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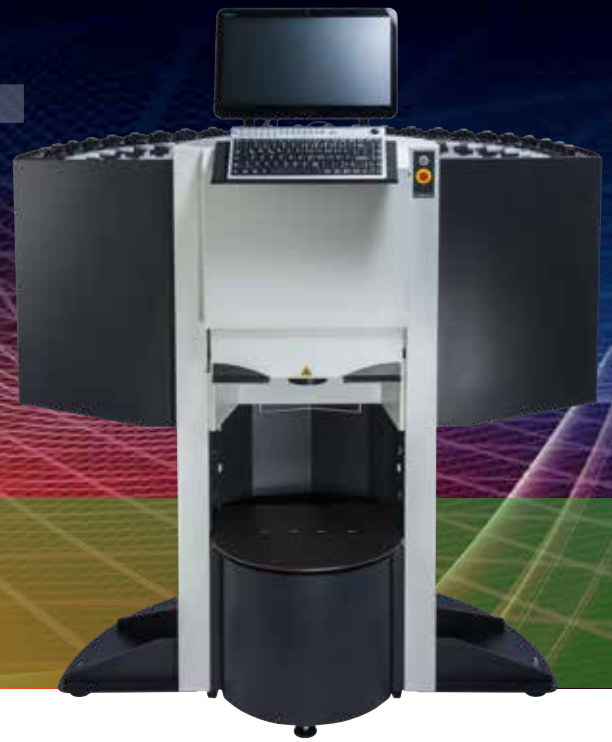
XTINTY

XPERT*note* #01



5 Questions - 5 Answers | »A Dispenser Without Stirring«

Collomix

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MADE IN GERMANY

Editorial

Up to now, stirring was the only answer to avoid sedimentation and syneresis in a dispenser. As a consequence, all Colorant containers had to be round and contain a stirring organ which kept the colorant moving. All colorant containers were moved in unison, individual colorant treatment was mainly not possible.
Especially with regard to stricter colorant regulations and a growing range of exciting new solvent-free, fast drying, innovative, and environmentally friendly colorant developments, conditioning of the colorant was fast becoming a top priority in dispensers.
This is why Collomix has invented – and perfected – TINTA, a system that recirculates colorants instead of stirring them.
Learn about TINTA's unique recirculation features compared to conventional stirring dispensers in this and the subsequent TINTA Expert Briefings.

In **TINTA Expert note #1** you will find answers to:

1. Why is TINTA more efficient in preventing colorant sedimentation and syneresis than stirring?
2. Does recirculation reliably prevent colorant build-up, adhesion, and encrustation along the run-down path?
3. How can TINTA canister intelligence eliminate contamination, increase colorant shelf life, and enable air tight, convenient colorant processing?
4. How do you condition individual colorants on a TINTA dispenser?
5. Why is recirculation especially suitable for handling thixotropic colorants?

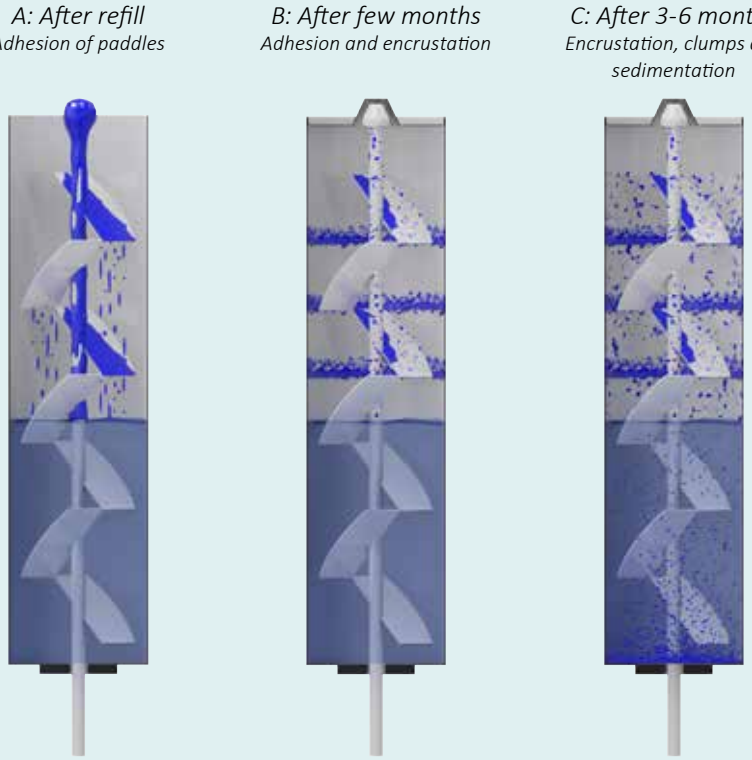

Figure 1.1: Canisters with stirrers facing colorant build-ups and encrustation at the paddles and formation of clumps inside the canister

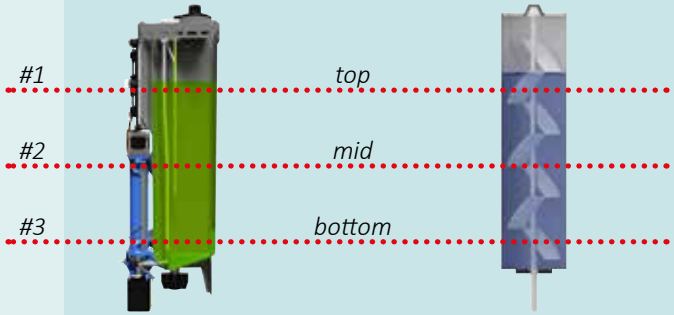

Figure 1.2: Measurement of sedimentation in three canister levels

	TINTA-Recirculation			Deviation		Stirring without Recirculation			Deviation	
Colorant*	***#1*** *(in%)*	***#2*** *(in%)*	***#3*** *(in %)*	***top** to **mid*** *(in%)*	***top** to **bottom*** *(in%)*	***#1*** *(in%)*	***#2*** *(in%)*	***#3*** *(in %)*	***top** to **mid*** *(in%)*	***top** to **bottom*** *(in%)*
Manufacturer A, Colorant #01	60	59,2	59,2	0,8	0,8	60,8	61	61,1	-0,2	-0,3
Manufacturer B, Colorant#02	76,2	76,4	76,2	-0,2	0	77,6	77,4	77,1	0,2	0,5
Manufacturer C, Colorant#03	75,2	76,6	76,4	-1,4	-1,2	77,8	77,4	78,8	0,4	-1
Manufacturer D, Colorant#04	69,5	70	70,4	-0,5	-0,9	70,3	70,6	70,7	-0,3	-0,4
Manufacturer E, Colorant#05	64,5	64,7	65,1	-0,2	-0,6	65,1	64,8	65,4	0,3	-0,3
Manufacturer F, Colorant#06	64,7	65,1	64,7	-0,4	0	65,5	66,9	65,5	-1,4	0
Manufacturer G, Colorant#07	54,1	53,7	54,6	0,4	-0,5	54,4	54,7	55,2	-0,3	-0,8
Manufacturer H, Colorant#08	42	42,1	40,9	-0,1	1,1	44,2	43,4	43,2	0,8	1
Manufacturer I, Colorant#09	43,4	43,9	43,7	-0,5	-0,3	41,9	43,6	43,1	-1,7	-1,2
Manufacturer J, Colorant#10	72,5	72,8	74,5	-0,3	-2	77,2	81,4	81,1	-4,2	-3,9
Deviation (arithmetic average)				**0,24**	**0,36**				**0,64**	**0,64**

Table 1.1: Investigations about sedimentation **Manufacturers/colorants were made anonymous.*

»Why is TINTA more efficient in preventing colorant sedimentation and syneresis than stirring?«

Problem

Sedimentation can occur in any colorant container over time (*figure 1.1 C*). To avoid sedimentation, most conventional tinting systems stir the colorant for two reasons: The turbulences caused by stirring are to prevent sedimentation and settling on the bottom of the container. And they are to eliminate syneresis at its top. In addition, the paddles possibly break thixotropic behavior of the respective colorants and thus make it pump-able.
However, most »paddling« systems cannot handle the requirements of larger surfaces: They fall dry and are mechanically fragile. Sticky and fast drying colorants tend to adhere to the paddles, causing the formation of dry-outs and clumps inside the canister.
This is the reason why recirculating systems with stirring often fight with colorant build-up and encrustation along the run-down path above the filling level (*figure 1.1 B* and *C*). The velocity of the stirrer is often not sufficient preventing completely sedimentation.

Proof

In a 30 months test we compared recirculation against stirring with more than 180 different colorants, among them Europe's most popular paints and colorants from all major manufacturers. The *table 1.1* above shows a selection of 10 colorants tested. Solid content (color pigments) was measured at three different canister levels as an indicator for sedimentation (*figure 1.2*).

We determined the content of color pigments/solid in percentage by evaporating the volatile liquids of the colorant and put it into ratio to the total initial volume before evaporation. We chose solid content over density to avoid test results based on liquid colorant components like surfactants and additives that do not have an impact on color strength.

Result

Only three of ten colorants tested showed deviations > 1 % compared to five deviations > 1 % in the stirred canisters. Arithmetic average and absolute deviations prove the superiority of TINTA technology over conventional stirring in all kinds of colorants and especially in more difficult colorants. Test results clearly show that TINTA technology is more efficient in avoiding sedimentation.
While conventional stirring systems basically deliver satisfying results, their structural and technological set-up can cause limitations when more complex colorants or a variety of colorants with different properties are used. Especially with regard to new, faster-drying colorant generations of the future, recirculation offers better results in preventing sedimentation.

Why is TINTA more efficient in preventing colorant sedimentation and syneresis than stirring?

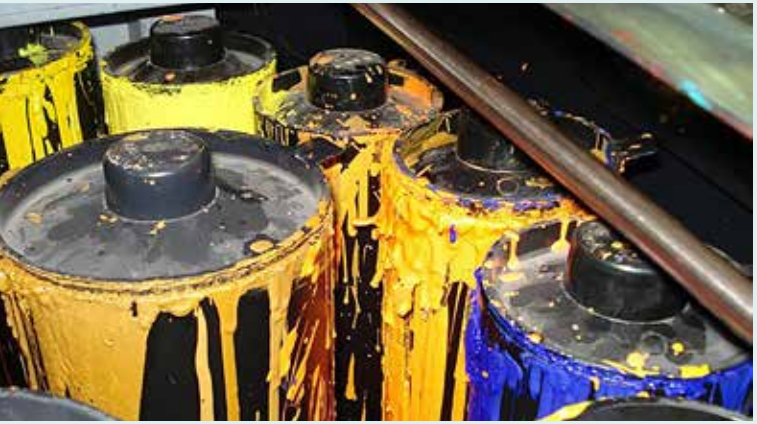

Figure 1.3: Challenges today´s dispenser technology

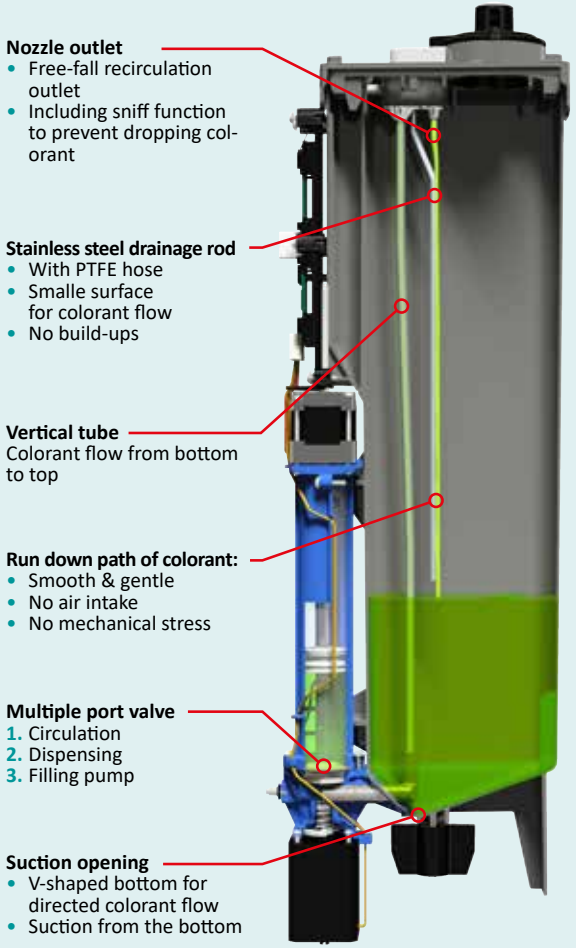

Figure 1.4: tint**ONE** *– the one circuit dispenser*

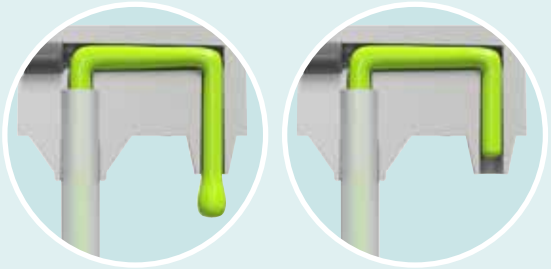

Figure 1.5: Sniffing-back the colorant into the nozzle to avoind dropping

Figure 1.6: Short free-fall recirculations outlet

»How does recirculation reliably prevent colorant build-up, adhesion, and encrustation along the run-down path?«

Problem

Colorants have a strong tendency to dry and are biochemically fragile. Therefore, problems usually occur where a colorant comes in contact with air: Colorant build-up, adhesions and encrustations in the canister and at the nozzle outlet may cause system failures and imprecise dosing with resulting colorant errors and high service cost.

Fast drying colorants tend to stick to the paddles, causing the formation of dry-outs and clumps inside the canister, as the stirring speed often is too low for this specific class of colorants (*figure 1.3*). Especially at the paddle tips close to the rotation axis centrifugal forces are too weak to efficiently move the particles outward. Medium resistance in general is not high enough to avoid plaque formation.

Conventional systems also often suffer from user errors, contamination and high service efforts in the context of colorant refills.

Proof

TINTA Dispensers feature a **short free-fall recirculation outlet**, which eliminates any possibility of adhesion to the recirculation's nozzle outlet (*figure 1.6*).

A **circulation drainage rod with innovative PTFE hose** ensures a gentle colorant flow from the recirculation nozzle, without impact splashes and air bubbles, thus avoiding adhesions to the canister wall (*figure 1.4*).

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 1.5*).

Result

A gentle colorant flow with low impact on the fluid's surface, no air bubbles (de-gasing), no impact splashes, and extremely low colorant build-up.

How does recirculation reliably prevent colorant build-up, adhesion, and encrustation along the run-down path?

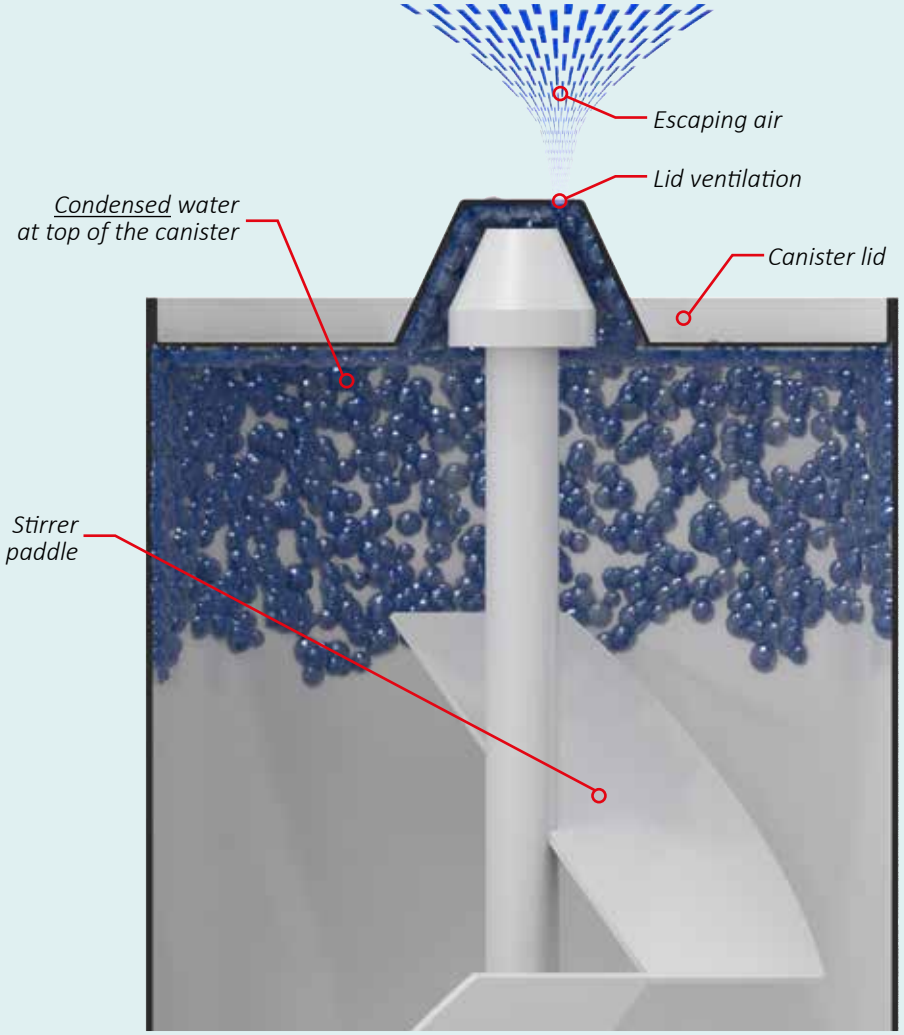

Figure 1.9: Typical free ventilation through lid of canisterns with stirrers

Figure 1.8a: Open umbrella valve and inflow during pump stroke for filling the piston pump

Figure 1.8b: Closed umbrella valve during standbay and dispensing

Figure 1.7: Umbrella valve (highlighted yellow)

Figure 1.10: Lid monitor (LED) and software guided filling process

Problem

Colorant processing, colorant refilling, pumping - all these processes bring the colorant in contact with the air. To avoid fast drying of the colorant, air contact has to be avoided. Conventional stirrer containers support microbiological degradation of colorant components by continuously allowing the import of air into the colorant matrix, which accelerates colorant aging (*figure 1.9*). In the worst case, biogenic metabolism will destroy the colorant. Accumulation due to solvent loss plays a major role in the degradation of color pigment colorants with resulting negative effects on quality and dosing precision.

Proof

To prevent the loss of humid air and solvents from the inside, each TINTA canister is equipped with a sealed refill cap and an umbrella valve (*figure 1.7*). The valve keeps the moist air in the canister and allows the inflow of outside air only when colorant is dispensed (*figures 1.8a* and *1.8b*).
Each canister is equipped with capacitive point-measurement level control: A filling level of 600 ml automatically actuates the adjustment of the filling level database entry and issues an operator alert to prevent the respective canister from running dry and pulling in air. The system also prevents any dosing orders causing the filling level to drop below 200 ml (threshold individually adjustable).
A bright light emitting diode on top of each canister lid indicates an open or not properly closed lid and low filling level. (*figure 1.10*) The software guided lid control locks the TINTA after one hour, if the lid has been kept open. After closing the TINTA will automatically go into operation again (configurable).
The filling process itself is also software-controlled. Only canisters assigned for a refill by the database can be refilled. When a canister has been selected, a blinking lid LED leads the operator to the correct position. Lid control registers each opening of a lid. Once the container has been refilled and the lid has been closed, the system monitors the colorant level and automatically adjusts colorant level and cancel the lock of the canister and the canister dependent recipes.

»How can TINTA canister intelligence eliminate contamination, increase colorant shelf life, and enable air tight, convenient colorant processing?«

Result

Relative humidity is always kept constant in the canister, preventing colorant dry out. Refilling is safe and easy with software guidance, reducing potential user errors.
The umbrella valve efficiently seals the colorant from any biological contamination. This feature is even more important as colorant producers are pushing colorant limits in the development of new solvent-free products.

How can TINTA canister intelligence eliminate contamination and increase colorant shelf life?

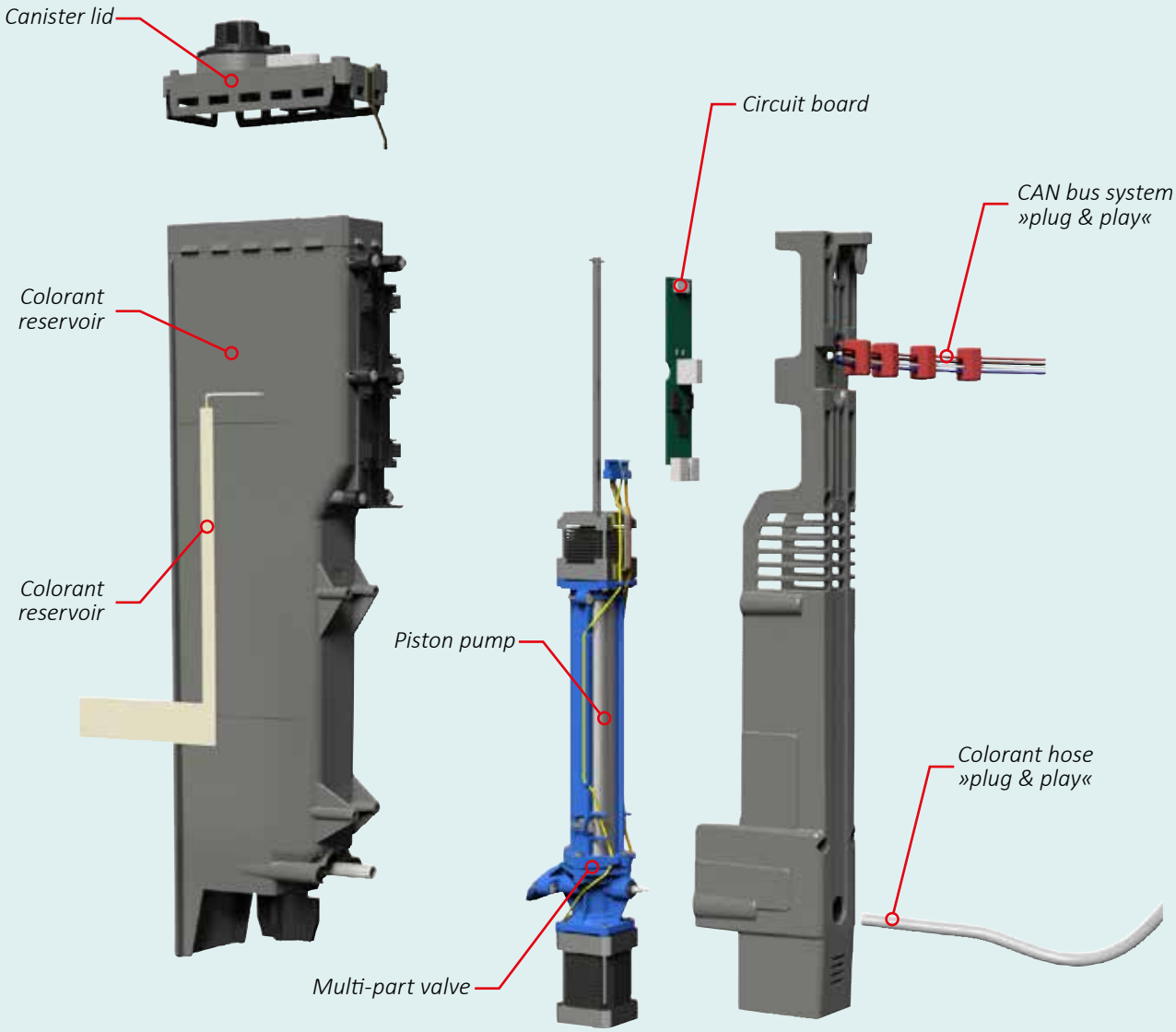

Figure 1.11: tint**ONE** *– the one-circuit dispenser*

Figure 1.12: Individual parameterisation of each canister

Figure 1.13: tint**ONE** *canisters in a row*

»How can you condition individual colorants on a TINTA dispenser?«

Problem

In a classical stirrer system, individual colorant rheology requirements often cannot be met as all colorant canisters are addressed and controlled together.
TINTA is more than just a rack of colorant dispensers. It is a modular plug & play station that allows for a wide versatility of individualized tasks.

Proof

Each TINTA canister is an individual unity – called One-Circuit-Dispenser – with its own separate pump, multi-port valve, pump drive, and printed circuit board (*figure 1.11*). This means that each individual colorant canister can be flexibly programmed, parameterized and controlled, independent of all other colorant canisters in the set-up. Canisters can be added or taken out anytime at the user's convenience. Scaling or retrofitting a TINTA dispenser is a matter of just three minutes. The service technician simply connects the new canister to the CAN bus. The software automatically identifies the new canister and offers a suitable unit ID for the technician to confirm or adjust. Ready to go! Replacing inactive canisters and add canisters for parallel operation is just as easy.

Result

The smart TINTA software enables easy programing of all canister features for perfect conditions: Even difficult colorants can be kept in prime condition over long periods of time, ensuring ultimate dispensing precision at any time.

- Colorants with syneresis tendency can be moved more frequently than others.
- New colorants are easily added with individual parameterization of the canister.
- Flashing and configuration of new canisters takes only 45 seconds.
- Spare canisters in standby mode are activated with just four simple clicks.
- Easy twin canister configuration, e.g. white oxide in canister 1 and 2. This reduces dispensing time by 50 % while doubling capacity.
- TINTA features enormous system flexibility for introducing completely new colorant and colorant types.

Figure 1.14: vibro**PAD** *at bottom of the canister breaks thixotropy*

Figure 1.15: Motor and eccentrical weight for regular vibration mode

Why is recirculation especially suitable for handling thixotropic colorants?

Problem

Usually, any dispenser contains a few colorants with thixotropic properties. In colorants prone to thixotropic behavior, the stirring paddles are designed to break thixotropy and keep the colorant pumpable. How can recirculation prevent thixotropy without stirring?

Proof

The TINTA Dispenser uses an innovative, patented technology, called »vibro**PAD**«, to break thixotropy (*figure 1.14*). Situated at the bottom of the canister and continuously submerged in the colorant, vibro**PAD** efficiently liquefies the colorant with precisely controlled regular vibration. The movement – triggered by a motor and an eccentrical weight – is comparable to a cell phone vibration mode (*figure 1.15*). Therefore, the TINTA does not need any rotation and fragile stirrer. vibro**PAD** function can be added to any canister individually parameterized to precisely match the rheology of any specific colorant. Collomix has successfully tested vibro**PAD** efficiency in over 15 different thixotropic colorants.

Result

Precisely controlled vibration enables even flow and ensures full cross-section material slip-down from the top without forming any suction craters.
Pigment is handled more gently than in a stirrer, maintaining highest pigment quality and ensuring ultimate dosing precision even with longer storage times.
For ultimate TINTA flexibility and cost efficiency, only those canisters holding thixotropic colorants will be equipped with vibro**PAD**.

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* **#02**

» Piston Pump & cool**NOZ - A Dispenser With Sample Pot Accuracy «**

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 it´s secret and how does it contribute to dosing precision?

Upcoming editions:

TINTA Xpert note #3:
» coolNOZ - A Dispenser Without Purging«**

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

TINTA Xpert note #5:
»A Dispenser That Adjusts To 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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