Polytech
Wind for life™

INSTALLATION INSTRUCTION

ELLE® Shells Replacement

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1. General Information

1.1 Change Description

The table below describes changes compared to the previous revision of the document.

Section	Description
	Version 8.0
Document name	Rename document name to: *LE-I002 8.0_en ELLE® Shells Replacement*.
Section 1.4 Installation Instructions	Text updated (document name)
Section 3.1 step 4	Text updated (document name)
Section 3.7 Step 3	Text added.
Section 3.8 Before Starting	Text updated (document name)
	Version 7.0
All	New template. Various editorial changes throughout.
1.3 Icons and Notes	New section added.
1.4 Required Documentation	*LE-Q003_Acceptance Catalog – Installation of ELLE® Shell* added.
2.2 Tools and Consumables	**Tools:** Type of application roller, application squeegee, non-woven wheel and rubber cleaner changed to Special Polytech tool. **Consumables:** Cloths and sandpaper added.
3.1 Function Description	Section deleted.
3.2 Technical Data	Section merged with *2.1 Environmental Conditions*.
3.1 Measuring of Damaged ELLE®	New section.
3.2 Removal of Undamaged ELLE™	Section renamed from “Identify damaged ELLE™ - Start by loosen undamaged ELLE™”.
3.7 Preparation of Surface	New picture added to Step 3.
3.9 Removal of Center Liner	New picture added to Step 1.
3.10 Positioning of New ELLE™	Step 2 rephrased.
3.11 Pressure-activation of ELLE™	New picture added to Step 2.
3.14 Curing Time	Information regarding release of rotor and WTG idle mode added.

1.2 Safety

1.2.1 Qualifications of Personnel

The table below defines which tasks can be assigned to qualified, trained and instructed personnel.

Task	Personnel
All	Qualified personnel ■ Personnel who, based on their specialist training, knowledge and experience and knowledge of the relevant regulations, are able to assess the work assigned to them and identify possible hazards.
Installation	Trained personnel ■ Personnel trained in the operation and safe use of the product.
Packaging and Transport	Instructed personnel ■ Personnel instructed in the tasks assigned to them.

1.2.2 PPE (Personal Protective Equipment)

Wear PPE as defined in the table below.

	**For all tasks** Wear foot protection.
	**For all tasks** Wear eye protection.
	**For all tasks** Wear protective gloves.
	**For tasks where sufficient venting is not possible** Wear respiratory protection. ■ Recommended filter type: A2, P2.

1.3 Icons and Notes

The table below defines the meaning of icons that appear in this document.

Icon	Definition
	**Caution** or **Warning** Details about risk of personal injury.
	**Note** Details about risk of property damage.
	Reference to additional documentation.
	Details about time constraints.

1.4 Required Documentation

The table below lists other required documentation.

Safety Data Sheet	■ CENTAUR 960 SDS ■ IPA Sprit 99,9% Polytech ■ Sika® Aktivator-205
Technical Data Sheet	■ Polytech TDS Centaur 960 ■ Polytech TDS ELLE® ■ Sika® Aktivator-205
Installation Instruction	■ LE-Q003 ELLE® Shells Acceptance Catalog Installation ■ LE-I003 ELLE® Shells Repair of Detachment ■ LE-I006 ELLE® Shells Surface Preparation ■ LE-I007 ELLE® Shells Installation

1.5 Abbreviations

The table below defines the abbreviations used in this document.

Abbreviation	Full Form
ELLE®	Everlasting Leading Edge
IPA	Isopropanol Alcohol
PPE	Personal Protective Equipment
SDS	Safety Data Sheet
TDS	Technical Data Sheet
WTG	Wind Turbine Generator

2. Preparation

2.1 Environmental Conditions

The table below defines the temperature and humidity requirements during installation.



Refer to Technical Data Sheets for storage and transportation requirements.

Property	Value	Unit
Ambient temperature	5 ... 35 41 ... 95	°C °F
Surface temperature:	5 ... 50 41 ... 122	°C °F
Permitted relative humidity	30 ... 90	%

2.2 Tools and Consumables

Tools	
Item	**Type**
Application gun	-
Application roller	Special Polytech tool
Application squeegee	Plastic spatula, special Polytech tool
Chisel	-
Non-woven wheel	Special Polytech tool
Rubber cleaner	Special Polytech tool
Sprayer	-
Straight grinder	Minimum 750 W with adjustable speed up to 7000 min^{-1}

Consumables	
Item	**Type**
Adhesive	Centaur 960
Cleaning agent	Isopropanol 99.9%
Cloths	Lint-free
Masking tape	-
Sandpaper	Grit 220 to 240
Surface activator	Sika® Aktivator-205

3. Installation

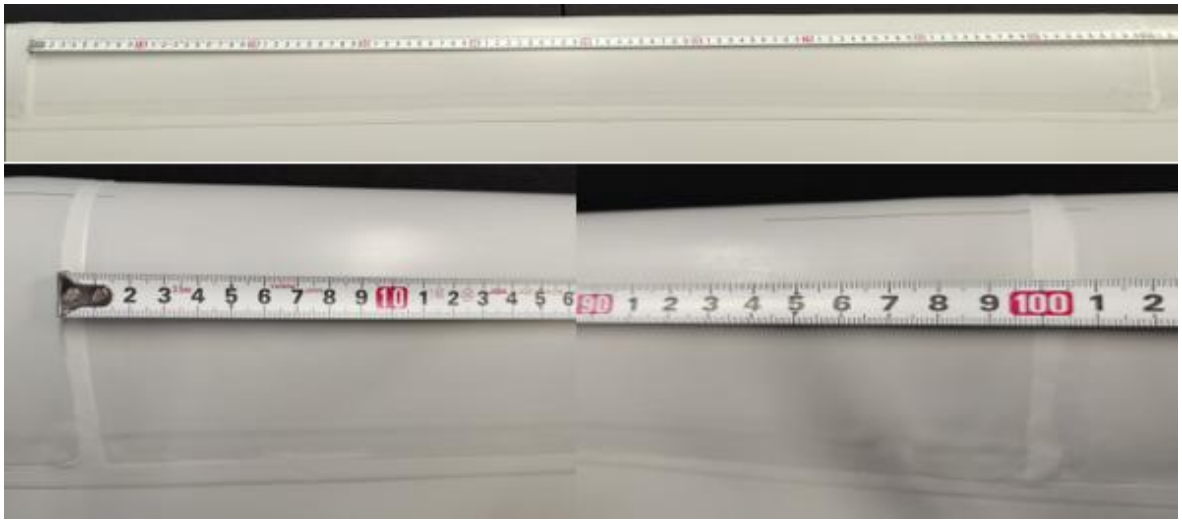
3.1 Measuring of Damaged ELLE®

Step 1

Locate the damaged ELLE®.

Step 2

Measure the length of the damaged ELLE® from ELLE® start to ELLE® overlap.



Step 3

Check if an ELLE® that fits is available.

- A distance of 5 mm from the minimum position mark in both ends is acceptable.

Exceeding the maximum position marks is not accepted. If it is not possible to stay within the position marks, remove extra ELLE® until tolerances are in place.



Step 4

If a suitable ELLE® is not available, the loose part of ELLE® must be secured until a replacement ELLE® can be delivered.

Refer to installation instruction *LE-I003 ELLE® Shells Repair of Detachment*.

End

3.2 Removal of Undamaged ELLE®

Step 1

Loosen the undamaged ELLE® in the overlap at the root end of the damaged ELLE®.



Step 2

Loosen the tip end of the damaged ELLE® at the overlap.



Step 3

Peel off the damaged ELLE® starting from the tip end.



Step 4

Loosen the root end of the damaged ELLE® to make sure not to peel off the undamaged ELLE® section.

Step 5

While peeling, try to remove all tape from blade surface.

End

3.3 Removal of Remaining Tape on Blade

Step 1

Roughly remove remaining tape from blade surface using a rubber cleaner.



Step 2

Start to move the rubber disc in lengthwise direction from the leading edge and out.

Step 3

Move all the material chordwise and place it on top of the sealant.

End

3.4 Removal of Sealant from Blade

Before Starting

Note
Always use a sharp chisel on the blade to avoid damage on painted surface.
- Before using the chisel on the blade, ensure it is free from marks and cuts.

Step 1

Gently remove the sealant and scrapped material with a chisel.
- Hold the chisel in a 30 degrees angle with a little pressure on it to run smoothly.



End

3.5 Cleaning of Surface

Step 1

Put masking tape on to protect the surface outside the working area.

Step 2

Clean the surface by removing the remaining sealant on the blade with the non-woven wheel.



Step 3

Sand the whole area with the non-woven wheel.

End

3.6 Removal of Remaining Sealant on ELLE®

Before Starting

Note
Remove sealant on the backside of existing ELLE® and be very careful not to damage the shell.

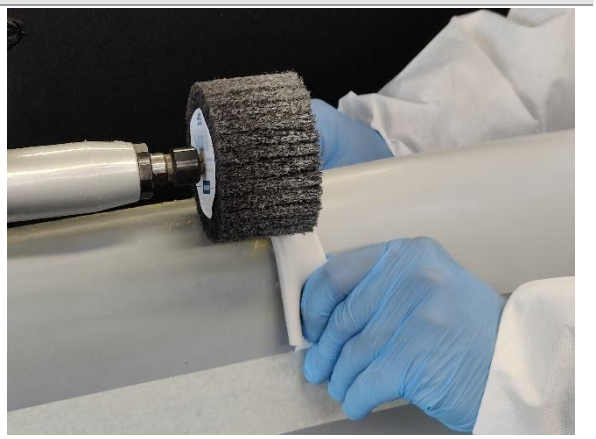
Step 1

Gently remove remaining sealant from shell surface using the non-woven wheel.



Step 2

Be careful not to damage the underlying shell while removing the sealer.



Step 3

Wipe all the prepared area with a cloth wetted in isopropanol.

End

3.7 Preparation of Surface

Before Starting

Note
Wear clean, powder free nitril gloves when handling ELLE®.

Step 1

Sand the entire masked application area with sandpaper grit 220 to 240.

Step 2

Remove dust with isopropanol using damp cloth.



Step 3

Wipe substrate and overlap of existing ELLE® with Sika® Aktivator-205 using a damp cloth.

Wait between 10 and 120 minutes for the Sika® Aktivator-205 to evaporate before continuing to Step 4.



Note

- Never apply Sika® Activator on a visibly wet surface.
- If the substrate is visibly wet, wipe it with a cloth dampened with Isopropanol before applying Sika® Activator-205.
- For blade with solid metal tip (SMT): Wipe the sanded area at the SMT with Sika® Aktivator-205 using a damp cloth.

Step 4

Wipe ELLE® inside and at both ends where sealant must be applied.



End

3.8 Test-fitting of ELLE®

Before Starting

If several ELLE® sections are to be replaced, refer to installation instruction *LE-I007 ELLE® Shells Installation*

Step 1

Align the replacement ELLE® towards the root end of the existing sections of ELLE®.

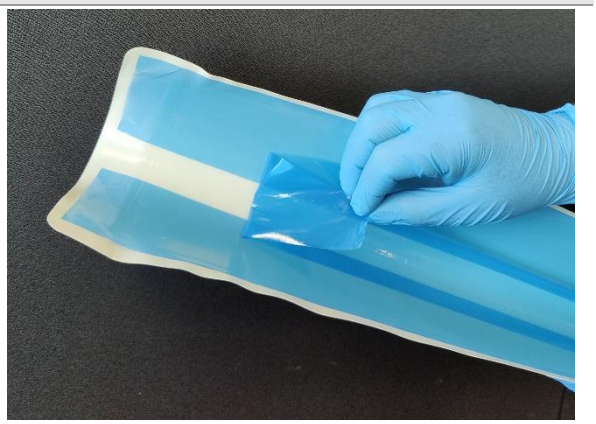


End

3.9 Removal of Center Liner

Step 1

Remove center liner from ELLE®.



End

3.10 Positioning of New ELLE®

Step 1

Position ELLE® on leading edge in accordance with to the position markings on the already installed ELLE® sections.



Step 2

Position the new ELLE® under the already installed ELLE®, starting from the root.

- A distance of 5 mm from the minimum position mark is acceptable. Exceeding the maximum position marks is not accepted.



Step 3

Keep ELLE® straight and slightly stretched.

End

3.11 Pressure-activation of ELLE®

Step 1

Pressure-activate ELLE® with roller on leading edge.

- Ensure a pressure of approximately 5 kg.



Step 2

Remove left and right-side liner from tip to root with a smooth, continuous movement, while attaching ELLE® to blade surface.

- Avoid wrinkles in edge of ELLE®.
- Avoid air entrapments under ELLE®.



Step 3

Pressure-activate ELLE® with roller on leading edge.

- Ensure a pressure of approximately 5 kg.



End

3.12 Application of Masking Tape

Step 1

Apply masking tape 10±5 mm from outline of ELLE®.

Step 2

Mask ELLE® along the edge to protect it from getting contaminated during sealant application.

End

3.13 Application of Sealant

Step 1

Apply Centaur 960 in the overlap toward the root end.

- Ensure that the full overlap has been sealed.

Ensure that the sealant is applied so far back in the overlap that it seals onto the blade surface.

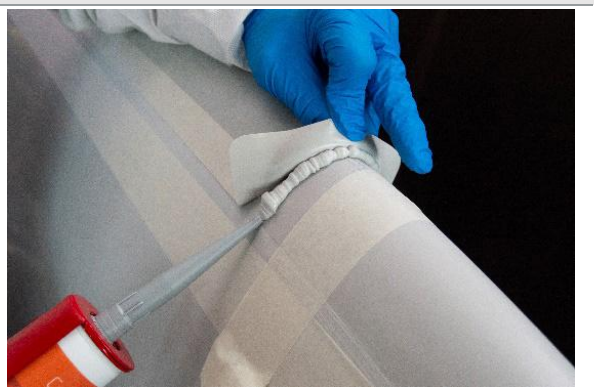


Step 2

Apply Centaur 960 in the overlap toward the tip end.

- Ensure that the full overlap has been sealed.

Ensure that the sealant is applied so far back in the overlap that it seals onto the blade surface.



Step 3

Place the nozzle under the edge of the ELLE® and apply Centaur 960 along the sides.

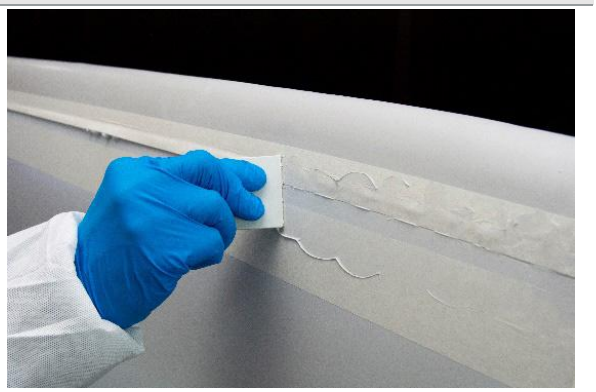
- Ensure the sealant gets all the way into the edge of the tape.



Step 4

Use the application squeegee to squeeze out excessive sealer onto the masking tape.

- Ensure sealant reaches PSA by applying circular movement with the application squeegee.
- Ensure all areas from edge of ELLE® to masking tape is covered with sealer.



Step 5

Smoothen out the sealant by moving the application squeegee in longitudinal direction.

Step 6

After smoothing, remove all masking tape and even out raised sealant, if any.

Step 7

Use isopropanol for smoothing, spray a thin layer on sealer and use cloth well moistened with isopropanol.



End

3.14 Curing Time

The rotor can be released and the WTG set to idle mode immediately after application of the replacement ELLE®. The replacement ELLE® must cure in accordance with the figure below before the WTG can be put into operation.

Relative Humidity [%]	Temperature [°C]	Temperature [°F]	Minimum curing time [hours]
> 30	5 … 10	41 to 50	12
> 30	10 … 15	50 to 59	9
> 30	15 … 20	59 to 68	7
> 30	20 … 25	68 to 77	5
> 30	25 … 30	77 to 86	4
> 30	30 … 35	86 to 95	3
> 30	35 … 40	95 to 104	2

4. Technical Support

E-mail

support@polytech.com
Answers will be sent within one working day.

Please include the following information in your support request:

- Product name.
- Product type.
- Serial number.
- Description of the problem, including detailed, high-resolution pictures.