![VITO oil filter system logo]

OILTESTER - Deep-frying Oil Tester

Instruction manual

1   Contents

2 Safety and the environment

2.1. About this document

Use
> Please read this documentation through carefully and familiarize yourself with the product before putting it to use. Pay particular attention to the safety instructions and warning advice in order to prevent injuries and damage to the products.
> Keep this document to hand so that you can refer to it when necessary.
> Hand this documentation on to any subsequent users of the product.

Warnings
Always pay attention to information that is marked by the following warnings with warning pictograms. Implement the specified precautionary measures.

Representation	Explanation
⚠ WARNING	Indicates potential serious injuries
NOTICE	indicates circumstances that may lead to damage to the products

Symbols and writing standards

Represen-tation	Explanation
🛈	Note: Basic or further information.
1. ... 2. ...	Action: more steps, the sequence must be followed.
> ...	Action: a step or an optional step.
- ...	Result of an action.
Menu	Elements of the instrument, the instrument displays or the program interface.

[OK]	Control keys of the instrument or buttons of the program interface.
... | ...	Functions/paths within a menu.
"..."	Example entries

2.2.   Ensure safety

> Only operate the product properly, for its intended purpose and within the parameters specified in the technical data. Do not use any force.

> Do not operate the instrument if there are signs of damage at the housing, mains unit or feed lines.

> The objects to be measured or the measurement environment may also pose risks: Note the safety regulations valid in your area when performing the measurements.

> Temperatures given on probes/sensors relate only to the measuring range of the sensors. Do not expose handles and feed lines to any temperatures in excess of 70 °C unless they are expressly permitted for higher temperatures.

> Do not perform contact measurements on non-insulated, live parts.

> Transport and store the instrument exclusively in the aluminium case provided in order to avoid damage to the sensor.

> Do not store the product together with solvents. Do not use any desiccants.

> Carry out only the maintenance and repair work on this instrument that is described in the documentation. Follow the prescribed steps exactly. Use only original spare parts from Vito AG.

2.3.   Protecting the environment

> Dispose of faulty rechargeable batteries/spent batteries in accordance with the valid legal specifications.

> At the end of its useful life, send the product to the separate collection for electric and electronic devices (observe local regulations) or return the product to Vito AG for disposal.

3   Specifications

3.1.   Use

The OILTESTER is a handy measuring instrument for the fast inspection of deep-frying oils and is designed in equal measure for left and right handers.

The TPM value (total polar materials) enables a statement on the ageing of deep-frying oils due to the effects of heat.

The following measuring tasks can be performed:

- Display temperature of the deep-frying oil:
  Indicator for correct setting of the deep-fryer, inspection of integrated temperature displays.
- Display TPM value:
  Indicator for the ageing of the deep-frying oil.

The sensor works on a capacitive basis and determines the total amount of polar materials in % as the reading.

The free fatty acids that are determined above all for the evaluation of unloaded oils (rancidity) cannot be detected.

> **i**   The temperature of the deep-frying oil to be measured must be at least 40 °C. The maximum operating temperature is 200 °C.

> The sensor and the probe tube are designed to come into contact with oil used in deep fat fryers for the typical duration of a spot check measurement. The materials used in these components meet the relevant requirements in the Regulation (EC)1935/2004.

3.2.   Technical data

Feature	Values
Measuring range	Temperature: 40.0 to 200.0 °C / 104.0 to 392.0°F
	TPM: 0 to 40%
Accuracy	Temperature: ± 1.5 °C
	TPM[1]: ±2% (40.0 to 190.0 °C / 104 to 374 °F)

---

[1] typical, referred to internal reference, at an ambient temperature of 25 °C.

6

Feature	Values
Resolution	Temperature: 0.1 °C / 0.1 °F TPM: 0.5%
Power supply	Batteries: 2x micro (type AAA)
Battery (micro AAA)	Designation according to IEC: LR03 Chem. composition: Zn-MnO2 (alkaline)
Battery life at 20 °C	Approx. 25 hrs continuous operation (corresponds to 500 measurements) without display illumination
Temperature sensor	PTC
TPM sensor	Capacitive sensor
Operating temperature	0 to 50 °C / 32 to 122 °F
Ambient humidity	0 to 90%RH
Storage/transport temperature	-20 to 70 °C / -4 to 158 °F
Display	LCD, 2-line, display illumination
Weight	255 g
Housing material	Top part: ABS Lower part: ABS-PC glass fibre 10%
Dimensions	Approx. 50 mm x 170 mm x 300 mm (WxHxD)
TPM response time	Approx. 30 secs
Protection class	IP65
Warranty	24 months
EC Directive	2014/30/EC

# 4 Product description

4.1. Overview

1 Display
2 Control keys
3 Battery compartment
4 Probe shaft
5 Oil quality (%TPM) and temperature sensor
6 Min. immersion depth
7 Max. immersion depth

Items shown on the display:

Items shown	Function/property
↑ **200** (flashing temperature value > 200 °C)	Temperature measuring range exceeded
↓ **40** (flashing temperature value < 40 °C)	Temperature measuring range undershot
Alarm �	Alarm indicator activated
PIN	Configuration mode locked
▥	Battery capacity 100 %
▮▯	Battery capacity 66 %
▮	Battery capacity 33 %
▭	Battery capacity < 10 %
Alarm ↑	Upper TPM limit value exceeded
Alarm ↓	Lower TPM limit value exceeded
Hold	Readings held (manually)
Auto-Hold	Readings held (automatically)
°C / °F	Temperature in °C or °F

Important display messages

Item shown on the display	Explanation
000 lights up	Instrument is ready to measure, sensor is not in oil.
Reading >**190** flashes	Measured temperature is above 190 °C (374 °F). The reading flashes in the range from 190.1 °C (374 °F) to 200 °C (392 °F).

Control keys

Buttons	Function/property
[⏻]	• Switch instrument on/off • Configure instrument
[Hold]	• Hold measuring values manually • Switch to the measuring mode • Configure instrument
[▲]	• on/off; yes/no - Configure instrument
[▼]	• on/off; yes/no - Configure instrument

Battery compartment

4.2.   Basic properties

Power supply

The power is supplied to the instrument via two micro batteries (type AAA). The batteries are included in the delivery.

5 First steps

5.1. Commissioning

Inserting batteries
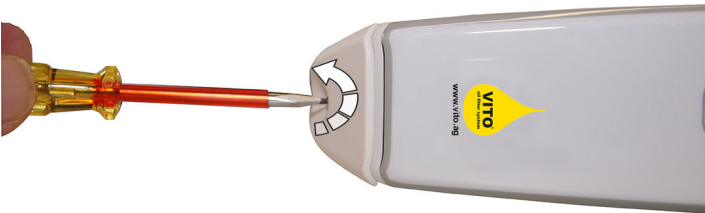
1. Undo the screw on the battery compartment.

2. Remove the battery holder.

3. Insert batteries. Adhere to the polarity.

4. Insert the battery holder into the battery compartment.
5. Secure battery compartment with screw.
6. Switch instrument on: Press **[⏻]**.
   - Display test is carried out: all segments light up.
   - The instrument switches to the measuring mode.
   - **000** lights up on the display, the instrument is ready for use.
7. If necessary, switch instrument off.

For storage of the instrument
Suspension attachment

> The integrated suspension attachment can be used to hang the instrument on a hook.

Plastic case
- The instrument is securely stored in a plastic case for protection against contamination and for transport.

5.2. Getting to know the product

5.2.1. Switching the instrument on/off

To switch on
> Press **[⏻]** until the indicator elements appear in the display.
- Display test is carried out: all segments light up.
- The instrument switches to the measuring mode and is ready for operation.

To switch off
> Press and hold **[⏻]** for approx. 2 secs.
  - Display goes off, instrument switches off.

5.2.2.   Description of important functions and displays

5.2.2.1.   Alarm indicator

The alarm indicator uses the following display colours to show what range the measured TPM value is in:

Green	TPM value < lower limit value
Orange	TPM value is between the lower and the upper limit value
Red	TPM value > upper limit value

The alarm indicator is switched on when the instrument is delivered. The TPM limit values are set as follows:

Lower limit value	20%
Upper limit value	24%

To activate/deactivate the alarm indicator, see Configuring the instrument, page **16**.
To set the TPM limit values, see Setting the TPM limit values, page **14**.

5.2.2.2.   Setting the TPM limit values

ℹ The TPM limit values can be between 0 and 40%. The upper limit value (**Alarm ↑**) must be at least 1% higher than the lower limit value (**Alarm ↓**).

ℹ In order to apply the settings of the lower and upper TPM limit value, you must make sure you confirm the input of the upper TPM limit value with **[Hold]**.

Setting the lower TPM limit value
Requirement: Instrument is in configuration mode, see Carrying out the configuration, page **17**

1. **Alarm ↓** and the set lower limit value appear on the display.
-   When alarm indicator is activated: the display lights up orange.
2. Set the lower limit value with **[▲]** or **[▼]**.
3. Confirm with **[Hold]**.
-   New lower limit value is applied.
-   The instrument switches to the upper TPM limit value (**Alarm ↑**).

14

Setting the upper TPM limit value

Requirement: Instrument is in configuration mode,

lower TPM limit value has been set and confirmed with **[Hold]** .

1. **Alarm ↑** and the set upper limit value appear on the display.
- When alarm indicator is activated: the display lights up red.
2. Set the upper limit value with **[▲]** or **[▼]**.
3. Confirm with **[Hold]**.
- New upper limit value is applied.
> Carry out further settings in the configuration menu or quit the configuration menu with **[⏻]**.

5.2.2.3. Hold function

Measured values can be held manually.

Requirement: Sensor is in the oil.

1. Briefly press **[Hold]** (< 1 sec).
- **Hold** appears in the display.
- Readings are held.
2. To switch to the measuring mode: Briefly press **[Hold]** (< 1 sec).
- Hold function is deactivated.
- Current readings are displayed.

5.2.2.4. Auto-Hold function

When the **Auto-Hold** function is activated, the measured values are automatically held by the instrument after the equalization period.

To activate/deactivate the **Auto-Hold** function, see Carrying out the configuration, page **17**

5.2.2.5. Auto-off function

When the **Auto-off** function is activated, the instrument automatically switches off after a certain time

- If the instrument is in measuring mode: automatic switch-off after 2 mins.
- If the instrument is in hold or configuration mode: automatic switch-off after 10 mins.

To activate/deactivate the **Auto-off** function, see Configuring the instrument, page **16**

5.2.2.6. Battery capacity

With decreasing battery capacity, a symbol lights up in the display (
). If the empty battery symbol () flashes in the display, the
remaining capacity is only approx. 30 min.

If the battery voltage is too low, the instrument automatically
switches off.

> Change batteries, see Changing batteries, page **24**

5.2.3. Configuring the instrument

Setting options in the configuration mode

Configurations	Setting options
Setting the TPM limit values **Alarm↓, Alarm↑**	Lower TPM limit value **Alarm↓**
	Upper TPM limit value **Alarm↑**
Carry out calibration **CAL**	**no**: Do not carry out calibration.
	yes: Carry out calibration.
Automatically hold readings **Auto-Hold**	**on**: Readings are automatically held by the instrument.
	off: Readings are not automatically held.
Automatically switch off the instrument **Auto-off**	**on**: Instrument switches off automatically after 2 or 10 mins.
	off: No automatic switch-off.
Set alarm indicator **Alarm ☼**	**on**: Alarm indicator activated
	off: Alarm indicator deactivated
Set temperature unit **°C, °F**	**°C** or **°F**
Lock configuration, including TPM limit values **PIN**	**no**: Do not lock configuration.
	yes: Lock configuration
Carry out reset **rst**	**no**: Do not reset the adjustment value to the factory setting.
	yes: Reset the adjustment value to the factory settings.
Firmware version	Firmware versions of the product components are shown.

Carrying out the configuration

Requirement: The instrument is switched off.

1. Switch the instrument on.

   > Switch the instrument on, press **[Hold]** during the display test and hold down for approx. 2 secs.

   - When the configuration menu is locked, **PIN** lights up.

   > To unlock, set the last two figures of the serial number with **[▲]** or **[▼]**.

  ℹ If an incorrect PIN is entered, the instrument switches into measuring mode.

   - When the configuration menu is not locked, you can gain access by setting the limit values.

2. Set the alarm limit values.

   - **Alarm↓** lights up in the display.

   > Set lower limit value (**Alarm↓**): **[▲]** or **[▼]** and confirm with **[Hold]**.

   - **Alarm↑** lights up in the display.

   > Set upper limit value (**Alarm↑**): **[▲]** or **[▼]** and confirm with **[Hold]**.

3. Carry out / do not carry out calibration.

   - **CAL** and **no** or **yes** light up in the display.

   > Activate / deactivate calibration / adjustment function (**no** is the standard setting): **[▲]** or **[▼]** and confirm with **[Hold]**.

   - Selection of **yes**: The instrument can be calibrated / adjusted,

   - Selection of **no**: No calibration / adjustment possible

4. Automatically hold readings.

   - **Auto-Hold** and **on** or **off** light up in the display.

   > Switch **Auto-Hold** on or off: **[▲]** or **[▼]** and confirm with **[Hold]**.

5. Automatically switch the instrument off.

   - **Auto-off** and **on** or **off** light up in the display.

   > Switch **Auto-off** on or off: **[▲]** or **[▼]** and confirm with **[Hold]**.

6. Set alarm indicator

- **Alarm** ☼ and **on** or **off** light up in the display.
- > Switch alarm indicator on or off: **[▲]** or **[▼]** and confirm with **[Hold]**.

7. Set the temperature unit.
- **°C** or **°F** lights up in the display.
- > Set the temperature unit **(°C/°F)**: **[▲]** or **[▼]** and confirm with **[Hold]**.

8. Enable / disable PIN.
- **PIN** and **yes** or **no** light up in the display.
- > Activate **PIN** (**yes**) or deactivate it (**no** is the standard setting).

9. Carry out reset.
- **rst** and **yes** or **no** light up.
- > Activate or deactivate **rst**: **[▲]** or **[▼]**.
- Selection of **yes**: Delete adjustment value, is reset to the factory setting.)
- Selection of **no**: no reset, adjustment value is retained).

Quitting configuration mode early and saving
You can quit the configuration mode early.

i   The configuration mode cannot be stopped in the adjustment / calibration process.

- > Quit configuration mode early: Press and hold **[⏻]** for approx. 1 sec.
- Configuration mode is stopped.
- The values which have so far been set and confirmed with **[Hold]** are applied.
- The instrument switches to the measuring mode.

5.2.4. Locking / unlocking configurations

You can lock/unlock the set values, including TPM limit values, from the configuration mode. The instrument is delivered with the configuration mode unlocked (PIN is deactivated, **no**).

Requirements: Instrument is in configuration mode.
- > Go through the configuration mode with **[Hold]**, until **PIN** and **yes** or **no** light up in the display.

Lock configuration mode
- > Activate **PIN**: Select **yes** with **[▲]** or **[▼]**.
- **PIN** is activated and the configuration mode is locked.

The last two figures of the instrument's serial number are automatically set as the PIN (see sticker on the instrument).

Unlock configuration mode

Requirement: PIN is activated and the instrument is in configuration mode.

Enter **PIN**:

> Select first figure: **[▲]** or **[▼]** and confirm with **[Hold]**.
> Select second figure: **[▲]** or **[▼]** and confirm with **[Hold]**.

If an incorrect PIN is entered, the instrument switches into measuring mode.

- The configuration mode is enabled for the duration of the settings being carried out.

Deactivate **PIN**:

> Go through the configuration mode with **[Hold]**, until **PIN** and **yes** or **no** light up in the display.
> Deactivate **PIN**: Select **no** with **[▲]** or **[▼]**.
- Settings can be carried out without entering the PIN.

6 Using the product

6.1. General measurement information

The instrument enables several measurements to be carried out one immediately after the other without any waiting times.

Which oils/cooking fats can be measured?

In principle, all oils and fats intended for deep fat frying can be measured.

This includes, for example, rapeseed, soya bean, sesame, palm, olive, cotton seed or groundnut oil. Fats from animal sources can also be measured. There may be a variation of several percentage points in the % TPM value for fresh cooking oils, depending on the type.

The maximum service life for the cooking oil cannot be derived from this.

Example: Fresh palm oil has a higher % TPM value than other cooking oils, but ages considerably more slowly.

Use of additives

The instrument is designed for the use of pure fats/oils. If additives are used, deviations may occur.

Comparison of laboratory methods / OILTESTER

Cooking oil is a mixture of substances with a wide variety of polarities. During ageing, the proportion of more highly polar components increases. The laboratory method of column chromatography separates the fat into a polar and a non-polar group. The proportion of the polar group compared to the total amount of cooking oil being investigated is described as the % TPM value (total polar materials).

The % TPM value established by column chromatography may vary slightly depending on the setting of the separation limit between the polar and the non-polar group.

Depending on the type of fat, slight variations of the polarity in both groups (polar/non-polar) may occur which are not however identified by the chromatography.

On the other hand, the instrument records the entire polarity of the cooking oil and thus the actual polarity of both groups (polar/non-polar). This means the reading of the instrument may be higher or lower than that of the column chromatography in individual cases.

An example of this is coconut oil, for which the instrument shows higher TPM values than column chromatography. However, this fat is unsuitable for deep fat frying and is therefore primarily used for roasting.

Free fatty acids
The instrument measures the total amount of polar materials in the cooking fat (% TPM) which makes it very possible to evaluate the load of the oil as a result of deep fat frying. On the other hand, free fatty acids (FFAs) are used for the evaluation of the age of the fat during storage. FFAs are not suitable for identifying the thermal loads of the oil. FFAs cannot be measured with the instrument.

Polymeric triglycerides (PTGs)
Polymeric triglycerides are also being used for the evaluation of cooking oils with increasing frequency. The results of this method are in most cases comparable with the % TPM value.
PTG ≈ % TPM/2

6.2. Carrying out measurements

> ⚠️ **WARNING**
>
> **Risk of burns due to hot instrument parts (sensor and probe shaft)!**
> > Do not touch hot instrument parts with your hands.
> > In the event of burns, immediately cool the relevant spot with cold water and see a doctor if necessary.

ℹ️ Please take note of the following information in order to obtain correct measurement results:

- Take the product being deep fried out of the oil and wait 5 mins until there are no more bubbles rising before measuring.
- If you suspect a measurement error due to water being contained: Repeat the measurement after 5 mins (do not deep fry during this time, keep oil/fat at a high temperature). If the new reading is lower, measure again after 5 mins until the reading stabilises if necessary.
- Keep the sensor away from metallic parts (e.g. deep-frying basket, pan walls), as these may affect the measurement result. Minimum distance from metal parts: 1 cm on each side.

21

- Measurement in hot oil min. 40 °C, max. 200 °C.
- Adhere to min. and max. marking when immersing in oil.
- "Temperature striations" in the oil may cause measurement errors. Move instrument in the deep fat fryer.
- Cleaning of the sensor is recommended before every measurement or when changing from one deep fat fryer pan to the next, see Cleaning the sensor, page **24**.
- Switch off induction deep fat fryers during the measurement or take a cooking oil sample, as the electromagnetic field can lead to incorrect readings.
- Change cooking oil as from approx. 24% TPM. A different limit value applies in some countries. If the measured values are above the country-specific limit value, the cooking oil should be changed!

With activated Auto Hold function

1. Immerse the sensor in cooking oil. Adhere to the immersion depth!
- If the temperature is within the permissible measuring range (40 to 200 °C): **Auto** flashes, along with the reading and the alarm indicator (display colour).
2. Wait until **Auto Hold** is shown in the display.
- Readings are automatically held by the instrument, with the alarm indicator activated, the display colour lights up.
3. Read the measurement values.
4. To switch to the measuring mode: Briefly press **[Hold]** (< 1 sec).

With deactivated Auto Hold function

1. Immerse the sensor in cooking oil. Adhere to the immersion depth!
2. If the temperature is within the permissible measuring range (40 to 200 °C): Wait for the end of the equalization period (approx. 30 secs).
- Readings are displayed.
- Measurement is finished when the temperature display no longer changes.

3. To hold readings: Briefly press **[Hold]** (< 1 sec).
- **Hold** appears in the display.
- Readings are held.
4. Read the measurement values.
5. To switch to the measuring mode: Briefly press **[Hold]** (< 1 sec).

6.3.   Function test

For a simple function test without adjustment (accuracy +/- 3 % TPM[2]), we recommend a measurement during the commissioning of your new instrument in unused deep-frying oil at 150 to 180 °C.

We recommend performing the function test every time after refilling the deep fryer with fresh oil.

1. Perform measurement in unused deep-frying oil at 150 to 180 °C, see Carrying out measurements, page **21**.
2. Note reading.
3. Repeat steps 1 and 2 several times.
- The average of the readings is your specific reference value for subsequent instrument testing.

> **i**   When changing the type of oil or the oil supplier, the reference value must be determined anew.

Your specific reference value:

_____

---

[2] typical, referred to internal reference, at an ambient temperature of 25 °C

7 Maintaining the product

7.1. Changing batteries

CAUTION
Incorrectly inserted batteries can damage the instrument!
> Adhere to the polarity when inserting the batteries.

Requirement: The instrument is switched off.

1. Undo the screw on the battery compartment cover and open the battery compartment.
2. Remove the empty batteries from the holder and insert new batteries (type AAA).
3. Close battery compartment and secure with screw.

7.2. Cleaning the sensor

⚠ WARNING
Risk of burns due to hot instrument parts (sensor and probe shaft)!
> Do not touch hot instrument parts with your hands.
> Allow instrument to cool sufficiently before cleaning.
> In the event of burns, immediately cool corresponding spot with cold water and see a doctor if necessary.

CAUTION
Possible damage to the sensor!
> Do not remove cold oil residues from the sensor.
> Do not use any sharp-edged objects.
> Do not use aggressive cleaning agents and solvents.

> Use weak household cleaning agents, standard household rinsing agents, water or soap suds.
> Gently clean sensor with a soft paper towel, or rinse under running water.
> Carefully dry sensor with a soft paper towel.

With cold oil residues on the sensor

1. Immerse sensor in hot oil.
2. Allow sensor and probe shaft to cool until there is no longer a risk of burns.
3. Clean sensor before the oil residues cool down.

7.3. Cleaning the housing

Requirement: The instrument is switched off.

CAUTION
Possible damage to housing!
> Do not use sharp-edged objects.
> Do not use any aggressive cleaning agents or solvents.

> Use mild household cleaning agents, standard household washing-up liquids, water or soap suds.
> Clean housing with a damp cloth.
> Dry housing.

7.4. Cleaning the plastic case

| CAUTION |
| --- |
| **Possible damage on and in the plastic case!** |
| > Do not use sharp-edged objects. |
| > Do not use any aggressive cleaning agents or solvents. |

> Use mild household cleaning agents, standard household washing-up liquids, water or soap suds.
> Clean plastic case with a damp cloth.
> Wipe plastic case with a dry cloth.

7.5. Calibrating/adjusting the instrument

i
- The sensor is exposed to large temperature jumps and pollutants while in measuring mode. We therefore recommend having an annual test carried out by customer Service. For more information go to: www.vito.ag.
- For measurements as part of a quality-assurance concept (e.g. ISO 9001), we recommend the annual renewal of a calibration certificate (accuracy +/- 2% TPM). For more information go to: www.vito.ag

8 Tips and assistance

8.1. Questions and answers

Items shown on the display:	Possible causes / solution
↓ lights up and flashing temperature value **<40 °C** appears in the display	Permissible measuring range undershot > Increase oil temperature.
↑ lights up and flashing temperature value **> 200 °C** appears in the display	Permissible measuring range exceeded > Reduce oil temperature.
Battery symbol 🔋 lights up	Battery charge level low (approx. 2.5 hrs remaining life) > Change batteries if necessary.
Battery symbol 🔋 flashes	Batteries empty (approx. 1.2 hrs remaining life) > Change batteries.
000 lights up	Sensor not in oil > Instrument is ready for measurement. Immerse sensor in oil.
PIN lights up	Configuration mode locked. > Unlock configuration mode.
Err 1 lights up	TPM sensor faulty > Contact Vito AG or your dealer.
Err 2 lights up	Temperature sensor faulty > Contact Vito AG or your dealer.
Err 3 lights up	TPM sensor and temperature sensor faulty > Contact Vito AG or your dealer.
Err 4 lights up	Other fault > Contact Vito AG or your dealer.

Items shown on the display:	Possible causes / solution
ser lights up	When entering the adjustment value, a TPM value discrepancy of more than 10% TPM. occurs. > We recommend a technical check of the instrument by Vito AG.

If we have not been able to answer your question: please contact your local dealer or the Vito AG. For contact details, see the back of this document or visit the website www.vito.ag.

Vito AG

Eltastrasse 6
D-78532 Tuttlingen

Fon: 0800 / 3050777
Fon: +49 (0) 7461 / 96289-0
Fax: +49 (0) 7461 / 96289-12

info@vito.ag
www.vito.ag