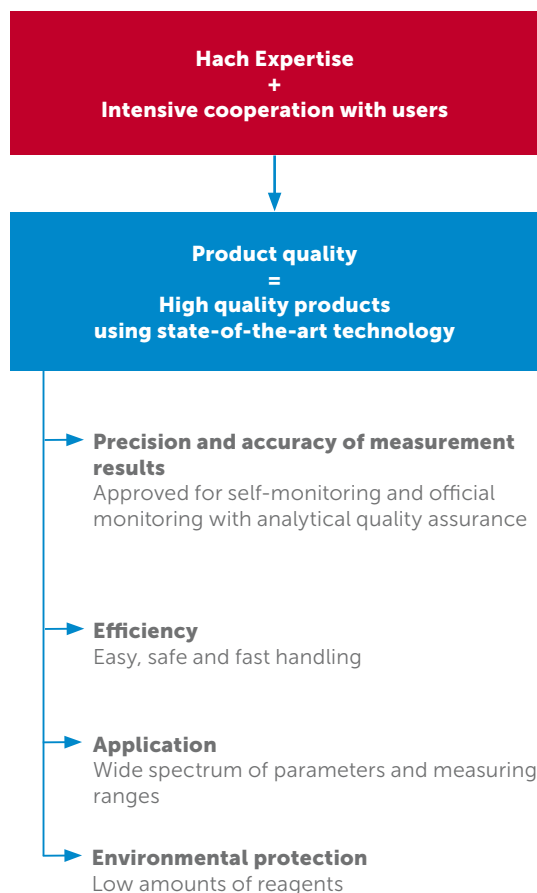


# TNTplus Vial Tests: Expert testing made simple

## Introduction

The launch of the world's first ready-to-use reagent packages for photometric analysis in the 1960s had a substantial effect on water analysis. Today Hach® TNTplus™ Vial Tests and photometers are indispensable elements of both process control and compliance monitoring. Innovations such as 10-fold rotational measurement and Truecal have simplified analysis even further making measurements more accurate and reliable. With TNTplus Vial Tests, high quality analytical measurements are available in every laboratory.

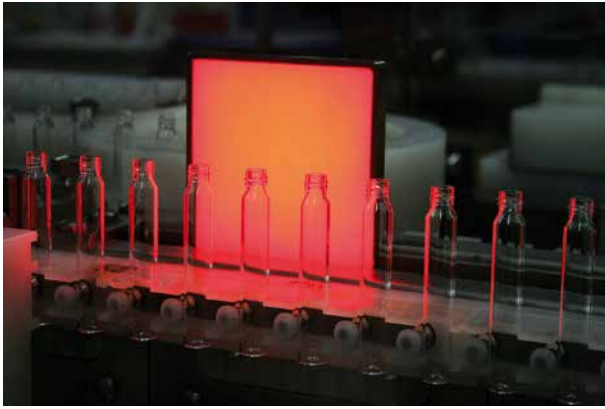


*User and manufacturer expertise are crucial to the quality of the measurement results.*

## The TNTplus Vial Test System

A good, practical, measurement system consists of more than vial tests and a photometer. Naturally, these products are the basis for reliable and compliant analyses, but just as important are the appropriate accessories and comprehensive services such as user support by qualified personnel. Correct measurement results are not obtained by chance, but depend on a combination of product quality and workflow quality.

If photometers or reagents are flawed, the user can do everything correctly and still obtain incorrect results. The inverse is also true: Even the best analysis system cannot compensate for flawed handling. Even a correct result will only be valid if the necessary quality assurance measures are performed and documented. This applies to every measurement system, irrespective of whether it is used for process control or regulatory compliance.



100 % controlled quality: Each vial is inspected for glass flaws before it is filled.



Preparation of the vial caps in the control and sorting drum.



Automatic fastening of the vial caps

### Quality checks during production

Hach product quality begins even before production: during research and development and in purchasing. Comprehensive checks are carried out on suppliers and raw materials, e.g. the empty glass vials are subjected to high voltage tests to detect material flaws.

Product quality is also a top priority during production. Special machinery is used to ensure the highest quality and reliability, e.g. sorting the caps. Product quality should be totally transparent. Hach ensures it is, e.g. by offering download of Certificates of Analysis on the websites.

### Wide range of reagents and photometers

#### Reliability from day one

A special feature of the Hach TNTplus Vial Test System is its focus on practical requirements. Photometer and reagents are developed together to ensure maximum reliability of the complete analytical procedure. User feedback is taken into account whenever a new test is developed. The result is smart photometers and vial tests, whose systematic and simple handling is designed to prevent errors from the start.

#### Diversity of tests

There are now vial tests for more than 30 different parameters – from ammonia to TOC – with almost 50 measuring ranges. The diversity of tests makes them suitable for the analysis of drinking water, wastewater and process water. Hach TNTplus Vial Tests cover applications, from the field to largescale laboratories.

#### Photometers help reduce operating errors

Hach spectrophotometers are configured and precalibrated in the factory, so the measurement result is obtained after just a few steps. No reagent blank is required. All important test data are already stored in the photometer. Potential sources of error are therefore reduced to a minimum.

Reference beam technology provides correct and reproducible results. In contrast to single-beam photometers, Hach spectrophotometers have a second beam that serves as a reference standard. This allows the photometer to compensate for potential interference factors such as lamp ageing and power fluctuations, so that they cannot influence the measurement result.

The 10-fold rotational measurement with the integrated barcode reader ensures maximum reliability of the results and operator confidence. The photometer automatically identifies and evaluates the vial test. Several parameters have Hach's Truecal feature included – the barcode contains the calibration curve data specific to each lot of chemistry, and automatically updates the calibration curve. At the same time, anomalous readings caused by soil or scratches on the vial glass are recognized as outliers and eliminated, so that they cannot influence the result.

## Analytical Quality Assurance

Regular application of AQA ensures that:

- The results of analyses are traceable.
- The correct status of the analysis system is documented.
- Handling errors can be recognized immediately.
- Measured results can be compared.
- Analytical results are valid.

Hach supports AQA by offering single and multiparameter standard solutions, test filter sets for photometers and Service Programs for preventive instrument maintenance.



*Spectrophotometer range from portable to UV-VIS*

## Health and environmental protection

### User safety

Safe handling of chemicals is a key priority for Hach. The narrow neck of the TNTplus vials prevents chemicals from spilling even when an open vial is knocked over accidentally. At the same time it keeps evaporation to the absolute minimum whenever the cap is removed.

On top of that the Dosicap system was developed to make adding solid reagents to the vial as simple, as safe and as reproducibly precise as possible. The required amount of reagent is freeze-dried in a vial cap. When the reagent needs to be added the Dosicap is screwed on the vial and the solid reagent is dissolved only after the vial is safely closed again.



*Cuvette tests use 90 % less chemicals than traditional methods.*

### Looking after the environment

Continuous environmental stewardship is the other high priority in the development of the TNTplus Vial Tests. The small volumes required for TNTplus tests minimize the amount of chemicals and hazardous substances used.



*Dosicap Zip allows for exact, non-contact dispensing of freeze-dried reagent.*

## TNTPLUS VIAL TESTS

### Ready-to-use vial tests

- Maximum safety for users, thanks to the closed system and low amounts of reagents
- Convenient and error-free dosing of the reagents without pipetting and reagent contact thanks to Dosiscap / Dosiscap Zip: vial caps containing an exactly pre-dispensed amount of freeze-dried reagent
- Complete labelling of the individual vials, including barcode label for automatic recognition in the photometer

### Well-thought out package design

- Analysis is easier for beginners, with clear instructions inside the package lid.
- GHS hazard codes are shown on each test package. Safety data sheets are available for download on the website.
- Differentiation between tests and measuring ranges by means of color-coding
- An RFID tag carries the Certificate of Analysis (CoA). The certificate can be printed out immediately via the spectrophotometer.

The TNTplus Vial Test package informs users about safety precautions and work steps.

### Color-coded measuring ranges



Color-coded boxes, labels and caps indicate the measuring range at a glance.

The barcode label contains all the characteristic values required for automatic recognition and measurement, lot number and expiry date information. Several parameters have Hach's Truecal feature included.



Pictures showing work steps at a glance

On the side of the box: GHS hazard codes, safety instructions, performance characteristics, lot number, use-by date



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