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G2/G3
BACKGROUND AND OPPORTUNITIES



G2/G3

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G2

- Highly loaded concentrates developed with combination of pigments and UV stabilizers for outdoor applications. Primarily for polyolefins
- Patent granted in 2008 for formulation

G3

- Highly loaded concentrates for polyolefins, styrenics and engineered resins like PC, Nylons, PET
- Patent granted in 2017 for both formulation and process

G2

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- With G2 we are able to offer the highest loading of UV additives with pigments
- Benefits
 - Low use rate 0.5%-1% vs 2-3% resulting in lower coloring costs
 - Improved color distribution
 - Less carrier in the let down resin, better physicals
 - Less storage requirements
 - Sustainability benefits over traditional concentrates

G 2 finds application in packaging and other applications for highly loaded concentrates without UV additives

G2 Loadings

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- UV /AO additives 30%, total solids loading 70%
- Organic pigments-25-30%
- Pearlescent pigment 25%-30%
- Highly loaded G2 concentrates are typically made in a TSE under water pelletized

G2 Applications

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Outdoor Durables Market:

Roll Out Carts, Outdoor Furniture, Piping,
Portable Toilets, Siding, Netting & Fencing

Packaging:

Food, Personal Care, Cosmetic, Housewares

Industrial:

Drums, Containers, Pails, Lids, Jerry cans

Automotive:

Truck parts, Interior side panels, Dashboards

G2 Examples

Product	Application	Process	Loadings	Use rate
Green	Rollout trash cans	Rot. Molding	14% Pigments 61% Stabilizers	0.45%
Blue	Rollout trash cans	Rot. Molding	34% Pigments 40% Stabilizers	0.70%
Silver	Outdoor furniture PP	Injection Molding	42% Pigments 24% Stabilizers	.40%
Blue	Beverage crates HDPE	Injection Molding	55% Pigments 23% Stabilizers	2.2%

G3

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- **G3** – is a new method of making concentrates
- **Highest industry loadings**
 - Organic Pigments -35-40%
 - Pearlescent Pigments 40-50%
 - Dyes-35-45%
 - Slip additives 20-25% in combination with pigments
 - Underwater pellets
- **Resins**
 - Polyolefins, PS, ABS, PC, PET, PMMA and Nylons

G3 –Target Applications

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- Highly loaded concentrates in polyolefins for injection molded applications-closures, deodorant caps, razor handles, housewares, feminine hygiene products
- Highly loaded concentrates for HDPE blow molding
- Foam packaging PS
 - Egg cartons, Meat packaging,
- HIPS sheet extrusion and thermoforming
 - Beverage cups, plates
- SPDS for compounders

G3 target applications

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- Nylon concentrates for power tool handles, housings, THHN cables, monofilaments, zip ties
- PC sheets, injection molded applications
- ABS and PMMA sheets
- PET- sheets and bottles

G3 Examples

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Product	Application	Process	Loadings	Use rate
White	ABS	Sheet extrusion	66% pigments	7%
Beige	PET	Sheet extrusion	71% pigments	1.75%
Orange	PET	Sheet extrusion	48% TiO ₂ 16% yes	1%
Black	PET	Blow Molding	40% Dyes	0.5%
Red	Beverage cups HIPS	Thermoforming	41% Dyes	0.7%

G3 Examples

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Product	Application	Process	Loadings	Use rate
Blue	Nylon monofilaments	Extrusion	40% phthalo blue	0.3%
Red	Nylon , tool handles	Injection Molding	30% dyes 30%TiO2	0.5%
Orange	THHN cable	Coextrusion	30% dyes 10% TiO2	0.7%
Arctic white	PMMA	Capstock Extrusion	62% pigments	2.8%

PET

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- Several options are available
 - PET carrier with recrystallization option
 - Co polyester carriers for high loadings
 - PBT +co polyester for sheet extrusion
 - G3 based on co polyester carrier
 - ✦ Bottles and sheets
 - ✦ Loadings 70% total
 - ✦ Dyes 35-40%
 - ✦ Pearlescent pigments
 - ✦ Low melting, good color distribution
 - ✦ Better Alternative to liquid color and wax based products

Feeders

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- G2/G3 can be metered using conventional color feeders
- Chroma has a successful collaboration with LIAD
 - Gravimetric feeders
 - Very accurate for low use rates
 - Easy to install and operate
 - Can be used for injection molding, blow molding and extrusion applications
 - More than 200 units installed