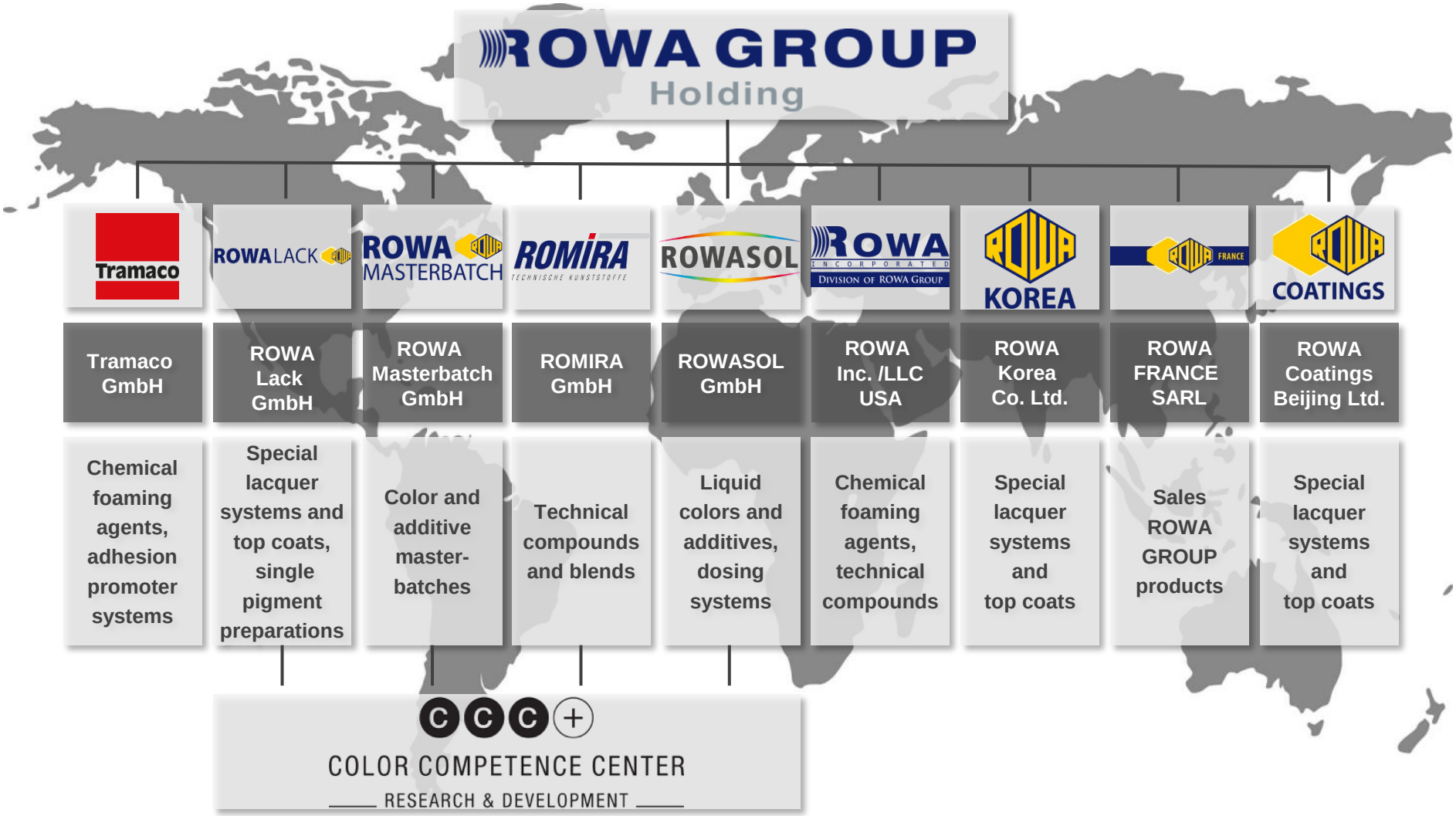
ROWASOL

LIQUID COLORS

The clever alternative!

THE ROWA GROUP



PRODUCT SEGMENTS

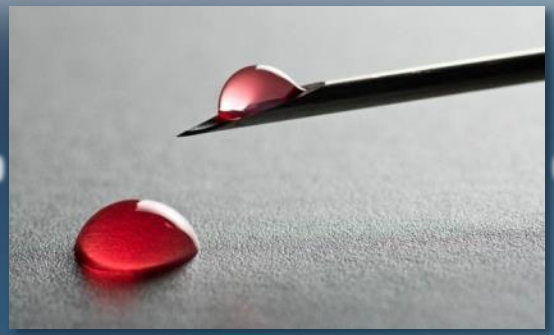
INTRODUCTION INTO LIQUID COLOR CONCENTRATES

COLORANTS

Pigments or soluble colorants

+

ADDITIVES



Disp. & rheol. agents, etc.

+

CARRIER

Universal or custom-designed

MIXING

High effective dispersing

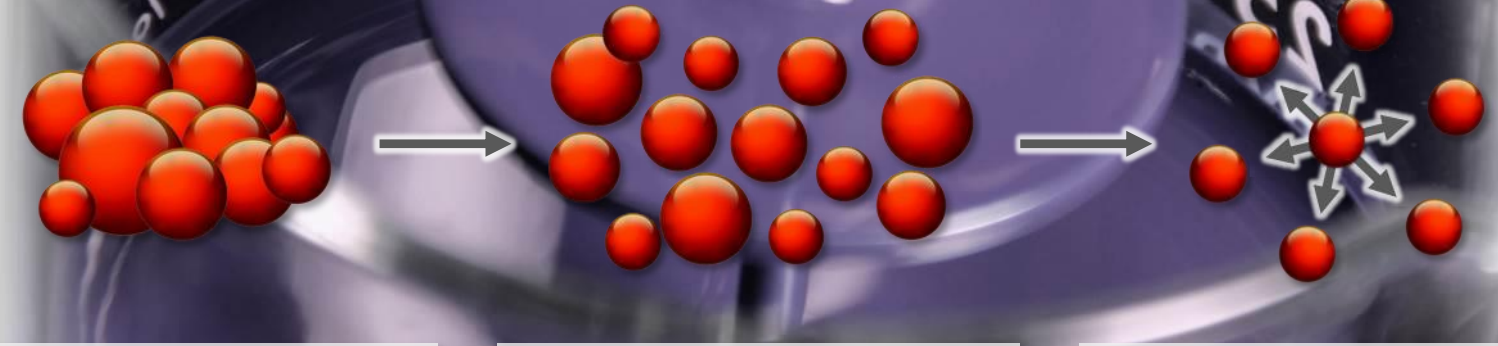
LIQUID COLOR

High visc. to easy flowing

ADVANTAGES OF LIQUID COLORS – DISPERSION QUALITY

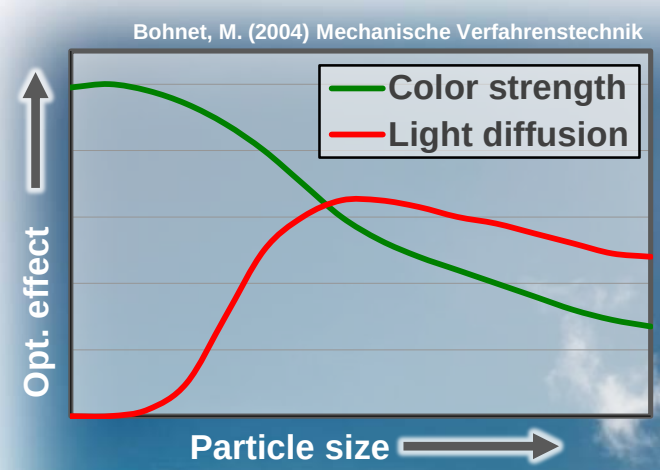
BATCHWISE PRODUCTION

Dwell time approx. 10 x longer than at masterbatch production
➔ Much better netting of colorants



Pigment condition as delivered	Distribution in masterbatch	Distribution in liquid color

ADVANTAGES OF LIQUID COLORS – COLOR STRENGTH



FINE DISTRIBUTION
= HIGH COLOR STRENGTH

➔ **Less colorants necessary**
(compared to masterbatch)

20/40-THUMB RULE

20 % more expensive (than masterbatch)
40 % less pigments (dosage)

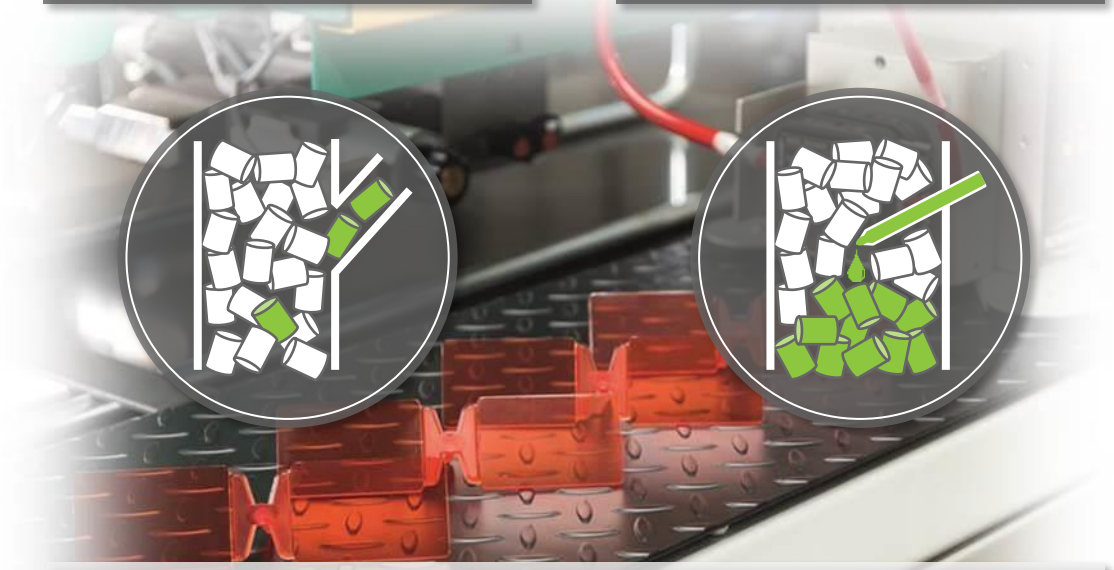
➔ **Lower raw material costs**

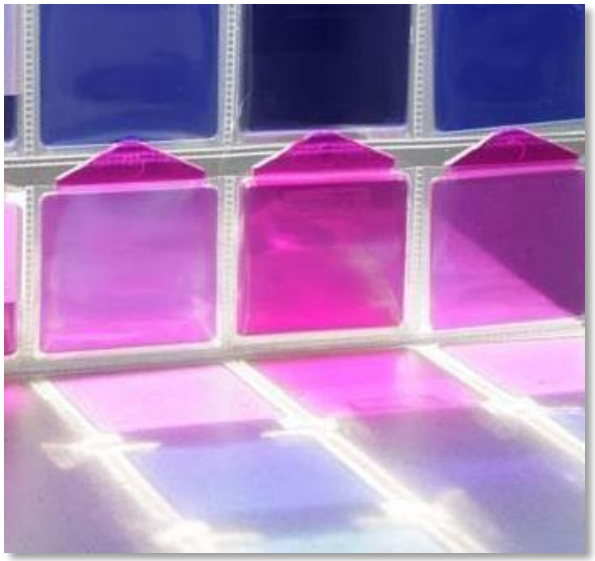
ADVANTAGES OF LIQUID COLORS – 100 % QUALITY CONTROL

MASTERBATCH	LIQUID COLOR
• Continuous production	• Discontinuous production
• Quality control randomly and usually only of color	• Quality control of color, max. particle size and viscosity of every lot
• If correction is necessary the batch must be extruded a second time ➔ stressing of polymer and pigments	• If needed the whole batch can be corrected ➔ no stressing of polymer and pigments
• Homogenization afterwards via mixing of the granules ➔ local inhomogeneity in general possible	• Homogenous product and 100% quality controlled ➔ always complies to customer's specification

ADVANTAGES OF LIQUID COLORS – DISTRIBUTION AND FINENESS

MASTERBATCH | **LIQUID COLOR**





Better statistical distribution from the beginning on
➔ Dosage < 1 % possible!

Furthermore: Grain size down to 1 µm
➔ Perfect for transparent applications!

ADVANTAGES OF LIQUID COLORS – AGGREGATE STATE

LIQUID COLOR IS PRODUCED AT MAX. 40 °C

No thermal pre-stressing of the colorants

➔ Perfect for sensitive pigments, as less scrap will be produced at further processing

(e.g. daylight pigments)

LIQUID COLOR HAS NOT TO BE MOLTEN

Dosing downstream in plastic melt possible

➔ Perfect for extrusion, as there are high saving potentials at color changes

(material + time)

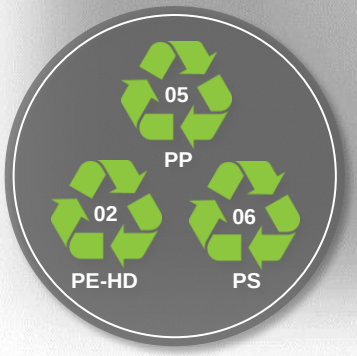
ADVANTAGES OF LIQUID COLORS – CARRIER

FAST COLOR CHANGES

Pigments are netted by the liquid carrier, thus less bonding to metal occurs

➔ Significantly reduced color changing times – especially with hot runner systems!

UNIVERSAL CARRIER



Coloring of almost all common plastics with only one carrier system

➔ Combining of demands and minimizing of stock possible!

ADVANTAGES OF LIQUID COLORS – SELF-COLORING

EASY AND DUST-FREE SELF-COLORING

Increased flexibility, shorter color development cycles, internal corrections, adaptable color quantities ➔ reduced coloring and storage costs!

AUTOMATIC MIXING

With customized dispensers known from DIY stores with software for color matching and management of remaining quantities.

Gravimetric controlled and reproducible!

LIQUID COLORS – INTERESTING FACTS

SOLVENT-FREE

Without solvents or water

➔ no drying out

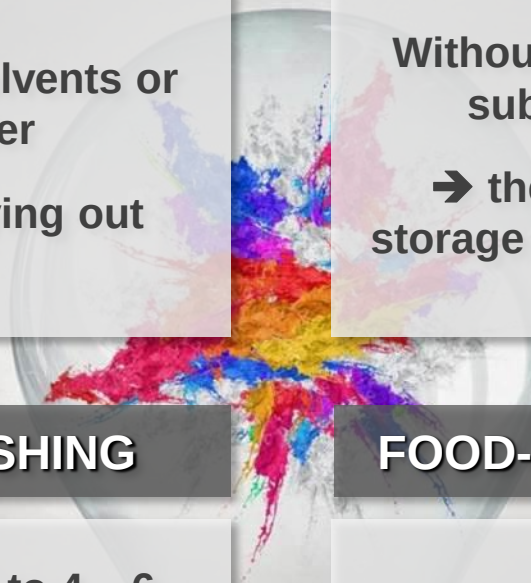
STORAGE LIFE

Without perishable substances

➔ theoretically storage life is eternal

SEDIMENTATION

After a couple of weeks phase separation can cause a transparent film on the surface and/or sediments



REFRESHING

Stable up to 4 – 6 month

➔ stirring, shaking or tumbling before use is recommended

FOOD-APPROVAL

On request FDA, VO (EU) 10/2011 or BfR

➔ Declaration of conformity

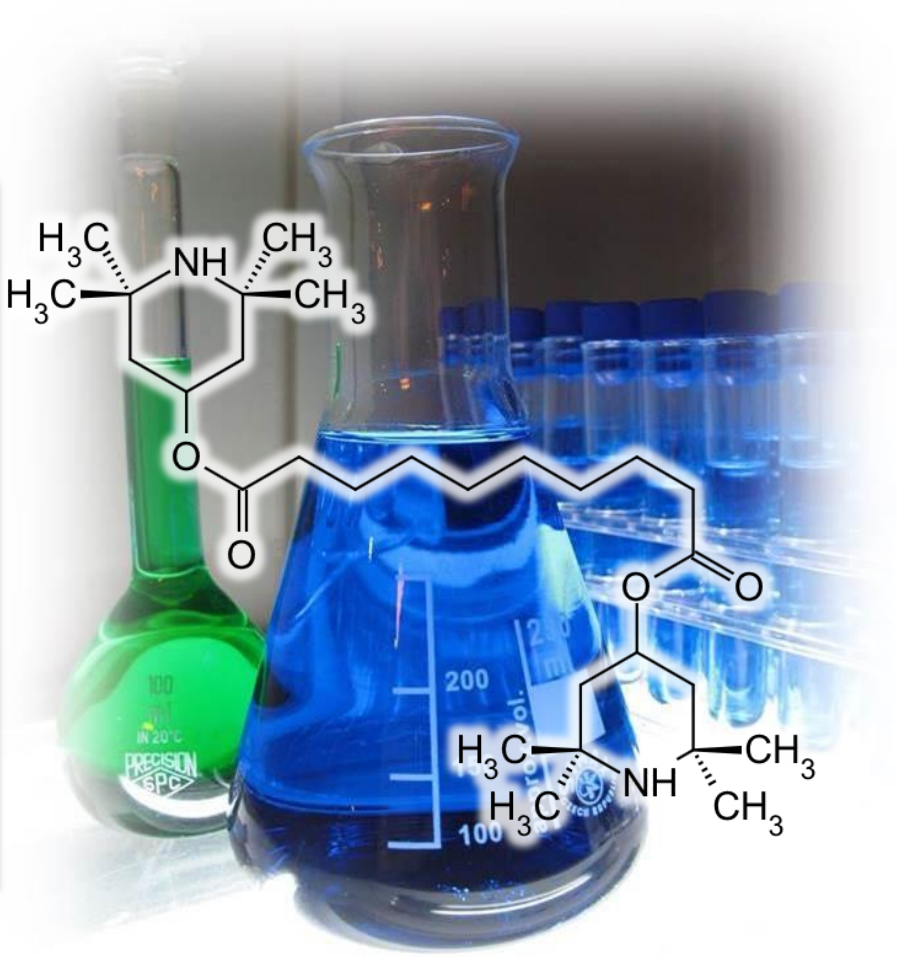
PROPERTIES

Theoretically it's a softener ➔ practically no impact on product detectable at usual dosages of 0.5% – 2%

ADDITIVE CONCENTRATES AND COMBINATION BATCHES

FUNCTION IN LIQUID FORM

- Light stabilizers
- Antistatic agents
- Lubricants
- Laser active substances
- Antioxidants
- Custom tailored products
- Combination batches (color + function)



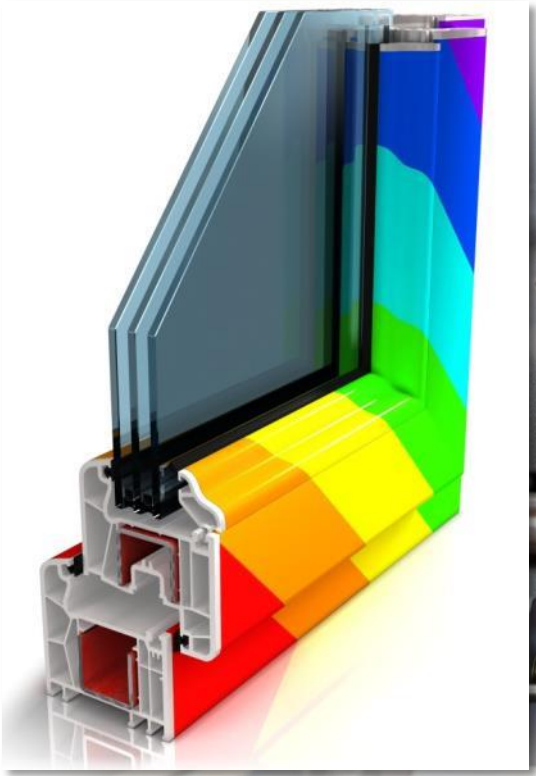
TYPICAL APPLICATIONS - INJECTION MOLDING

INJECTION MOLDING APPLICATIONS

- Thick-walled parts ➔ possible saving on coloring costs, homogeneous colorization
- Thin-walled transparent parts ➔ lower dosage, no specks, no streaks
- Hot runners ➔ faster color changes (30 - 50 % less purging cycles)
- Engineering plastics (TPU, PBT, PA, ABS and the like) ➔ lower raw material costs
- Commodities (PE, PP, PS) ➔ reduced quantity of colorant
- Examples: PP pen tubes, TPU shoe soles, PE and PP caps, PC and ABS container, PS cutlery and many more

TYPICAL APPLICATIONS - EXTRUSION

EXTRUSION APPLICATIONS



- Films ➔ no streaks and specks
- Compounds ➔ efficient self coloring
- Profiles and fibers ➔ Reduction of coloring costs
- Color injection downstream ➔ time and material savings during color changes
- Examples: ABS edge bandings, engineering compounds, PP films, PVC flooring, PP fibers, HD-PE plates, filaments for 3D prints, PVC window profiles and many more

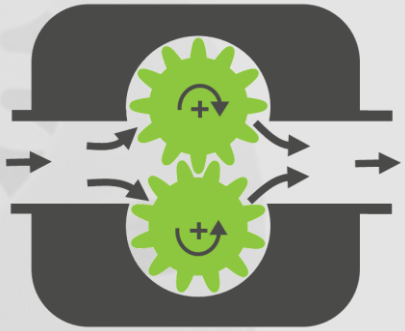
TYPICAL APPLICATIONS - MISCELLANEOUS

MISCELLANEOUS APPLICATIONS

- LSR ➔ Silicone oil as carrier, with approval for food contact if desired
- PVC ➔ Softener can be used as carrier for liquid colors, thus 100 % compatibility
- Reactive resins and foams ➔ liquid colors can be pre-mixed in one of the components
- Examples: Silicone components, PVC flooring, acrylic plates, window profiles, exercise balls, integral foam, flexible foam, PU shoe soles, adhesives, sealing, boat fender, buoys and many more

ROWAMETRIC

OPTIMIZED DOSING

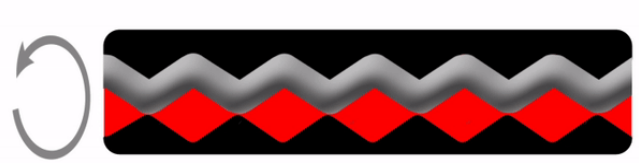
PERISTALTIC PUMP	PROGR. CAVITY PUMP	GEAR PUMP
		
THE standard device for dosing liquids	High-precision and pulsation-free	For pressure injection

ROWAMETRIC

THE PERISTALTIC PUMP

- **THE standard device for all applications**
- **Displacement pump, hose is squeezed**
- **Dosing via lance into the main hopper**
- **Fast color changes as no cleaning of pump head (hose is changed)**
- **Gravimetric or volumetric operation mode**
- **Easy synchronization with extrusion throughput or injection molding cycle, self-excitation with dosing period**
- **As color packaging we recommend our returnable container COLOR CUBE**

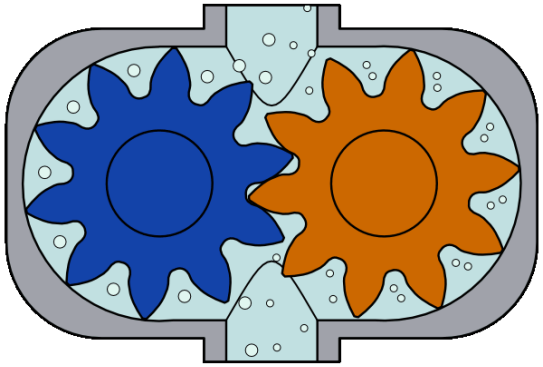
THE PROGRESSIVE CAVITY PUMP

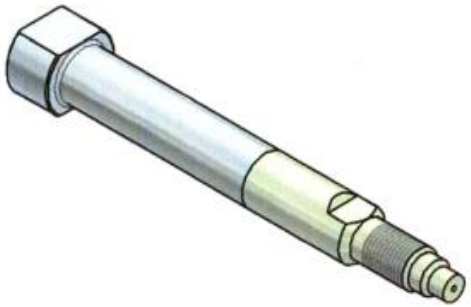


- Rotating displacement pump, Rotor and stator (in various dimensions)
- Pulsation-free
- Up to a pressure of 27 bar
- Color flows through pump head which must be either purged or changed for color change
- Applications:
  - for little throughputs from 0.1 g/min, e.g. for shading
  - shear sensitive pigments
  - highly viscous pastes
- As color packaging we recommend our returnable container COLOR CUBE

ROWAMETRIC

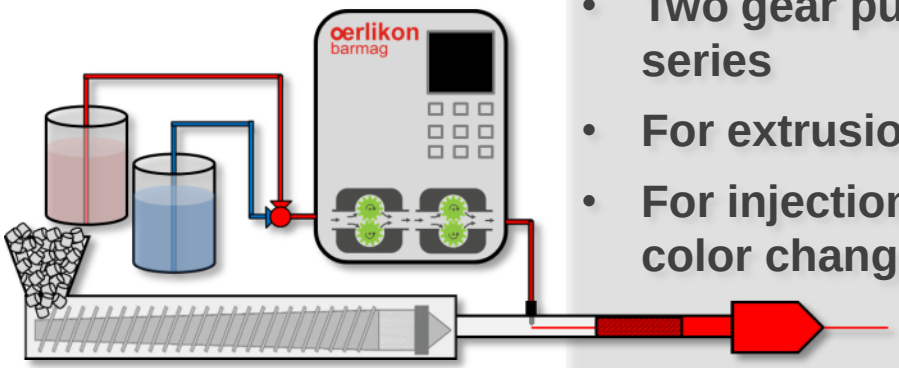
THE GEAR PUMP - DOSING SYSTEM BASIC





- Application: extrusion, from 1.5 g/min on color throughput
- Injection above main hopper or downstream into the polymer melt for extreme fast color changes
- Up to a pressure of 80 bar
- Volumetric dosing
- Optional equipment for continuous production and seamless color changes :
  - 3-way-purging valve
  - special developed non-return valve
  - in regulator circuit integrated pressure controller
  - Synchronization with extruder throughput possible

THE GEAR PUMP - INJECT AC



- Two gear pumps (booster and dosing pump) in series
- For extrusion, from 1,5 g/min color throughput
- For injection into polymer melt for extreme fast color changes
- Up to a melt pressure of 300 bar Volumetric dosage
- Simple touch screen control
- Optional equipment for continuous production and seamless color changes :
  - 3-way-purging valve
  - special developed non-return valve
  - in regulator circuit integrated pressure controller
  - Synchronization with extruder throughput possible

ROWAMETRIC

COMPARISON OF THE DOSING SYSTEMS

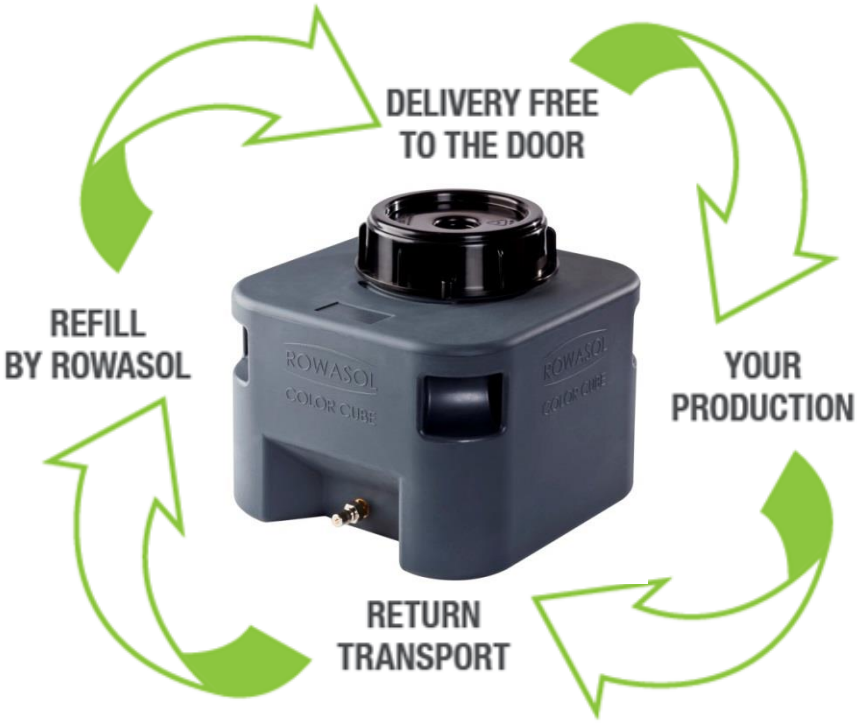
	Peristaltic Pump	Progressive Cavity Pump	Gear Pump
Dosing Principle	volumetric or gravimetric	volumetric or gravimetric	volumetric
Application	injection molding/extrusion	injection molding/extrusion	extrusion
Dosing Position	above main hopper	above main hopper	above main hopper or in polymer melt
Dosing Range	from 1 g/min	from 0.1 g/min	from 1.5 g/min
Color Change	switch hose	switch or clean pump	clean pump
Key Benefit	fast color changes	pulsation free also at low dosages	color injection also downstream
Field of Application	frequent color changes, variety of colors, small batches	few color changes, limited color diversity	continuous processes, few color changes

COLOR CUBE

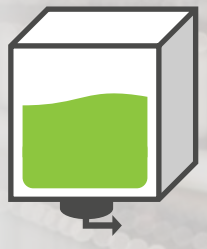
THE NEW RETURNABLE CONTAINER

- Perfectly matches ROWAMETRIC dosing systems
- Also compatible with other pumps
- Diaphragm valve for air exchange
- Robust 22 liter HD-PE container
- Stackable due to special design
- Self-sealing-coupling at outlet
- Closed system
- Transport box for 18 cubes

✓ No contact to the color
✓ No residual amounts
✓ No waste



STANDARD PACKAGING

POLITAINER	BUCKET	BARREL	IBC
			
5 / 10 / 20 liter „Bag in Box“	10 / 20 / 30 liter „Hobbocks“	200 liter Steel barrel	640 / 1,000 liter Intermediate Bulk Container

Of course we also offer to fill our products into customer-specific packages!

ROWASOL

SERVICE PACKAGE

INITIAL INTERVIEW	COLOR MATCHING	FIELD TEST	FOLLOW-UP SERVICE
			
Identifying the optimization potential and defining the project goals as well as discussing the eligible ROWAMETRIC dosing system.	Development of one or more colors according to customer‘s specification, profitability analysis and production of samples.	Free presentation of the matched color together with the fitting dosing system at the customer‘s production plant.	Excellent support during the changeover to liquid coloring, e.g. the setup of a color portfolio or the installation of the dosing equipment.


THANK YOU VERY
MUCH FOR YOUR
INTEREST!