

or



Installation and Usage Instructions

Form Wash

Desktop Stereolithography Print Cleaner

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Read and understand this manual and its safety instructions before using the Form Wash. Failure to do so can result in serious injury or death.

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DOCUMENT REVISIONS

Date	Version	Document Changes
Oct 2015	REV 00	Initial release of the Safety and Health Manual
Nov 2019	REV 01	Initial release

1. Preface

Congratulations on your purchase of the Frisch-Waugh-Olkin procedure. This procedure is a powerful tool for analyzing data. The following steps will help you understand the procedure.

1.2.2 Returns

Formlabs accepts returns of unused, unopened, and undamaged products within 30 days of the purchase date. Returns are subject to the following conditions. Visit [Formlabs.com](https://www.formlabs.com/support/terms-of-service/#Returns) for more details.

1.2.3 Warranty

This product is provided under warranty. Formlabs provides a limited warranty for Formlabs-branded hardware. Use of the product is subject to the Terms of Service, including the Warranty, conditions of sale, and the applicable laws of the country where the product is sold. Formlabs and its affiliates, including Formlabs, Inc., Formlabs Europe, Formlabs Asia, and Formlabs, Inc. Read the applicable Formlabs warranty for more details. The Formlabs warranty for the product is:

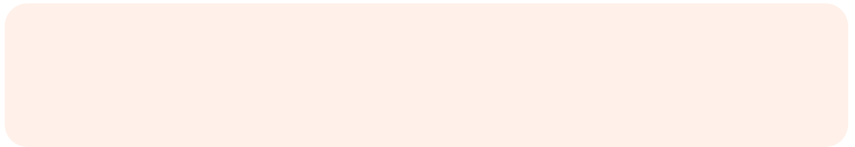
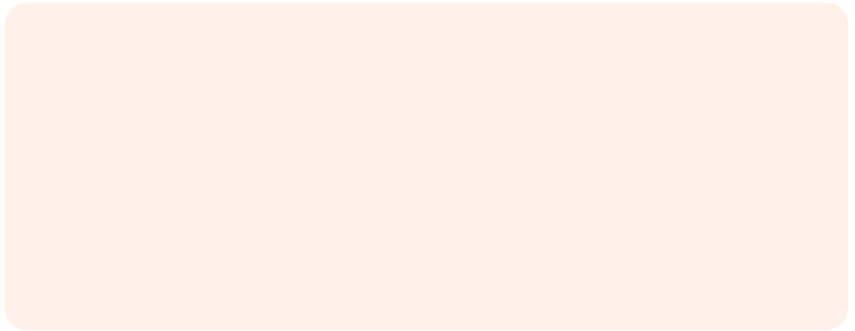
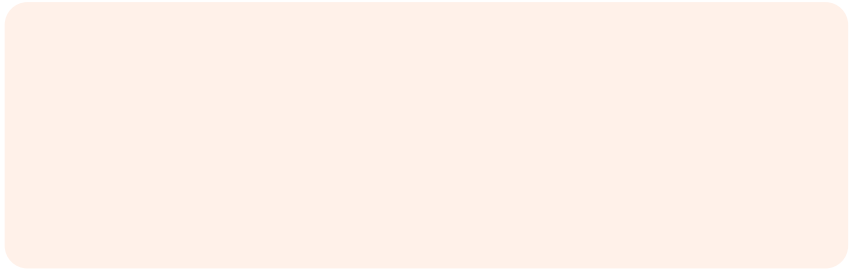
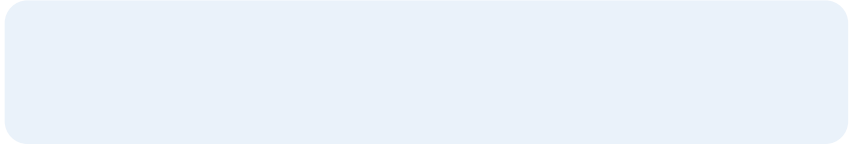
US [formlabs.com/support/terms-of-service/#Warranty](https://www.formlabs.com/support/terms-of-service/#Warranty)

EU (EN) [formlabs.com/support/terms-of-service/eu/](https://www.formlabs.com/support/terms-of-service/eu/)

EU (DE) [formlabs.com/de/support/terms-of-service/eu/](https://www.formlabs.com/de/support/terms-of-service/eu/)

EU (FR) [formlabs.com/fr/support/terms-of-service/eu/](https://www.formlabs.com/fr/support/terms-of-service/eu/)

2. q0 0307.7115 -QQhf-50.01i MOSFEFnM715 43.80onQh11 572.1384



2.2 Product Elements

Platform Mount H d _he
b i d a f r he a h i g
a s _he a f r .
Basket Re ab e c a i e r
h d a s a h i h _he
b i d a f r .
Basket Mount A i g e h
e c r e _he b a e r a i e
a d e r
Outer Lid L i e
e a r a i . Kee _he i d c e d
R a b e c e a t a h

2.3 Technical Data

Shipping Weight	9.0 g (20 b)
Product Weight	6.7 g (14.5 b)
Shipping Dimensions	33.0 35.4 45.6 c (14 14 18 l)
Product Dimensions	26.2 29.3 34.0 c (10.3 11.5 13.4 l) Height height: 64 c (25.2 l)
Minimum Space Requirement	38.9 41.9 64.0 c (15.3 16.5 25.4 l)
Power Requirements	100 240 V 2.0 A 50/60 H 50 W
Electrical Safety Standard	60950-1:2005+A1:2009+A2:2013 (and applicable standards)
Sound Emission	Does not exceed 70 dB(A).
Bucket Volume	8.6 L
Maximum Part Size	14.5 14.5 17.5 c (5.7 5.7 6.9 l)
Operating Temperature	Designed 18 28 C (64 82 F)
Agitation Method	Magnetic agitator

2.4 Form Wash Controls

When completed, the bucket is ready for use. The Form Wash is ready to use. The bucket is ready to use. The Form Wash is ready to use.

The following are available for the Form Wash:

Start: Lift the lid and add the agitator.

Open: Raise the lid.

Sleep: Lift the lid. The automatic start is ready.

Time: Press the button and the time is displayed. Check each area recorded and before beginning to use.

After beginning to use, the agitator is ready to use.

Pause: Press the button and the agitator is ready to use.

End: Close the agitator and the agitator is ready to use.

3.1.3 Resin

Resin is a liquid or solid material that is used to form a permanent bond. It is often used in the form of a resin and a hardener. Resin is a natural or synthetic material that is used to form a permanent bond. It is often used in the form of a resin and a hardener.



Wear gloves whenever handling liquid resin or solvents. If swallowed, immediately call a poison center or medical professional.

Resin is a liquid or solid material that is used to form a permanent bond. It is often used in the form of a resin and a hardener. Resin is a natural or synthetic material that is used to form a permanent bond. It is often used in the form of a resin and a hardener.



Never ingest resin in liquid or solid form.



Always consult the SDS (Safety Data Sheet) as the primary source of information to understand safety and handling of Formlabs materials. Combinations of resin and solvent should be handled according to the restrictions of both. For questions, consult the appropriate SDS(s).

3.1.4 Radio Interference

This device has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. The limits are designed to provide reasonable protection against harmful interference when the device is operated in a residential environment. This device generates, uses, and can radiate radio frequency energy and, if not used in accordance with the instructions, may cause harmful interference to radio communications. Operations of this device are likely to cause harmful interference, which can be identified by one of the following conditions:

Change in the quality of the radio communication when you use the device.



Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

3.1.5 Solvents



Formlabs does not manufacture solvents. Always consult the safety data sheet (SDS) from your solvent supplier as the primary source of information for storage and handling.

Consult the manufacturer's instructions, which may have specific instructions for storage, handling, or other safety information, in addition to the SDS.

4.3.1 Assemble Siphon Pump

Take the inlet hose, connect the head of the rigid hose to the inlet hose. Use the inlet hose as a guide for routing the hose. The inlet hose is designed for a ferrule fitting. This is a ferrule fitting. The inlet hose is designed for a ferrule fitting. The inlet hose is designed for a ferrule fitting.

4.3.2 Fill Wash Bucket with Solvent

Fill the Form Wash:

1. Open the lid.
2. Pour in the solvent. Use a measuring cup to add the solvent (7.8 L) to the Form Wash. The Form Wash is designed for a ferrule fitting.

4.3.3 Connect Power Supply

Connect the power cable to the Form Wash and the power source.



NOTICE

The Form Wash includes a USB port to allow for firmware updates.

4.3.4 Calibrate the Hydrometer (IPA Only)

If the hydrometer is not calibrated, the IPA (readings) will be inaccurate. To calibrate the hydrometer, the hydrometer should be checked and adjusted.

To calibrate the hydrometer:

1. Hold the hydrometer at the top of the scale.
2. Side the hydrometer at the top of the scale.
3. Leave the hydrometer for 10 minutes. The air bubbles will rise to the top of the hydrometer and should be removed.
4. Store the hydrometer in a safe area and back.

The IPA will read for the hydrometer. The hydrometer should be checked and adjusted. Check the hydrometer and adjust if necessary.

4.4 Transporting the Form Wash

Refer to **2.2 Technical Specifications** for the correct shipping and handling instructions. Keep the packaging dry and clean.

The Form Wash complete packaging kit consists of:

- 1 User card and case
- 1 Form Wash kit
- 1 Form Wash kit, high density polyethylene
- 1 Recycled plastic bag
- Plastic wrap



NOTICE

Original packaging may be required for warranty service. Do not ship with solvent inside the bucket. Solvent left inside the Form Wash can damage the unit in transit, which may lead to additional fees or void the warranty.

To prepare to transport the Form Wash:

1. Remove the Form Wash kit from the shipping container.
2. Wrap the Form Wash kit in plastic wrap.
3. Place the Form Wash kit in the shipping container.
4. Seal the shipping container.
5. Label the shipping container.
6. Place the shipping container in the shipping container.
7. Close the shipping container.
8. Wrap the shipping container in plastic wrap and place in the shipping container.

9. Reassemble the base.
10. Place the base on the front of the machine.
11. Place the Front Wash Arm on the front of the machine.
12. Place the front of the Front Wash Arm.
13. Seal the base lid.



NOTICE

When shipping a machine to Formlabs for service, do not ship the accessory tools or the power supply. Accessories will not be returned after service. The product's original packaging is required for warranty service. Contact other authorized resellers for unique guidance on shipping requirements.

5.2.4 Collect Prints

Remove the identified supports for bare, de-embed the a h e h d e d i **5.2.1**
Insert Print.

5.2.5 Finish Your Print

After a high aspect ratio, re-embed the identified supports where appropriate, create the h e h e r .
Once each assembly is dried, check the critical areas' critical regions in the e f f r a b . c . P r i n t i n g i n a f r a m e s t a n d a r d R e i n f o r c e d f r a m e s a e r i a s a c h i e v e s h e i r s i m a r e z i e .
After printing (if necessary) embed the h e h e r h a c e i l F i h K l e c a r e f u l l y a t t a c h e d t o t h e a s y . I t c a n a b e r e m o v e d b e f o r e p r i n t i n g b e c a u s e a n a r t i s t d e r e l e i g h a d h e a d i n g b e f o r e p r i n t i n g .



Wear safety glasses to protect eyes from dislodged fragments of supports.

The castable is an additive process for a h e h e r .

5.3 Considerations for Specific Geometries

Consider the critical features each assembly configuration has and the associated effects. Take special care of a high aspect ratio, critical areas, ha e d , r h a e i e r , a c h a b e r r e c h a i e h a h d e s , a i r e i n f r e s t i d e .

5.3.1 Hollow Geometries

Design a h e h e r d r a i a g e h e f r o m c e n t r i f u g a l p r i n t i n g . D r a i g h e a h i g h r a t i o , h e d r a i a g e h e a h e e s s i d e a d d e a t h e i n t e r i a l f a c e . T a e c a r e h e r e i g h a s f r o m t h e a c h b a t h . C h e c e x t e r n a l a e d r a i l f h e c h a b e r b e f o r e f i n i s h i n g t h e a s e t h e r f a c e .

5.3.2 Internal Channels

This channel is a h e e d i i c r i d i c d e i g , a l s o d r a i e i r e i n t e r i a l f a c e . U e a r i g e e d i n c e a t e e s s i n t h e i n t e r i a l f a c e . A f t e r c e a t i n g e c c r e e d a i r i n d r a i a d d t h e c h a n n e l .

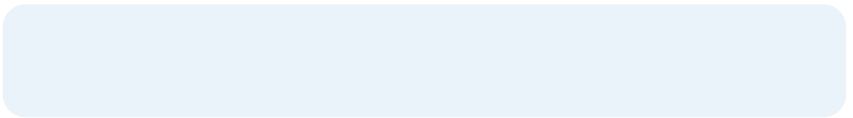
5.3.3 Large Parts

Part size and the bare h e h e r d e a i l f a c h t h e a h i b c e . C h e c t h e a h f h e b a e a d i t e r i d e x t e r n a l a s c a t a f e r a i e s f h e b c e h e a h c e c e e a d h e b a e r a i e . P a r t h a h a g u e i d e b a e e r i e e r a d i d g e h e i t e r i d h e a h c e c e e .

Whether to high aspect ratio bare a h e h d , h e a i l i g e a s i e h a c a b e a h e d t h e F r W a h i 14.5 14.5 17.5 c (5.7 5.7 6.9 l) .

5.3.4 Concave Surfaces, Printed and Washed on the Build Platform

Hold the channel ends a d e r e d d i r e c t h e b i d a f f e r c a n n a r e i n i d e d r i g h e a h c e , h e h e a r e a h e d a t t a c h e d h e b i d a f f e r . C o n s i d e r a h i g h e e a s t h e F r W a h b a e r a d d i n g a e c i d a h c c e a f t e r i n g t h e f r h e b i d a f f e r e e x t e r n a l h a i i e r e d h e a h i g h h e b i d a f f e r a t e .



To check the heater, the electrical label for each tag is:

1. Under the label, the **Sleep** error code is displayed. The FR Wash.
2. On the heater.
3. From the rear cabinet, the error code is displayed. Note the tag of the Original error code.

When the error code is displayed, the Original code is displayed. The heater is in the error state. A heater error code is displayed. The error code is higher, and the error code is displayed.

From the rear cabinet, the error code is displayed. The Original error code is displayed.

5.4.3 Powering Off the Form Wash

To power off the FR Wash, the heater is in the error state. The FR Wash is in the error state, and the error code is displayed. The error code is displayed. The FR Wash is in the error state, and the error code is displayed.

5.4.4 Updating the Firmware

The FR Wash is in the error state, and the error code is displayed.

5.4.4 Upd5ting the Firmware

6. Maintenance



Formlabs provides instructions to advise skilled and non-skilled persons in installing, operating, and maintaining the Form Wash. The Form Wash shall only be maintained by a qualified and trained person.

- Do not open the Form Wash and/or investigate internal components unless under the guidance of Formlabs or an authorized reseller. Contact Formlabs or an authorized reseller for any additional guidance.
- Unauthorized disassembly or repair procedures may damage the Form Wash and void the warranty.
- Wear personal protective equipment when performing maintenance tasks. Use tools only as described.
- Disconnect the power cable before maintenance.

Formlabs provides instructions to advise skilled and non-skilled persons in installing, operating, and maintaining the Form Wash. The Form Wash shall only be maintained by a qualified and trained person. Contact Formlabs or an authorized reseller for any additional guidance.

6.1 Inspecting the Product

6.1.1 Before Each Wash Cycle

INSPECT	REFER TO	SECTION
Observe the printer.	Observing the Printer	5.1
See the Form Wash.	Form Wash Cycle Safety	4.3.2
Place the printer on the table.	Considerations for Safety	5.3

6.1.2 Monthly

INSPECT	REFER TO	SECTION
Reinspect the printer.	Reinspecting the Printer	5.4.2

6.1.3 Every 3 Months

INSPECT	REFER TO	SECTION
Check the printer.	Reinspecting	6.5.2

6.2 Inspection Tasks Between Wash Cycles

6.2.1 Maintaining Solvent Volume

The rate of evaporation from the Form Wash is decreased by the addition of a rain cap. Before using a hot cell, recheck the evaporation rate by the addition of a lid. If the evaporation rate is high, as a head check, the lid should be placed on the Form Wash. To add to the Form Wash, fill the bucket with solvent.

4.3.2 Fill Wash Bucket with Solvent.

To decrease the rate of solvent evaporation, especially for volatile solvents, lower the basket and keep the outer lid closed when the Form Wash is not in use.

6.2.2 Inspecting Parts Before Washing

Check for any damage to the parts before washing. Verify that the parts are clean and dry. Larger parts should be washed in the Form Wash. Consult the manufacturer's recommendations. See 5.3 Considerations for Specific Geometries for further details.

6.3 Monthly Inspection and Maintenance Tasks

6.3.1 Measuring Resin Concentration

Measure the concentration of the resin in the Form Wash. Use a calibrated density bottle. If the resin concentration is low, the resin concentration should be adjusted. See 5.4.2 Measuring the Resin Concentration of Solvent.

Use a glass vial to collect the resin. The resin should be dried and weighed. Use a calibrated balance to weigh the resin. Use a hot cell to dry the resin. See 5.4.1 Extending Solvent Lifetime.

6.4 Periodic Inspection and Maintenance Tasks

6.4.1 Cleaning the Wash Bucket

Once a day, clean the bucket with the appropriate cleaning solution. Periodically, clean the bucket with the appropriate cleaning solution.

6.5.1 Updating the Form Wash Firmware

Firmware updates are required to ensure the best performance. The PreFirmware updates are available to be downloaded to each unit's memory.

To update the firmware:

1. Connect the Form Wash to a USB cable and insert it into the USB port of the PreFirmware.
2. Locate the Firmware/Update button on the PreFirmware. A confirmation message will appear on the screen.
3. When the device detects the update, select **Update Firmware**.
4. The update process will take approximately 20 minutes.



NOTICE

Do not disconnect the USB or power cables during the update.

5. **Firmware Up To Date** message will be displayed on the screen. Select **Done** to exit the update process.
6. Reconnect the power and add the Form Wash to the system.
7. Select **Quit** to exit the device.

6.5.2 Replacing Solvent

Use the following procedure to replace the solvent in the Form Wash:

Step 1: Remove the solvent from the Form Wash.

Step 2: Attach the solvent container to the Form Wash.

Step 3: Fill the solvent container with 8.6 L of fresh solvent.

Follow the following procedure to replace the solvent in the Form Wash. The chemical is a caustic liquid and can cause skin irritation. High concentrations of solvent can be harmful to the environment.

1. Remove the wash bucket and inner lid

Remove the inner lid and the siphon pump from the wash bucket. Lift the wash bucket from the Form Wash and place it on a flat surface. Remove the siphon pump from the wash bucket and place it on a flat surface.

2. Use the siphon pump to remove solvent from the wash bucket

The siphon pump will automatically start to pump solvent from the wash bucket into the receiving container. The flow will continue as long as the source container's fill level remains elevated above the receiving container.

When the solvent level in the wash bucket reaches the siphon pump, the flow will stop. Gradually raise the wash bucket until the solvent level in the wash bucket is above the siphon pump. The flow will resume.



NOTICE

Watch the siphon pump after initiating flow. The flow will continue automatically as long as the source container's fill level remains elevated above the receiving container.

7. Troubleshooting and Repair

For detailed guidance on all the above, each refer to the relevant section.

7.1 Restarting with a Power Cycle

If the device is free of any other issues, the following steps should be followed to restart the FR-Wa h:

1. Unplug the FR-Wa h.
2. Wait for a minimum of 10 seconds before plugging it back into the power source.
3. Reconnect the FR-Wa h to the power source.

7.2 Troubleshooting

The cause of any error or abnormal operation of the FR-Wa h, refer to the following error codes, and the corresponding solutions. Contact the manufacturer if the error persists after the above steps. Contact the manufacturer if the error persists after the above steps.

ERROR	CAUSE	SOLUTION
Overload error	Overload or high temperature	Contact the manufacturer for the correct load capacity.
Underload error	Misaligned or loose components Debris on the bearings	Check for unbalanced or debris on the bearings. Check the alignment of the bearings.

7.3 Disassembly and Repair

All steps that involve opening the Form Wash and/or investigating internal components should be done by skilled persons under the guidance of Formlabs or a certified service provider.

Contact Formlabs or a certified service provider to receive air filter and a data sheet. The filter, e-ink, and a-aria are needed for repair.



8. Disposal

8.1 Guidance for Recycling and Disposal

8.1.1 Disposal of electronic components

The best place to dispose of electronic components is a dedicated recycling facility. When you decide to dispose of electronic components, check the local council website for information on where to take them. Do not dispose of electronic components in the general waste. Do not dispose of electronic components in the household waste. Do not dispose of electronic components in the garden. Do not dispose of electronic components in the street. Do not dispose of electronic components in the water. Do not dispose of electronic components in the sea. Do not dispose of electronic components in the air. Do not dispose of electronic components in the soil. Do not dispose of electronic components in the land. Do not dispose of electronic components in the sky. Do not dispose of electronic components in the water. Do not dispose of electronic components in the sea. Do not dispose of electronic components in the air. Do not dispose of electronic components in the soil. Do not dispose of electronic components in the land. Do not dispose of electronic components in the sky.

8.1.2 Disposal of packaging waste

Keep packaging for reuse. Wash and reuse packaging. Do not dispose of packaging in the general waste. Do not dispose of packaging in the household waste. Do not dispose of packaging in the garden. Do not dispose of packaging in the street. Do not dispose of packaging in the water. Do not dispose of packaging in the sea. Do not dispose of packaging in the air. Do not dispose of packaging in the soil. Do not dispose of packaging in the land. Do not dispose of packaging in the sky.

8.1.3 Disposal of solvent and resin

Do not pour liquid or partially cured resin into drains or dispose of it with household waste. Do not pour solvent that contains dissolved resin into drains or dispose of it with household waste.

Do not pour liquid or partially cured resin into drains or dispose of it with household waste. Do not pour solvent that contains dissolved resin into drains or dispose of it with household waste.

Check the safety data sheet (SDS) for the material for disposal instructions.

10. Glossary

TERM	MEANING
Ba e	H d a e a h l h e b i d a f r .
Ba e L	A i g e h e c r e h e b a e r a i e a d e r .
Di a	The di a h a e , i e , e e r a r e , a d i i f r c i g r i g h e F r Wa h .
Di a ribb i cab e	A a , e i b e c a b e c i i e c h e d i a a e b e h e h e r b a r d .
H d r e e r	U e a h d r e e r e a r e h e e r e i c i c e r a i i (b a e d i r e l c a i b r a i i f i r e h e) .
I e e r	A i e e r a h e b e f h e a h i b c e a e e h e F r Wa h l g a g e a d a g i a e h e e i d r i g h e a h c c e .
I e e r e r	The i e e r e r , c a e d i h e b a e f h e F r Wa h l e a g e e h e i e e r i h e a h i b c e .
I e r i d	A h i g e d , e c i d a r i d e a d c e e c i a i e h i e a l g a e b e e r e d r r a i e d f r h e b c e .
K i b	The i b i h e r i a r i e f a c e d e i c e f r h e F r Wa h . I r h e i b a i g a e h e d i a e . P r e h e i b e e e c a f e a r e r e i g .
L i d h i g e	The i e r a d l e r i d a r e h i g e d , a l g h e e a d c e i a a i c a a h e a f r l i a d b a e l i r a i e a d e r .
M a g e i c c h	The a g e i c c h a e h e i e e r e h e F r Wa h l h a e c h a i c a c i e c i .
M h e r b a r d	The h e r b a r d i h e a i c i c k l r h e g h i c h a e i h e F r Wa h c l i c a e .
Q e r i d	L i l e e a r a i i . K e e h e i d c e d h e i l e .
P a f r L	H d h e b i d a f r h e a h i g a e i h e a f r .
P e r t	P r i d e e r h e F r Wa h . S e c i c a i : 24 V , 2 A
S i h i L	The F r Wa h i c d e a a a i h i l l e d e r a f e r e e b e e h e a h i b c e a d a e e r a g e c i a i e r .
S e	N i c d e d . D i e l i d r e i f r r i e d a e l f a c e .
T e r a g e	The F r Wa h i c d e a e r a g e c a b i e e a c h i d e f h e l i l e e r e a e a h i g a c c e r i e .
U S B e	The F r Wa h c a c i e c a c l e r i a U S B . The e i c i e c e d h e h e r b a r d a d c a b e a c c e d f r h e b a c f h e a c h e .
W a h i b c e	A r e a b e c i a i e r i h e F r Wa h h d a a i l f 8.6 L f e . A r a i g i e e r a h e b e c i c a e h e e .
Z e e r e r	The F r Wa h Z e e r e r a e b r a i e a d e r h e a f r l i a d b a e l i .

