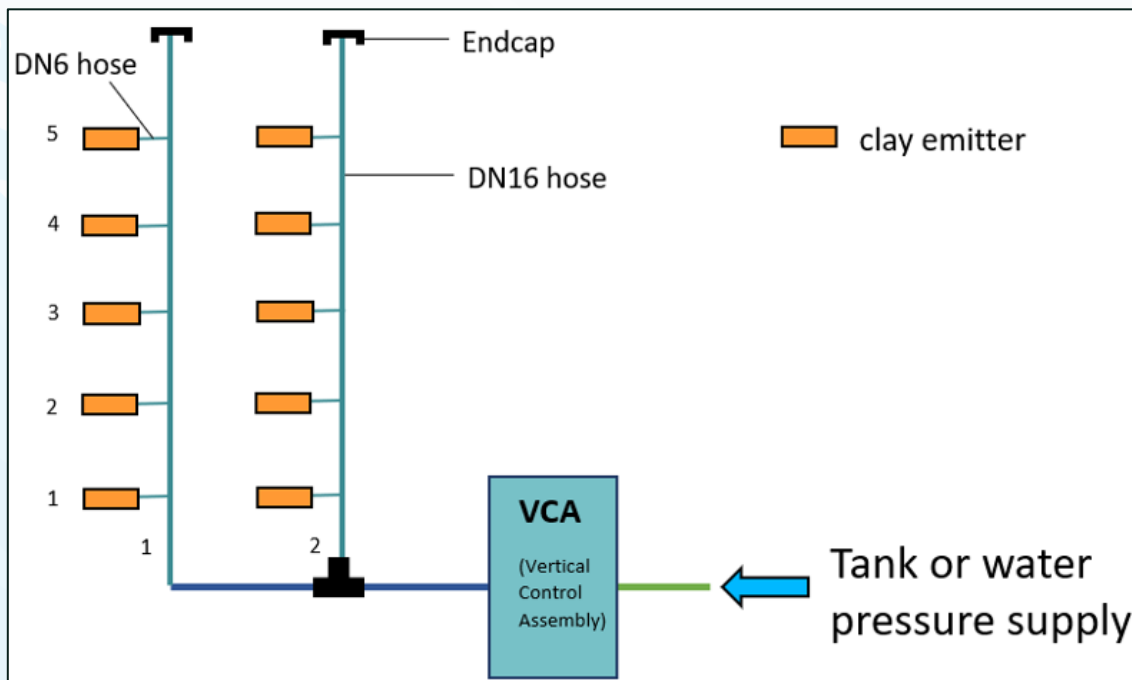



Figure 8: Clear map of a SLECI irrigation plan for 10 crops

The SLECI kit will contain the parts calculated from the irrigation plan. The number of clay bodies required per crop depends on the water needs of the crop. Please note that the filter system and DN16 or larger hoses with their adapters and/or connectors are not included in the kit as standard. The following parts are typical of the scope of the SLECI kit:

SLECI – Irrigation Kit

- SLECI - elements
- Vertical Control Assembly (VCA)
 - Float Valve Assembly (FV)
 - Smart water meter [Qualsonic W1](#)
 - mounting plate
 - UV-C filter*
 - pressure valve*
- DN 6 mm hose
- end caps, connectors for 6 mm connection
- digital manometer for checking operability
- punching tool for main line connection* 
- manual
- irrigation plan



**parts only included if necessary*

Figure 9: SLECI-Kit

5. Position of the SLECI elements

The bore-holes are drilled in the soil at a given position to the trunk of the plants. A small amount of fine hydrophilic sand is filled in the holes. Then the clay-tubes are put in and the entire holes are filled with sand.

Please notice that you first make a test run before putting the clay-tubes in the holes. The length of the hoses of the clay-tubes can also be enhanced by connecting 6x4 mm hoses with straight-way connectors.

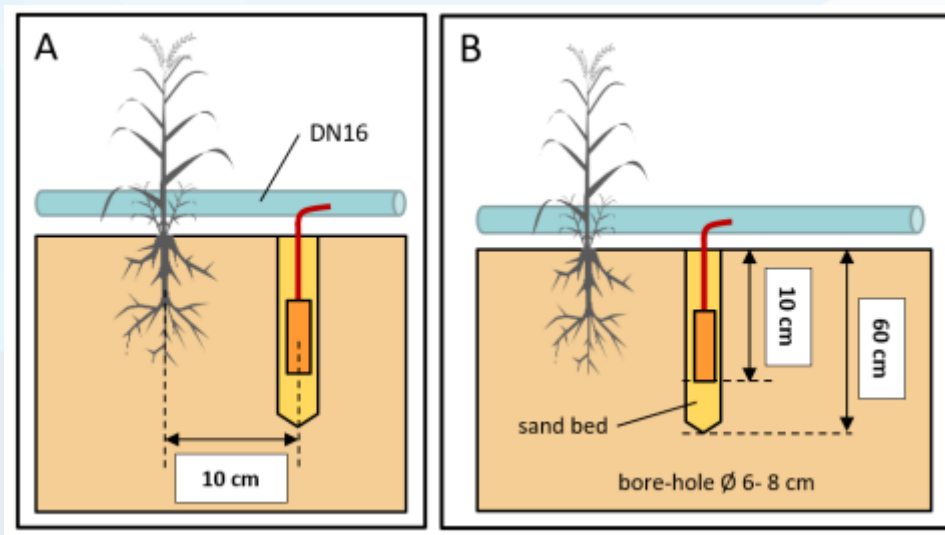


Figure 10: Side view: SLECI elements in boreholes, embedded in sand bed \varnothing 6-8 cm, depth 60 cm

6. Test Run

For the test run, the end caps of the connected main lines are first removed. Once the water flows out without large volumes of air, the end caps can be reconnected. The functionality of the VCA and the individual SLECI elements is checked. Drops of water should be visible from the SLECI element. Otherwise an exchange is required.



<https://www.medwet-eu.com/>



med-wet@hs-wismar.de



0049 3841 753-7649



**Hochschule Wismar
University of Applied Sciences
Technology, Business and Design
Philipp-Müller-Straße 14
Haus 21 · Raum 202b
23966 Wismar, Germany**

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