

Determination of volume without destroying prepackages

Consumption of beverages per year in Germany

Product	Volume in 10 ⁹ L	Turnover in 10 ⁹ €
milk (dairy products)	28,4	9,5
mineral water	10,5	2,2
beer	9,5	6,2
water with sugar and flavor	7,3	3,3
juice	3,5	3,5
spirits	tax revenue*	1,9
sparkling wine	tax revenue*	,422
beer	tax revenue*	,713
wine	tax revenue*	0 (no tax in DE)

Quelle: 235. PTB Seminar 2007 (?) / *) Statistisches Bundesamt für 2010

Determination of volume without destroying prepackages



*Container infeed on the KRONES
Sensometric filler*
Output rate up to 72.000 container/h

Determination of volume without destroying prepackages

Advantages of non destroying testing:

- low cost and resale of test objects possible
- - quicker and easier testing of great numbers

How the non destroying testing of the filling volume of prepackages is possible?

Main methods are:

- Volume by mass & density
- Using MCB's and determine volume with a templet

I. Volume measurement by density

Remember:

$$V = m / \rho$$

If the density ρ is known and the mass m has been determined by weighing the prepackage, then the volume V can be calculated.

Volume measurement by density

Literature:

- Determination of **density** see e.g.
OIML G 14 “Density measurement”
 - Procedures for **tare** determination see e.g.
**OIML R87 „Quantity of product in
prepackages” Annex B „Tare procedures”**
- For **aerosols** see separate presentation

II. Volume measurement in MCB with templates

Output rates are very high
(e.g. 72.000 container/h).

Filling tube with sensor is drained into the bottle. Filling stops if a definite filling high is reached.

→ Therefore it is suitable, to use
Measuring Container Bottles (MCB).

Volume measurement in MCB with templets

References for Measuring container bottles (MCB):

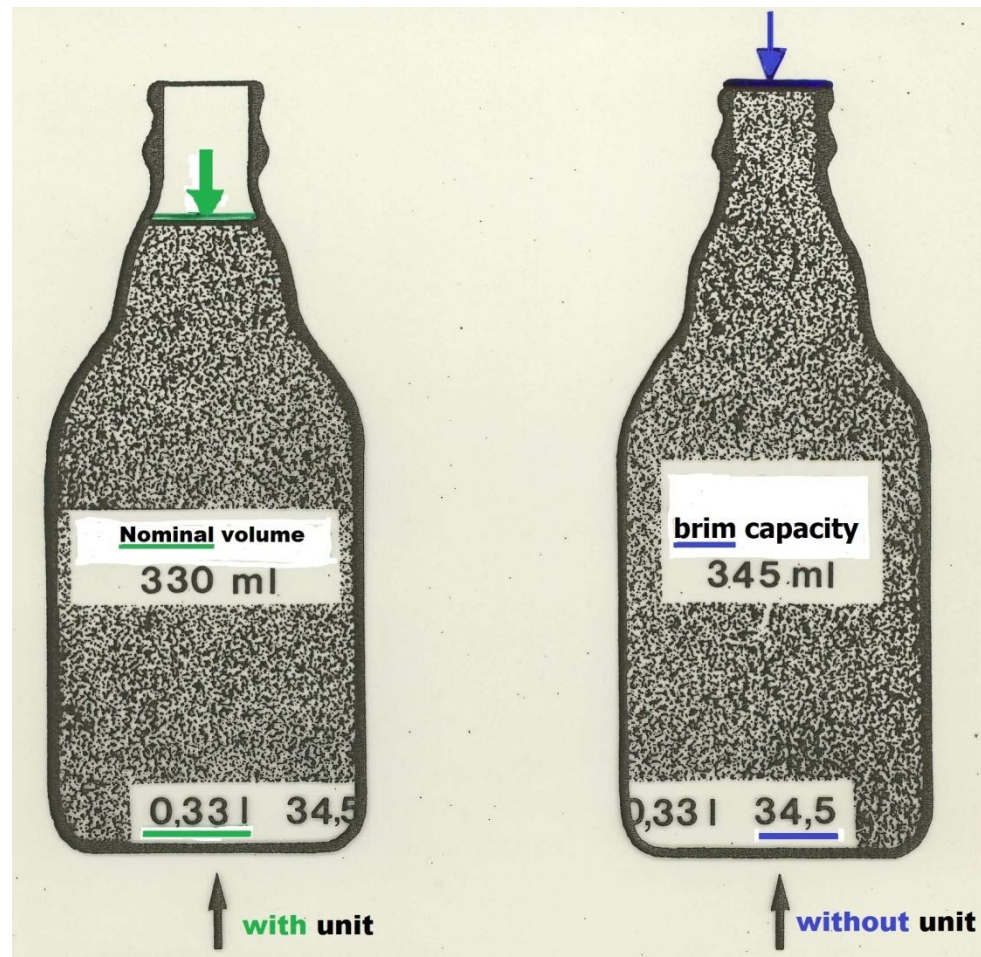
- **OIML R 138** Recommendation Edition 2007(E)
Vessels for commercial transactions
(mark of conformity for MCB is missing in OIML R 138)
- Council Directive **75/107/EEC** relating to **bottles used as measuring containers**
- WELMEC Guide **6.12**
Measuring Container Bottles - Guidance on Directive 75/107/EEC

International Punt Mark library see e.g.:

- **www.emhartglass.com**

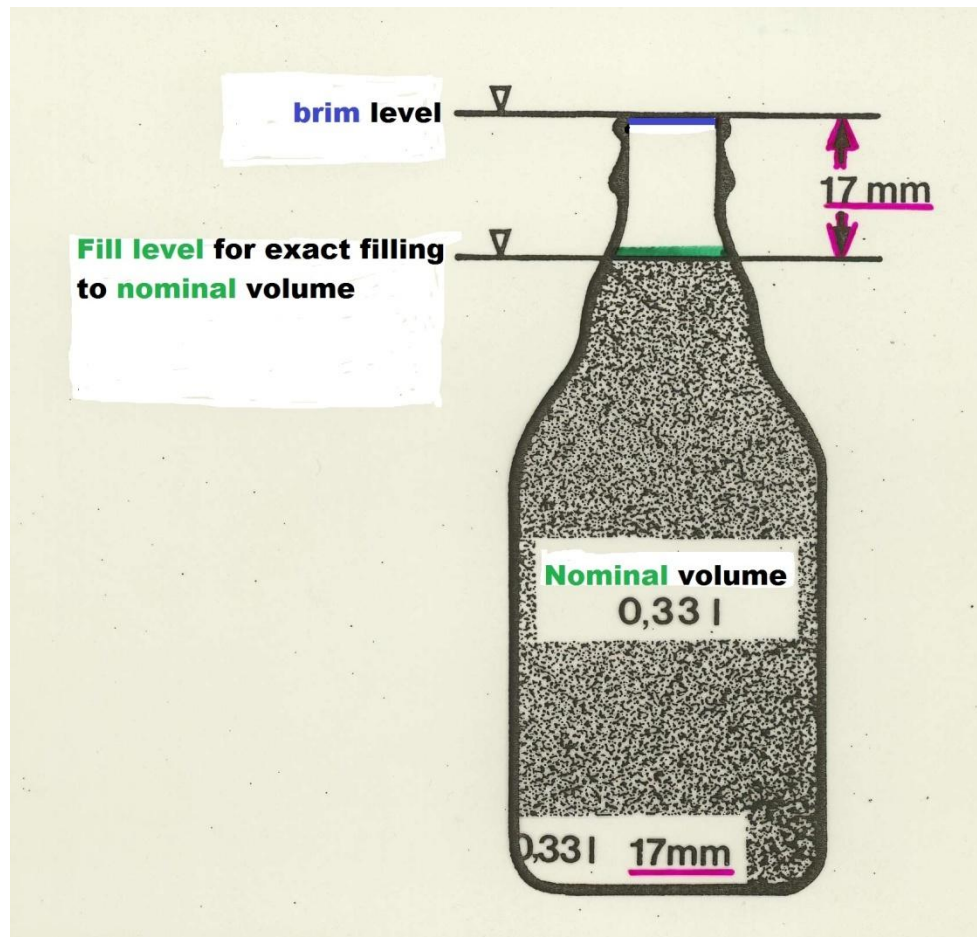
Volume measurement in MCB with templates

MCB: Nominal volume and brim capacity



Volume measurement in MCB with templates

MCB: Filling to a constant level



Volume measurement in MCB with templets



Picture shows the **indications of a MCB:**

- | | |
|---|--------|
| - nominal capacity* | 700 ml |
| - the approved identity mark* | R6 |
| - the reversed epsilon, not as prescribed* | ε |
| - the fill height* | 65 mm |
| - other marks, such as bottle design number | 7704 |
| - mould number | 13 |

**) mandatory*

Source: WELMEC 6.12

Volume measurement in MCB with templets

Maximum Permissible Errors for the MCB:

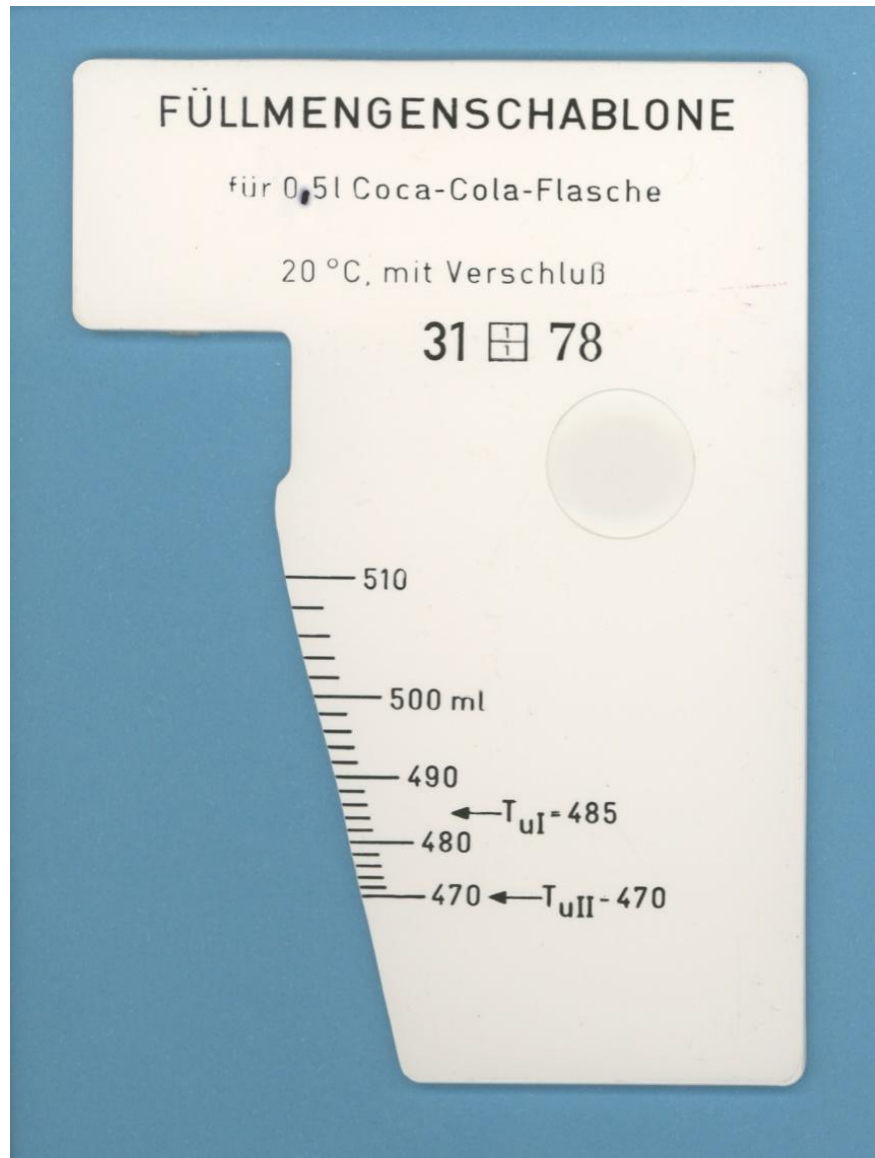
Nominal capacity V_n in millilitres	Maximum permissible errors	
	as a % of V_n	in millilitres
from 50 to 100	-	3
from 100 to 200	3	-
from 200 to 300	-	6
from 300 to 500	2	-
from 500 to 1 000	-	10
from 1 000 to 5 000	1	-

→ Notice that these values are half of the values for prepackages!

Volume measurement in MCB with templates



Volume measurement in MCB with templets



Manufacturer:
www.gowi-schablonen.de

Volume measurement in MCB with templets

Literature for templets:

- WELMEC Publication 6.5 Annex G “Guidance on Controls by Competent Department’s on “e” marked Prepackages”
- WELMEC Guide **6.12** Section 10 & 11 „Measuring Container Bottles - Guidance on Directive 75/107/EEC“
- Prüfanweisung für die Anerkennung von Messschablonen (DE)