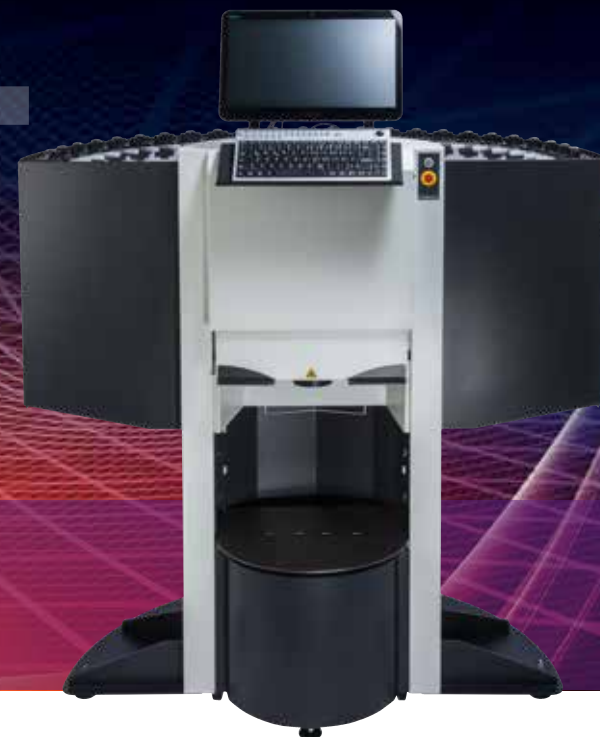




X^{TINTV}PERT *note* #03

+ 5 QUESTIONS - 5 ANSWERS | »coolNOZ – A Dispenser Without Purging«



 **Collomix**
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Editorial

Colors must dry fast. That is why colorants, too, are designed to dry as quickly as possible. While this is good for the painter, it is a challenge for the dispenser, as colorants tend to dry as soon as they come in contact with air.

Modern dispensers are built to handle this challenge using several techniques sealing and/or moisturizing the nozzle head. Additionally all of that requires a lot of purging. The downside often is considerable servicing effort for the operator and valuable colorant is wasted in the process of cleaning the nozzles: One dispenser loses between 10 and 20 liters of colorant per year owing to purging.

TINTA by Collomix is an almost zero-purge dispenser. The advantages: Significantly reduced colorant wastage, cleaning and service efforts.

Learn about TINTA's unique cool**NOZ** features and the system's advantages over conventional dispensers in this and four more TINTA Expert Briefings.

In **TINTA Expert note #3** you will find answers to:

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?

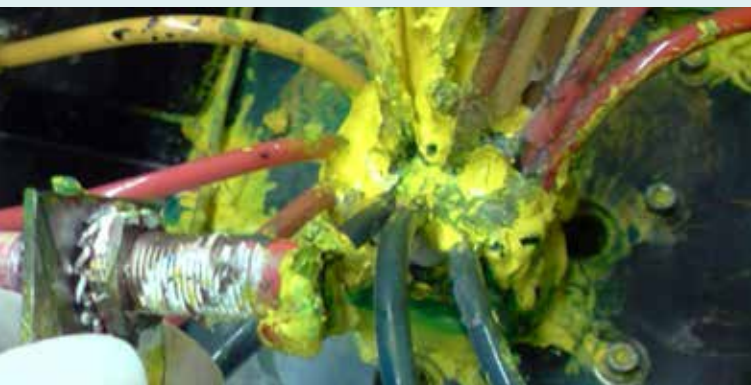
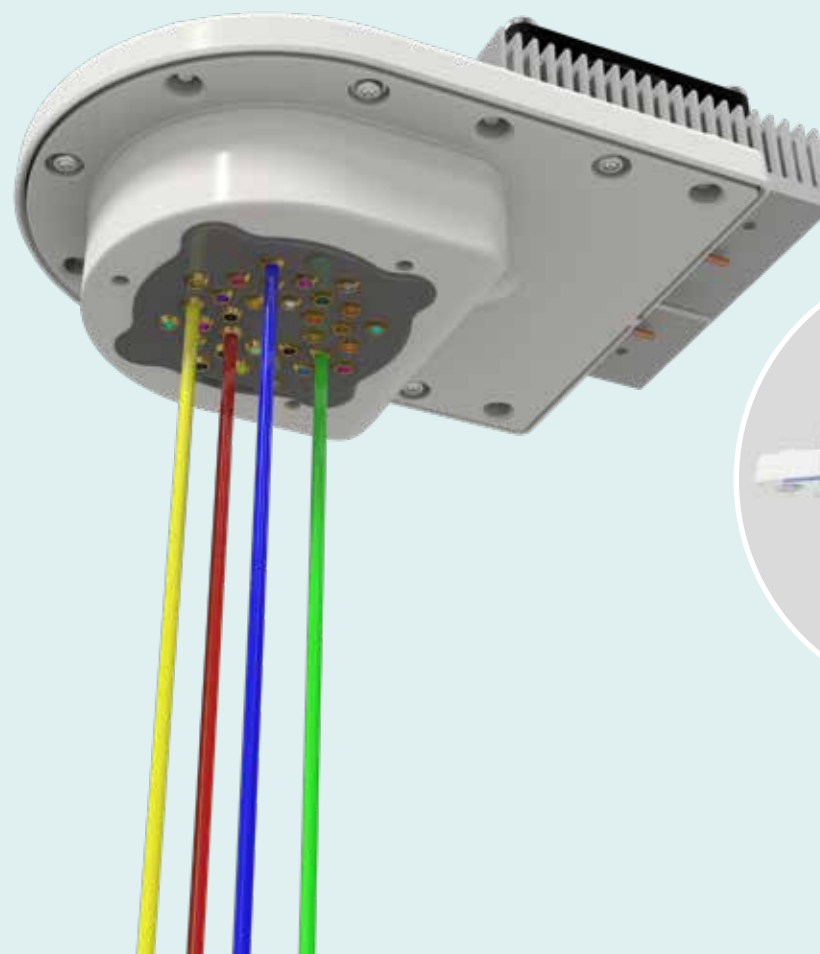



Figure 1.1: Clogged nozzels on conventional dispensers



*Figure 1.2:
coolNOZ technology
by Collomix*





»How does
coolNOZ eliminate
frequent purging
and reduce
purge waste
by up to 90%?«

Problem

Clogged nozzles from dry colorant residue are a major source of dispenser problems. Cleaning takes up valuable operator and machine time, while the clogged colorant cannot be reused. Automated protection covers, which many dispensers use to eliminate this problem, often cause their own problems, as they are easily damaged or contaminated (figure 1.1).

Proof

TINTA Dispensers use a proprietary and patented Collomix technology called coolNOZ (figure 1.2) to reduce nozzle clogging to an absolute minimum. coolNOZ builds on the physical dew point principle (The dew point is a logarithmic function of temperature and humidity. Humidity > 20 percent is favorable): The system cools the colorant in and around the nozzle tip exactly to dew point temperature, ensuring that no water will evaporate from the colorant. This keeps the nozzle open and permeable at all times, while keeping the colorant moist and fluid, even over long periods of time.



Result

TINTA coolNOZ technology

- creates a perfect microclimate that prevents the colorant from drying out and keeps the nozzle open – for months on end.
- keeps the colorant in prime condition, moist and fluid.
- eliminates the need for frequent purging. Purging is only required with very hot ambient temperatures, or very low humidity. This reduces purging waste by up to 90 % and saves valuable prime colorant material.
- is fully automatic and software-controlled, minimizing required cleaning and servicing for the operator.



How does coolNOZ eliminate frequent purging and reduce purge waste by up to 90 %?

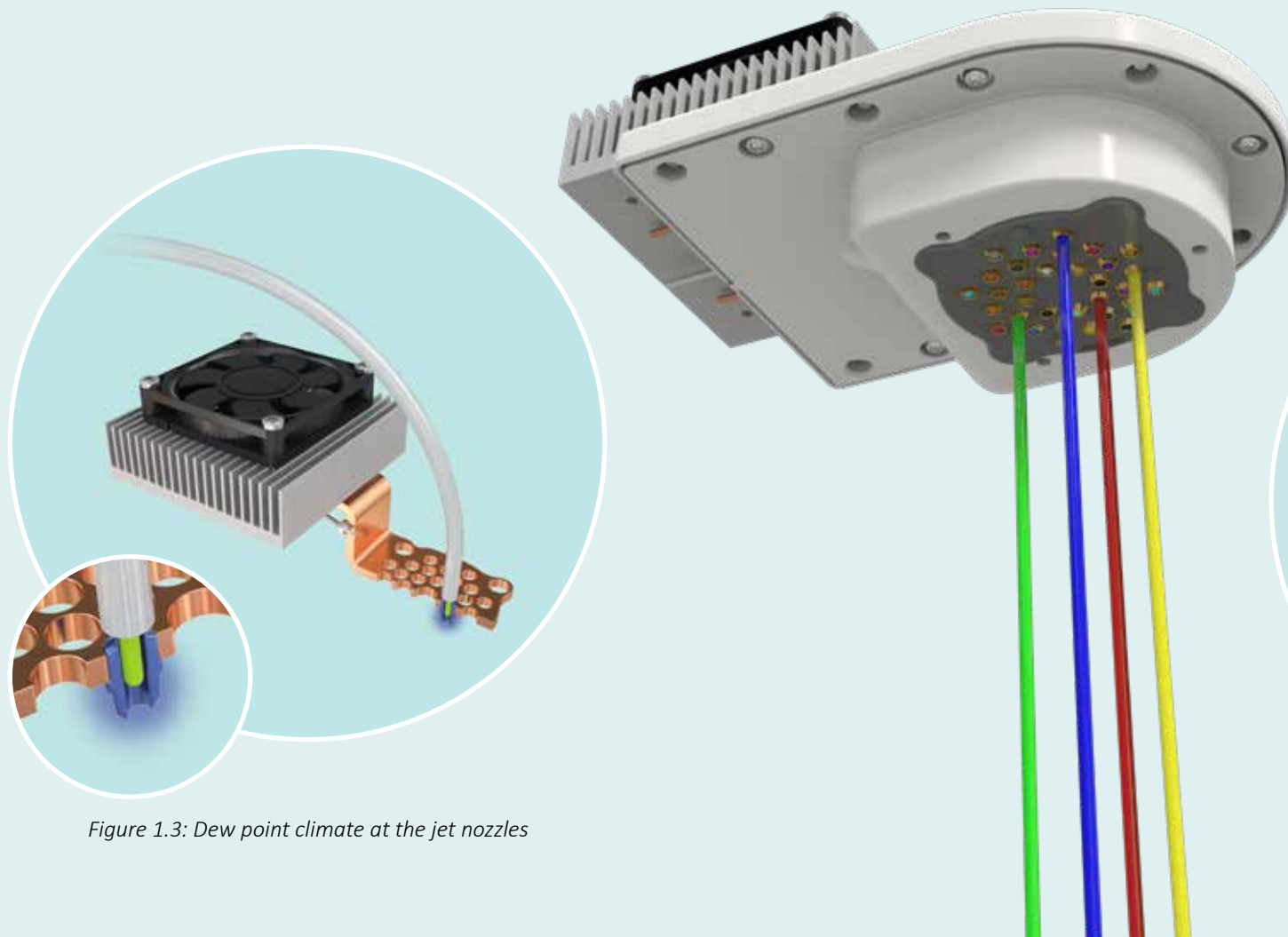


Figure 1.3: Dew point climate at the jet nozzles

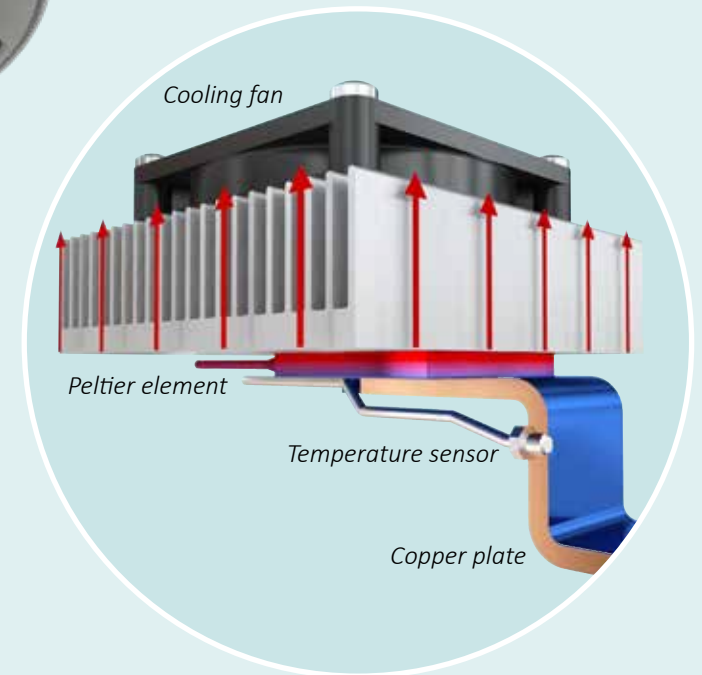


Figure 1.4: Peltier element

»How can coolNOZ' unique dew point technology prevent dry-outs?«

Problem

Water based colorants have a strong tendency to dry immediately when they come in contact with air. The water sometimes evaporates so quickly that even clogging of unused colorants inside of the nozzle head occurs during longer dispensing times.

Proof

With the help of sensors and a Peltier element connected to a copper plate (*figure 1.4*), TINTA coolNOZ technology always keeps the temperature in the nozzle at dew point. A plastic housing around the cooling components ensures good insulation.

Dew point is the temperature point, where airborne water vapor will start to condense into liquid water. At dew point, the air's relative humidity is 100 percent, which means that at that temperature the air is saturated with water vapor.

For a nozzle temperature close to dew point, two sensors regulate nozzle head temperature: The first sensor measures the temperature and humidity of the environment, and the second sensor measures the copper cooling plate temperature (*figure 1.4*). From this information the software automatically calculates and adjusts the coolNOZ temperature.

coolNOZ generates and maintains a precisely balanced dew point micro-climate inside and around the tip of the dosing nozzle. The system's software-controlled dew point technology prevents the exchange of moisture with the surrounding air, eliminating the evaporation of water from the colorant inside the nozzle (*figure 1.3*).

Result

coolNOZ technology

- inhibits colorant drying out by intelligent application of the physical dew point principle.
- precisely maintains conditions to prevent evaporation as well as condensation in the nozzle.
- keeps the colorant moist and fluid in the nozzle at all times, even over long periods when the colorant is not needed.
- eliminates complicated sealing mechanisms to give a considerable plus in reliability, precision and user friendliness.

+ How can coolNOZ' unique dew point technology prevent dry-outs?



Figure 1.5: move**NOZ** raised



Figure 1.6: move**NOZ** – easy and ergonomic handling



Figure 1.7: move**NOZ** pushed down for dispensing

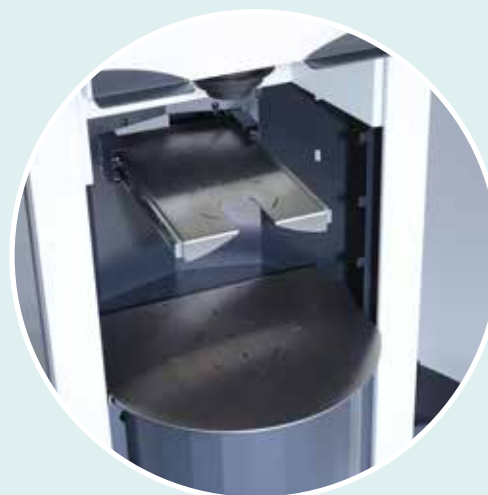


Figure 1.8: Pull-out plate for sample pots



Figure 1.9: Sensor for correct positioning of the move**NOZ**



Figure 1.10:
Complete Collomix
tinting system
with dispenser
and shaker

Problem

Lifting color tubs is a heavy task. For better ergonomics and improved handling, Collomix has developed the proprietary moveNOZ technology including neat but important features for real sample pot dispensing at PoS.

Proof

moveNOZ adjusts the TINTA dosing head to the height of the individual container guided by a sensor (*figure 1.9*): The sensor detects the presence and position of the container. When the moveNOZ is not positioned correctly, the sensor will trigger an alert and prevent dosing. The nozzle moves to the tub, not the other way round. This keeps the container table always at a constant height, fully compatible with all roller conveyors for ergonomic tinting with TINTA and a Collomix shaker or mixer (*figure 1.10*).

moveNOZ can be easily operated by hand, eliminating the need to manually lift the table and heavy container towards the nozzle (*figure 1.5-1.7*).

An optional pull-out-plate is available for sample pot processing. The optional pull-out-plate allows you to keep the container table always at the same height for standard sized paint containers. In the case of a sample pot preparation, you don't adjust the container plate but simply and quickly pull out the tray (*figure 1.8*).

»Why does the movable moveNOZ dosing head improve handling and work ergonomics?«

For precise positioning of small sample pot cans directly underneath the nozzle head, the TINTA provides a laser indicator system as an option. Three laser beams point towards the pull-out-plate for sample pots or the container plate support with the user placing the container into the center of the dispensing area.

Result

TINTA's coolNOZ technology

- ensures optimum operator ergonomics. The nozzle head is effortlessly adjusted to the tub height in next to no time.
- maintains a comfortable working height at all times.
- enables space saving circular dispenser designs.
- saves effort and time in tub handling.
- allows an easy push & slide process in combination with roller conveyors.

+ Why does the movable moveNOZ dosing head improve handling and work ergonomics?

Dosing volume (ml)	Calculated weight (g)	Measured weight (g)	Specific gravity (g/ml)	Deviation (%)
0.25	0.447	0.452	1.789	1.03
1	1.789	1.804	1.789	0.87
0.2	0.358	0.360	1.789	0.50
0.15	0.268	0.271	1.789	0.82
0.08	0.143	0.148	1.789	3.63
0.1	0.179	0.181	1.789	1.40
1	1.789	1.808	1.789	1.09
0.08	0.143	0.145	1.789	1.12
0.5	0.894	0.903	1.789	0.96
0.5	0.894	0.901	1.789	0.73
0.15	0.268	0.271	1.789	0.97
0.2	0.358	0.359	1.789	0.25
5	8.945	9.029	1.789	0.94
0.08	0.143	0.148	1.789	3.70
1.3	2.326	2.348	1.789	0.96
0.1	0.179	0.183	1.789	2.35
0.2	0.358	0.360	1.789	0.61
1.6	2.862	2.895	1.789	1.14
0.08	0.143	0.147	1.789	2.45
0.08	0.143	0.145	1.789	1.61
0.08	0.143	0.145	1.789	1.40

Table 1.11: Accuracy performance test results.
Different dosing volumes directly in succession.

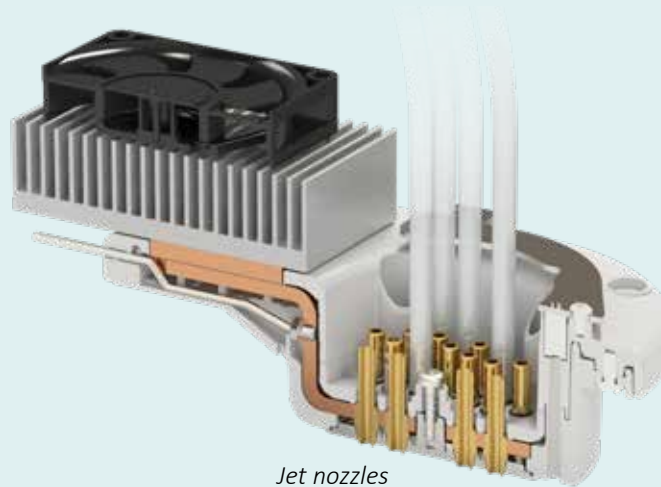


Figure 1.12: coolNOZ technology by Collomix



Figure 1.14: Example of a scale with three decimal places, e. g. Mettler Toledo JB 1603-C

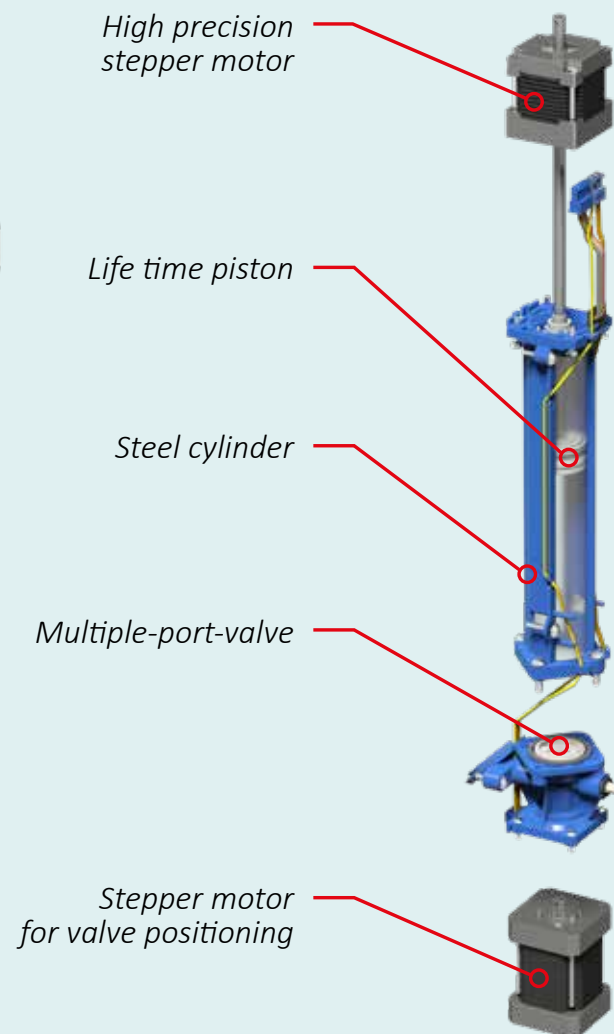


Figure 1.13: Piston Pump with stepper motor



»How does coolNOZ technology enable unparalleled dosing precision?«

Problem

Dosing precision is never more important than when it comes to color samples and to the reliable representation of smallest reproducible dosing amounts. In sensitive color recipes, for example light gray with minute percentages of red, even the slightest dosing mistake will cause significant deviations in hue. To avoid this, sample amounts are often over dimensioned to minimize the effects of dosing imprecisions.

Proof

TINTA's coolNOZ technology combined with an extremely accurate piston pump stepper motor (*figure 1.13*) enables quick, high precision dosing, even in the smallest batches. coolNOZ' 3 mm nozzles produce a highly precise dosing jet with fast and accurate flow stops. No air is drawn in, while particles < 3mm can easily pass through the nozzle. Copper material ensures excellent thermal conductivity (*figure 1.12*). When dispensing is done, TINTA's sniff retracts the colorant from the nozzle tip back into the dew point environment using reverse stepper motor motion, efficiently preventing dripping.

While currently accepted precision for dispensing is 0.15 ml with theoretically only 0.08ml required, we evaluated TINTA sample pot precision in-house tests with colorant volumes starting at 5 ml and down to 0.08 ml. After a standby of 24 hours, tests were performed at an ambient temperature of 16 °C and 28 °C respectively (*table 1.11*).

For high precision accuracy testing the gravimetric measurement and analysis was done with a Mettler Toledo JB 1603-C; readability: 0.001g.



Result

TINTA coolNOZ

- consistently provides high dosing precision:
 - 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
- ensures maximum process reliability, even with the smallest dosing amounts, eliminating recipe errors and deviations in follow-up recipes.
- efficiently prevents dripping by retracting the colorant from the nozzle tip at the end of the dispensing process.
- enables 100% sample pot precision for volumes of 250 ml and 80% precision for volumes down to 100 ml.



Figure 1.15: coolNOZ uncovered for regular operation



Figure 1.16: Nozzle cap for extreme climate conditions



Figure 1.17: Example of a scale with only two decimal places

relative humidity	Dew point temperature in °C		
	ambient temperature 15°	ambient temperature 20°	ambient temperature 40°
10%	-16.409	-12.569	2.61
15%	-11.449	-7.436	8.455
20%	-7.795	-3.652	12.776
25%	-4.88	-0.632	16.231
30%	-2.443	1.893	19.125
35%	-0.344	4.07	21.623
40%	1.505	5.988	23.826
45%	3.16	7.704	25.8
50%	4.659	9.26	27.591
55%	6.031	10.684	29.232
60%	7.297	11.998	30.748
65%	8.473	13.22	32.157
70%	9.572	14.361	33.475
75%	10.604	15.433	34.713
80%	11.577	16.443	35.882
85%	12.498	17.4	36.989
90%	13.372	18.308	38.04
95%	14.205	19.174	39.043

Table 1.18: Dew Point temperatures

The table shows the dew point temperature on the coolNOZ depending on temperature and relative humidity. The Peltier element/fan has a cooling capacity of up to 30°C.

- Purple highlighted dew point temperatures indicate a delta of necessary cooling capacity less than 30°C. Very good conditions!
- Orange table cells show that the delta is ok but the dew point is negative. Minimum temperature at nozzle is set to 0.5°C.
- Red table cells indicate a delta greater than 30 °C. The cooling capacity is no longer sufficient.



»How does coolNOZ perform in challenging conditions and changing climates?«

Problem

Dispenser precision must be reliably maintained even in challenging ambient conditions. They have to be just as precise in the extreme frost of a Northern winter as in the humid heat of a tropical summer. Precision reliability is even more important when VOC free colorants must be handled. How does TINTA's coolNOZ technology perform here?

Proof

Clogging & dry-out

The coolNOZ was designed to ensure maximum accuracy after 72h without any manual or daily care of the nozzle and without the need for a purge. The relative humidity should be above 20%. Nevertheless, after 5 days, sedimentation in the tubes can be observed which may affect the coloring. Therefore, we recommend a purge after one week for colorants which have not been used. The TINTA software will remind the user accordingly.

In tests at high ambient temperatures, low dew point and high cooling demand, occasional dry outs were observed, where the tube passes the Peltier element's heat sink. In these extreme cases, Collomix recommends purging non-used circuits.

In weather conditions with a negative dew point, the TINTA Peltier element/fan combination can cover a delta of up to 30 °C (respectively 30 Kelvin maximum cooling difference). Our tests showed that this covers most conditions (*table 1.18*).

For conditions with negative dew point, nozzle temperature is set to 0.5 °C, to avoid icing. This can cover dry periods shorter than four days. In all cases of negative dew point, the TINTA software will issue a warning and ask the operator for a purge owing to extreme climate conditions. For longer extreme condition periods we recommend protection of the nozzle by applying a nozzle cap (*figure 1.16*).

Dosing precision

In our tests, general TINTA dispensing accuracy was $\pm 1\%$. One reason for the deviation can be imprecise temperature dependent specific gravity or deviation in the colorant labeling. The TINTA software eliminates this problem by utilizing a manually triggered calibration of the specific gravity before an accuracy test.

Furthermore, errors in precision tests occur by using a non-appropriate scale. We highly recommend using a scale with three decimal places instead of only two decimal places (*figure 1.17*).

Innovative solutions
Retail
Tinting technology
Paints
Point of sale
Paint production
Wholesale
Varnishes
Industrial applications
Plasters



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

Collomix has been at the forefront 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 by coming up with new ideas. How do we achieve this? By developing proven functions, optimizing 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 #04*

»colloro.TINT – Next Generation Dispenser Control Software«

1. What advantages does the TINTA software bundle provide compared to other dispenser software?
2. What new benefits does **colloro.TINT** bring to dispensing?
3. How can **colloro.DBASE** control and optimise a complete TINTA network?
4. How can **colloro.TRACK** help you with data tracking, data mining and update implementation?
5. How does **colloro.SELECT** facilitate set-up and implementation of tinting jobs?

Other editions:

TINTA Xpert note #1:

»TINTA – A Dispenser Without Stirring«

TINTA Xpert note #2:

»Piston Pump & coolNOZ – A Dispenser With Sample Pot Accuracy«

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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