

**This short manual is no replacement of the actual MINIFLASH manual!  
Please, read the manual first to ensure complete functionality of the instrument**

1. Place **MINIDENS** on a **stable bench top** and connect the power supply cable to the power inlet on the rear side of the instrument and the mains voltage.

*During the mass determination, the instrument should not be exposed to any vibration (remember, there is built-in a 5-digit balance).*

2. **Switch on the instrument** with the power switch above the power connector  
The display of the instrument is now illuminated and shows the start-up menu:

```
*****
MINIDENS TCO VERS. 1.01 06/05/1996 09:37
*measure *memory *transport *setup
*****
```

STOP	RUN	TASK	←	⇒	↑	↓	
	STOP	...			Stop measurement at any time		
	RUN	...			Start measurement		
	TASK	...			Execute a selected operation, indicated by *		
	← and ⇒	...			Change the cursor position		
	↑ and ↓	...			Modify numbers, letters and select options		

## SETUP OF YOUR MINIDENS

1. Shift the cursor to **\*SETUP** and press **TASK**:

```
*****
← *param *usercal *com *loc *clk
  contrast=↓15                ↓US
*****
```

2. Shift the cursor to **\*PARAM** and press **TASK**. In this sub-menu you can change: the unit for: temperature (T): °C or °F and density (D): g/cm<sup>3</sup>; kg/m<sup>3</sup>; API

3. **Set the equilibrium time: EQU**

Change the cursor position to one of the digits of the equilibrium time and set this value to:

- 30 s for measurements at ambient temperature.
- 420 s for an API determination of bitumen at a sample temperature of 30°C

Other samples and other temperatures need shorter equilibrium times, but should not be shorter than 2 minutes.

4. **Select the dialogue language** (German; English) with the cursor on **↑US**: with the keys **↑** and **↓**.
5. **method=↓L or H**: allows user to change between **compression (H)** and **expansion (L)** from **barometric pressure** for volume determination procedure (depends on sample characteristics).
6. **\*CALPARAM.:** **V/V0** and **M/M0** are factors for the volume and mass calculation (**deviation from the factory calibration**) and should only be altered in case another aluminium calibration block is used (set values according to the test sheet of the aluminium block + **TASK** on **←** to store new values).
7. **\*USERCAL:** Shift the cursor to the number after user factor and press **↑** and **↓** to change the volume reading. The density is automatically corrected with the new volume. Press **TASK** on **\*OK** to store this factor.
9. Go to the start-up menu then enter the Measuring menu (**\*MEASURING + TASK**)
10. Shift the cursor to **\*#####** and press **TASK**
11. With **R**: off (or on) you can switch **OFF/ON** the temperature regulator (move the cursor to the beginning of the second row).
12. When switched **ON**, the user can program the required temperature after **T= C**

## CALIBRATION OF THE MINIDENS

1. In the Measuring menu shift the cursor to  $\uparrow$ CUP and select CALIB. then move the cursor to \*TARE and press TASK. Follow the instructions on the display for the tare measurement without a cup and afterwards confirm with TASK at \*OK to store this tare value in the memory.
2. Insert the certified aluminium block on the balance plate and follow the instructions on the display for the volume and mass calibration.

If the calibration is accepted, the display shows:

```
*****
 calibration ok           m=19.878 g
D=2.822 g cm;           T=27.5 C   V= 7.046 cm;
*****
```

3. Press STOP and the instrument is ready for your measurements.

## TARE MEASUREMENTS

- 5.1 In the measuring menu: select the cup you want to use for the next measurements (cursor on  $\uparrow$ CUP and select with  $\uparrow$  and  $\downarrow$ ).

- 5.2 Shift the cursor to \*TARE and press TASK. The display changes to

```
*****
← tare   ↑cup1           m= 0.000 g
      insert cup, press RUN
*****
```

- 5.3 Put the respective empty cup in the round depression of the balance top. Press RUN to start the tare measurement.

After the tare measurement the measuring chamber is opened and the display changes to:

```
*****
← cup1           m= 2.335 g
 *OK           T=27.5 C   V= 0.846 cm3
*****
```

- 5.4 Confirm with TASK at \*OK to store this tare value in the memory.

## PERFORMING MEASUREMENTS

- 6.1 In the start-up menu, shift the cursor to \*MEASURE and press TASK.
- 6.2 Wait for balance equilibrium. After the cursor is on  $\uparrow$ CUP press  $\uparrow$  or  $\downarrow$  to select the tarred cup or choose no cup in case you want to measure a pellet pressed sample.
- 6.3 Insert the pressed sample or the sample cup with the specimen into the round depression of the balance top. Close the lid to prevent the balance from drafts.
- 6.4 Press RUN to start the measurement.

After the volume of the sample is determined by expansion and compression of the measuring chamber, the density is calculated and the display shows the result and the end of the measurement.

```
*****
                               m=12.239 g
D= 3.241 g/cm3   T=27.5 C   V=3.776 cm3
*****
```

- 6.5 Record the value if no printer is connected, press STOP to switch again into the measuring mode.