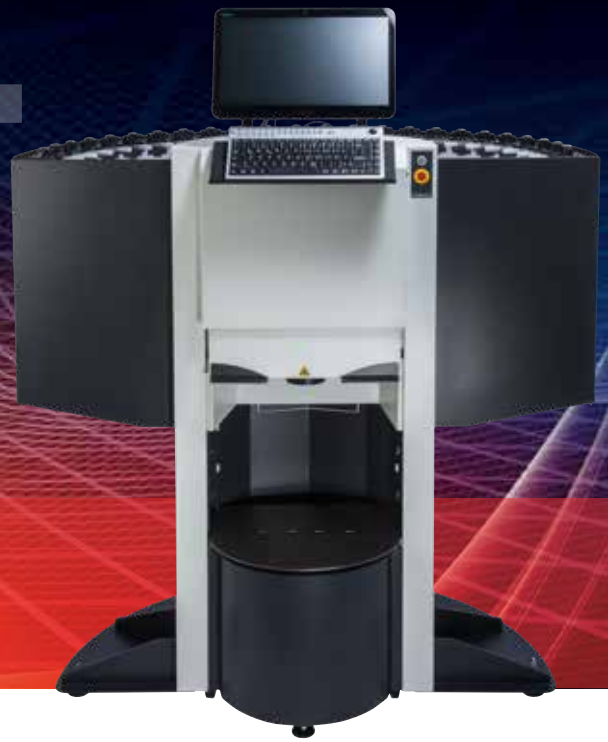
Collomix

XTINTY

XPERT*note* #02



5 Questions - 5 Answers | »A Dispenser With Sample Pot Accuracy«

Collomix

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MADE IN GERMANY

Editorial

Color samples help customers find the right color. Reproducible dosing precision of color samples is a must for customer satisfaction. In some cases, production of color samples requires dosing amounts smaller than one drop of colorant. TINTA features unparalleled dosing precision for ultimate sample pot accuracy: It enables smallest colorant shots of 1/384 fl.oz. resp. 0.077 ml in a sample pot base volume of just 100 ml – even without a previous purge!
How does TINTA achieve this? TINTA uses a very precise dosing pump. It is supported by a range of intelligent cool**NOZ** technology features, like nozzle temperature and colorant humidity control, to ensure colorant homogeneity at all times. Learn about TINTA's unique sample pot accuracy and the system's advantages over conventional stirring dispensers in this and three more TINTA Xpert Newsletters.

In **TINTA Xpert note #2** you will find answers to:

1. Why does TINTA use piston pumps?
2. How does TINTA's tint**ONE** one circuit dispenser improve dosing precision?
3. How will simultaneous dispensing and cool**NOZ** save you time and colorant?
4. How can cool**NOZ** enable unparalleled accuracy?
5. The Sniff: What is its secret and how does it contribute to dosing precision?

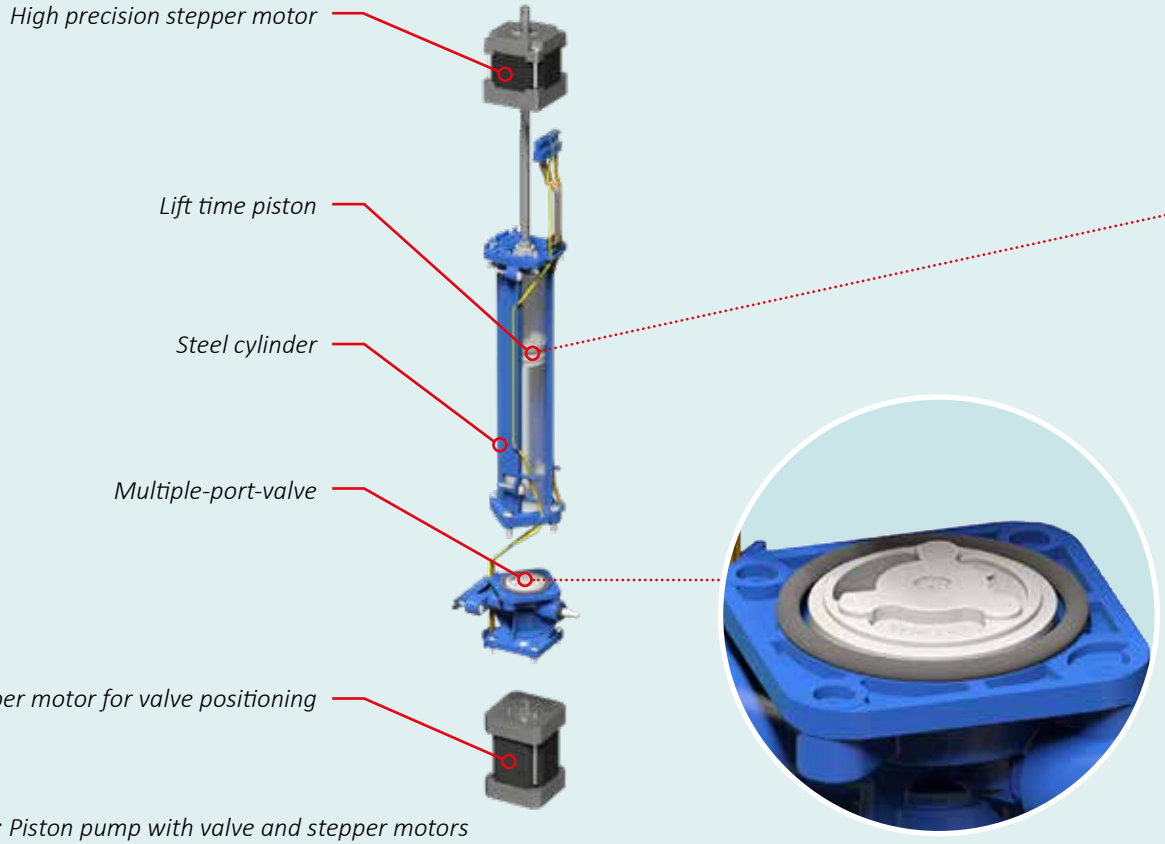

Figure 1.1: Piston pump with valve and stepper motors

Figure 1.2: New piston

Figure 1.3: Piston after 117.000 strokes with colorant brown oxide and still functioning

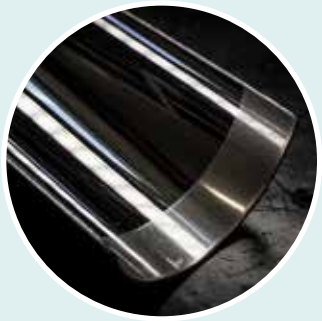

Figure 1.4: Inner surface of cylinder tube after endurance lifetime test

»Why does TINTA use piston pumps?«

Problem

In conventional dispensers the dosing is either sequentially or all dosing pumps do operate simultaneously. This requires elaborate mechanics. If one or several nozzles are clogged, the pumping pressure rises on clogged these nozzles, causing material wear tube bursts, irregularities and dosing imprecision. This is often the reason, why systems with simultaneous dosing require a lot of maintenance, regular pump calibration and – in the worst case – frequent part exchanges.

Proof

On a TINTA dispenser each colorant circuit is operated by an individually controlled piston pump for linearity, precision and calibration-free operation. (picture 1.1) The use of a piston pump ensures constant dosing amounts over the complete lifetime of the canister, as TINTA´s piston pumps – other than most pumps – do not suffer from material wear or internal build-up. Thanks to their geometry, they are the most precise of all pumps. An additional advantage: Piston pumps do not require calibration over their complete lifetime.
In TINTA, a proprietary high-precision Collomix stepper-motor drives the pump's piston, allowing finest, highly precise dosing steps free of any deviation, for ultimate dosing precision and circulation efficiency. The stepper motor is also the secret behind the innovative sniff function at the cool**NOZ** dosing head and the recirculation nozzle: 0.08 ml colorant is moved by as many as 30 motor steps!
The pictures above show TINTA pistons in different phases of their life in long-term tests with different colorants (*figure 1.2-1.4*).

Average colorants have been gone through long-term tests with more than 350.000 cycles. This results in a total moved volume of about 31.500 liters by considering a cylinder volume of 90 ml. TINTA pumps demonstrated their superior precision and efficiency. Therefore, we call it »Life-Time Piston Pump« since there is latterly no service during the TINTA lifetime needed.

Result

- Use of a single pump for both dosing and recirculation reduces mechanical complexity and the number of moving parts, which in turn decreases maintenance and service effort.
- Each canister has its own piston pump. This enables fast and simultaneous dosing without having to move all pumps at the same time. Pumps are only moved when they are needed, which in turn reduces material wear and maintenance.
- As each pump is moved individually by its own motor, pressure per pump is limited. This eliminates the danger of tube bursts due to high pressure. Collomix' proprietary high-precision stepper motor enables highest dosing precision for ultimate sample pot accuracy.

Why does TINTA use piston pumps?

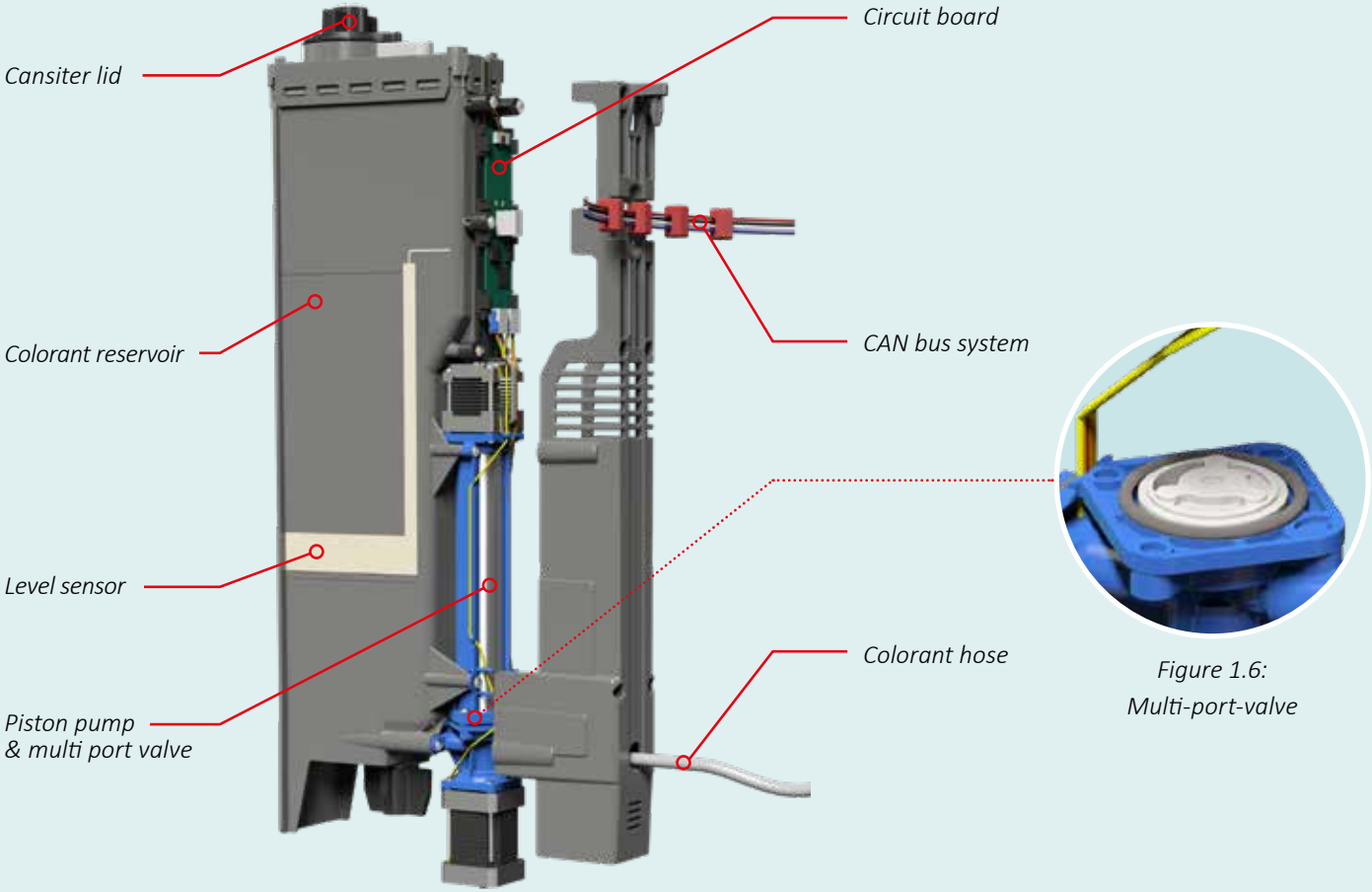

Figure 1.5: tint**ONE** *– a one circuit dispenser*

Figure 1.6:
Multi-port-valve

Figure 1.7: tint**ONE** *one-circuit dispenser connected simply by CAN bus system and colorant hose*

»How does TINTA's tint**ONE** *one circuit dispenser improve dosing precision?«*

Problem

In a conventional stirrer canister, individual colorant rheology requirements often cannot be met, as all colorant canisters are controlled and operated in unison.

Proof

TINTA's tint**ONE** is an intelligent one-circuit dispenser unit. It does much more than simply hold the colorant. The compact module is an integrated plug & play unit, complete with canister, pump, multi-port valve, and control element (*figure 1.5*). Air sealed and free of stirrers it prevents the dry-out of colorants. Thanks to a significantly reduced number of moving parts in the canister, tint**ONE** is low in maintenance and extremely service-friendly. tint**ONE** features:

- Abrasive pigments can cause wear of the inner cylinder surface, with negative effects on the durability of the piston. Collomix has developed high-grade steel cylinder tubes and an intelligent material combination for the cylinder piston system, for long lifetime.
- Coated ceramic discs in the multifunctional multi-port valve enable reliable operation over the complete lifetime (*figure 1.6*).
- Two proprietary individualized direct stepper-motor-drives for pump and valve for highest accuracy and long lifetime.
- The piston pump features a tested lifetime , resp. over 31,500 liter of pump volume in average (yellow oxide; white oxide colorant in worst case about 13.500 liters).
- Each canister comes with its own electric printed circuit board to parameterize and control each tint**ONE** individually.
- Any tint**ONE** can be equipped with Collomix' optional and patented vibro**PAD** for liquefying thixotropic colorants.
- Lid with LED indications increases process safety at point of tinting.
- Plug & play canister comes with simplest connections (connection to dispenser control by simple bus, direct connection to the dosing tube by bus plug).

Result

- All tint**ONE** one-circuit dispensers are autonomous, compact, easy to exchange modules with a single easy to use hose and bus connection (*figure 1.7*).
- Any tint**ONE** is easily configured and scaled to any size shop and job with the dispenser chassis.
- Each individual colorant canister can be flexibly programmed and controlled, independent of all other colorant canisters in the set-up.

How does TINTA's tint**ONE** one circuit dispenser improve dosing precision?

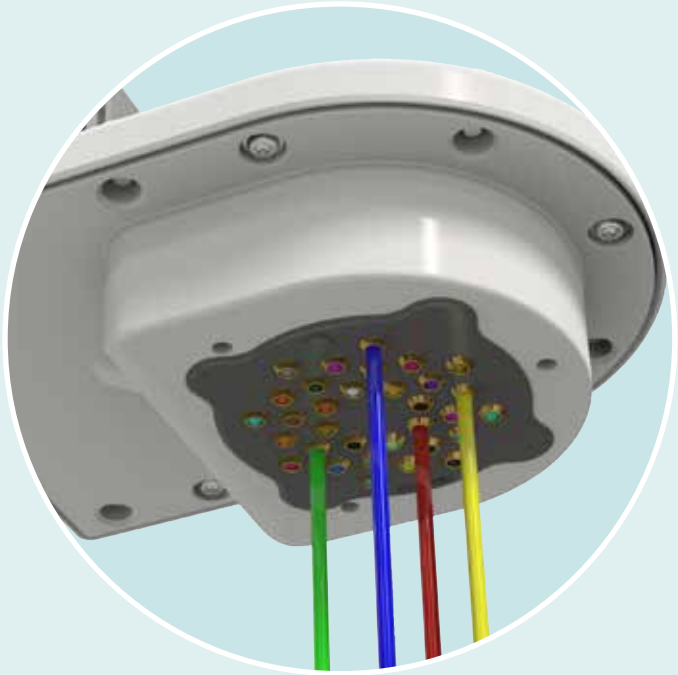

Figure 1.8:
cool**NOZ** *for simultanous dispending*

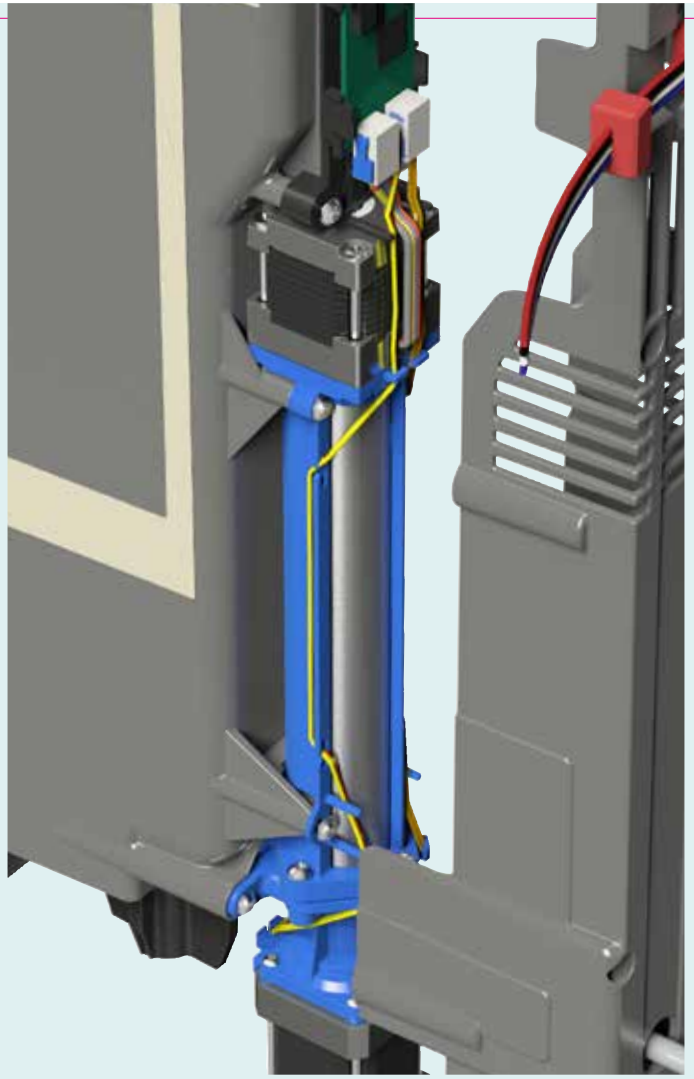

Figure 1.9: Highly precice and fast piston pump at each individual canister

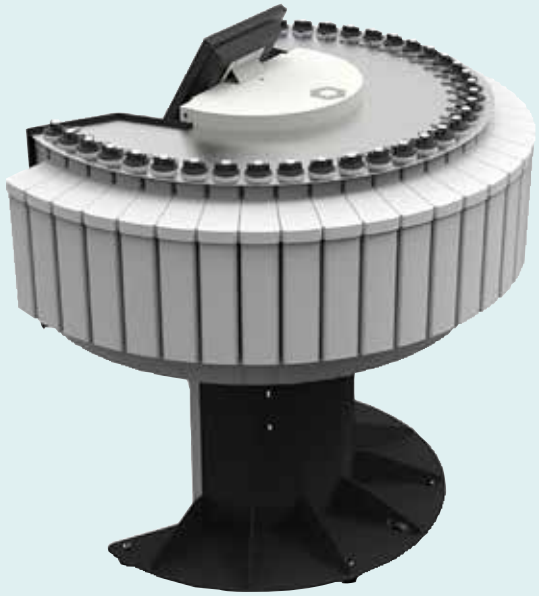

Figure 1.10: With the variable configuration you can not only increase the capacity but also the tinting speed due to simultanious dispensing of multiple canisters with the same colorant

Problem

Regular dosing head purging and maintenance requires time and cleaning effort in the shop. In addition, sequential dosing can lead to considerable waiting time. Recipe selection from the database may take quite some time, too.

»How will simultaneous dispensing and cool**NOZ** *save you time and colorant?«*

Proof

TINTA's simultaneous dispensing technology with proprietary pump and software set-up enables dispenser job processing in record time. In addition it saves you valuable time at the point of sale, as simultaneous dispensing will speed up job processing and reduce waiting time. Collomix' new tint**ONE** dispenser technology keeps the pumps and hoses permanently filled, so that all required colorants can be delivered to the dosing head at the same time. As the piston pump of each individual canister operates separate from all others, fast simultaneous dosing can be performed without having to move all pumps at the same time. Up to 4 colorants can be dosed simultaneously (*figure 1.9*). Thanks to its innovative cool**NOZ** technology with dew point functionality, TINTA is almost purge-free (*figure 1.8*). This is why in normal use TINTA reduces conventional purging by approx. 90 %.
That saves additional time and event colorant at POS!

Result

The piston pump provides a fast an highly precise dispensing at point of sale. TINTA´s simultaneous tinting ensures high productive tinting capacity.
We chose 90 ml as the pump cylinder´s capacity. The TINTA dispenses in one minute 0,18 liters. Approximately, 80 % of recipes require colorant amounts less than 180 ml. The result is that 80 % of all dosing operations can be completed in less than 1 minute with TINTA's simultaneous dispensing.
You can double or even increase by fourfold the dispensing speed of 0,18 l per minute by parallelizing colorants in multiple tint**ONE** canisters. For example 0,35 liter/minute or even 0,72 liter/minute. For a high running colorant you can choose a 5 liter canister for the same tint**ONE** slot at the dispenser *(figure 1.10)*.
Additional benefit: TINTA's innovative **colloro.TINT** software and data base control enables extremely fast recipe selection in milliseconds. Learn more about this feature in TINTA Xpert Letter #4.

How will simultaneous dispensing and coolNOZ save you time and colorant?

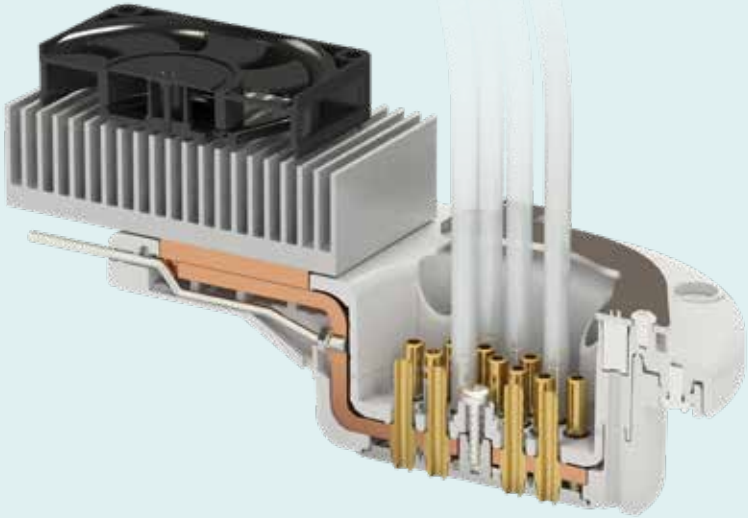

Figure 1.14: Cross section of coolNOZ *and peltier element*

Figure 1.11: Short tubes with identical lengths reduce system pressure

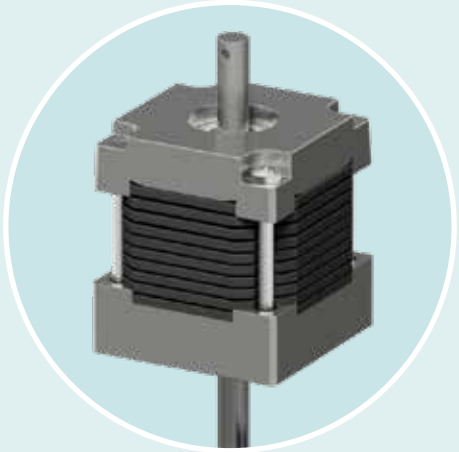

Figure 1.12: Highly accurate and calibration free stepper motor

Dosing volume *(ml)*	***Calculated weight*** *(g)*	***Measured weight*** *(g)*	***Specific gravity*** *(g/ml)*	***Deviation*** *(%)*
0,25	0,4472	0,4518	1,789	1,03
1	1,7889	1,8044	1,789	0,87
0,2	0,3578	0,3596	1,789	0,50
0,15	0,2683	0,2705	1,789	0,82
0,08	0,1431	0,1483	1,789	3,63
0,1	0,1789	0,1814	1,789	1,40
1	1,7889	1,8084	1,789	1,09
0,08	0,1431	0,1447	1,789	1,12
0,5	0,8944	0,903	1,789	0,96
0,5	0,8944	0,9009	1,789	0,73
0,15	0,2683	0,2709	1,789	0,97
0,2	0,3578	0,3587	1,789	0,25
5	8,945	9,0289	1,789	0,94
0,08	0,1431	0,1484	1,789	3,70
1,3	2,3256	2,348	1,789	0,96
0,1	0,1789	0,1831	1,789	2,35
0,2	0,3578	0,36	1,789	0,61
1,6	2,8624	2,8949	1,789	1,14
0,08	0,1431	0,1466	1,789	2,45
0,08	0,1431	0,1454	1,789	1,61
0,08	0,1431	0,1451	1,789	1,40

Table 1.13: Accuracy performance test results: Different dosing volumes directly in succession

»How can coolNOZ *enable unparalleled accuracy?«*

Problem

In sensitive recipes, e.g. light grey with minute shares of red, even the slightest dosing errors can cause significant shade deviations. To reduce the effect of such deviations, shops often increase their minimum sample pot size by a multiple of what would actually be needed. Finding the lowest reproducible dosing can save them valuable resources.

Proof

TINTA features ultimate color shade precision even with lowest sample amounts. The extremely accurate stepper motor of TINTA's piston pump (*figure 1.12*), the patented cool**NOZ** technology (*figure 1.14*), and TINTA's smart sniff function enable quick high-precision dosing even for smallest batch volumes.

TINTA's dosing precision features:

- Stepper motor action is based on defined actor rotation. A similar motion precision could only be achieved with a much more expensive BLDC motor with Hall-type sensors.
- Stiff pump cylinder receptacle, into which the cylinder is firmly clamped using a brace module.
- Piston and seal combination: The system needs no seal as the piston itself performs the sealing function.
- Defined sniff at the end of each dosing process.
- Gas-free cylinder.
- Short tubes with identical lengths reduce system pressure. This decreases tube inflation and colorant compression, eliminating post dosage dripping and increasing dosing precision (*figure 1.11*).

Result

After a 24 hour standby we tested an initial volume of 0.25 ml. The tests were performed at ambient temperatures of 16 and 28 °C respectively. There were no mentionable deviations depending on temperature recorded. Results are shown in the *table 1.13* above. For high precision accuracy testing the gravimetric measurement and analysis was done with a Mettler Toledo JB 1603-C; readability: 0.001 g; repeatability: 0.001 g.

Dosing results:

- 0,08 ml < 4 % deviation 24h after last purge/dose
- 0,08 ml < 1 % deviation after purge
- 0,04 ml < 5-8 % deviation after purge, depending on rheology

Tests proved that maximum process reliability on a TINTA prevents recipe errors and deviations in follow-up recipes. TINTA enables 100% sample pot precision for volumes of 250 ml and 80% precision for volumes down to 100 ml.

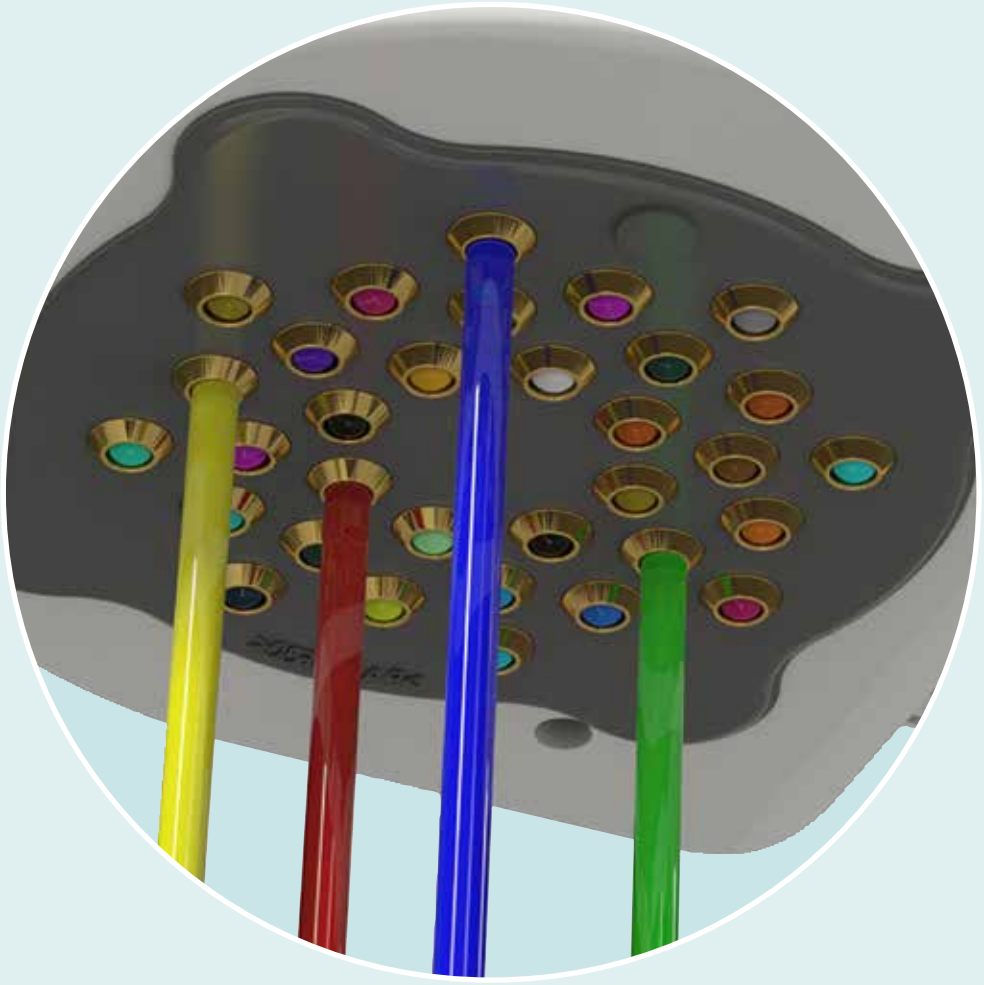

Figure 1.14: 3 mm nozzel diameter with sniffed-back colorants staying within the dew point environment

Figure 1.15: cool**NOZ**

Figure 1.16: Sniffing-back the colorant into the recirculation nozzle to avoind dropping

The sniff: What is its secret and how does it contribute to dosing precision?

Problem

In small sample batches every drop counts. Post dosage dripping of colorants can affect the precision of the current tinting job or falsify the result of the subsequent dosing job.
In addition, the drop at the nozzle can dry and clog the nozzle, calling for a purge.

Proof

After each dosing job TINTA automatically performs a sniff at the dosing head. This sniff pulls the colorant back into the nozzle and into the dew point climate. The pull-back motion is performed by reverse motion of TINTA's high-precision stepper motor. A sniff is performed after a pause of 200 ms and equivalent to 30 motor steps. 30 motor steps and a cylindrical surface of $(27/2)^2 \times \pi$ will move exactly 0.08 ml of colorant. As the hose's filling is always kept constant, the sniff ensures a constant size of the final drop.

Result

In combination with a 3 mm nozzle diameter TINTA's sniff feature efficiently eliminates post dosage dripping of colorants, creates a precise dispensing jet, and enables flow stream stopping (*figure 1.14*).
By the way, the TINTA uses the sniff function also in its recirculation process.
To further reduce adhesions to the drainage rod, the system performs a sniff at the end of every recirculation cycle to eliminate drop formation at the recirculation nozzle (*figure 1.16*).

Innovative solutions

Retail

Tinting technology

Paints

Point of sale

Paint production

Plasters

Wholesale

Varnishes

Industrial applications

The major benefit for our customers:
Why is Collomix the perfect partner in all matters relating to tinting solutions?

Collomix has been at home in the world of mixing for more than 40 years. Through its long-standing practical experience and close involvement with an extremely wide range of tasks and requirements, Collomix has built up profound knowledge which its customers benefit from too. Our mission as an innovation leader is to create added value for our customers in the industrial environment through coming up with new ideas. How do we achieve this? By developing proven functions, optimising profitability aspects and gaining a technological edge through interdisciplinary experience transfer – which is a real plus for our customers.

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As a system provider for tinting solutions, we give you advice that spans entire product fields and is tailored to your own, very special situation. During this process, you as a customer benefit from our intelligent, compact corporate structure. Short distances mean that we can respond to your requirements in a flexible and agile way. In so doing, Collomix uses highly qualified specialists and long-term employees. After all, they are the key to our outstanding products and, therefore, to our joint success as partners.

Coming next: TINTA **Xpert** *note* **#03**

»coolNOZ - A Dispenser Without Purging«

1. How does cool**NOZ** eliminate frequent purging and reduce purge waste by up to 90 %?
2. How can cool**NOZ**' unique dew point technology prevent dry-outs?
3. Why does the movable move**NOZ** dosing head improve handling and work ergonomics?
4. How does cool**NOZ** technology enable unparalleled dosing precision?
5. How does cool**NOZ** perform in challenging conditions and changing climates?

Other editions:

TINTA Xpert note #1:
»TINTA - A Dispenser Without Stirring«

TINTA Xpert note #4:
»colloro.TINT - Next Generation Dispenser Control«

TINTA Xpert note #5:
»A Dispenser That Adjusts Your Requirements«

Please contact us for a TINTA test and for further information.
Our sales & technical service team is happy to answer your questions.

More information on http://collomix-tinta.de/en

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