Hybrid Kure Vehicle

A hot topic among high-quality commercial sheetfed printers has been in-line UV coating of litho ink. The Kustom Group has pioneered this process with the development of Hybrid Kure Vehicles. Inks made with these vehicles achieve unique properties on litho presses with in-line UV coaters. Printers can apply KS-626 UV coating directly over wet litho hybrid ink with one pass through the press. The resulting job has very high gloss with minimal gloss back and excellent adhesion.

Hybrid Ink Formulation

Original hybrid inks were defined by the ratio of conventional material to UV material they contained. The latest hybrid inks have evolved and are defined more accurately by their performance properties rather than their percentage of oil-based and UV material. Use these guidelines to define a good hybrid ink:

- Minimal rubber swell (<5%) on conventional (NBR blend) rollers, especially when switching back and forth from conventional to hybrid ink.
- Clean up with conventional press wash (UV press wash is the biggest culprit for roller swell).
- Wider litho window versus straight UV inks.

With these guidelines in mind, we have done extensive testing with this new system of inks and have seen very good clean-up with conventional press wash and litho properties that rival high-quality oil-based inks. Best results were seen with KS-626 Kustom Kure High Gloss UV Coating. The most exciting fact about this technology is that printers are excited about the potential quality, time savings and simplified processing versus off-line coating.

		Tack*	Viscosity	Yield**
KS-296	UV Hybrid Gel	13 – 15	400 – 600 Poise	4200 – 5200
KS-291	UV Hybrid Freeflow	24 – 28	400 – 600 Poise	N/A
KS-236	F. A. Modified Polyester Gel	3 - 6	100 – 200 Poise	600 - 2000
KS-626	High Gloss UV Coating	N/A	21 – 24 sec. #3 Zahn	N/A

*1 min/400 rpm
** dynes/cm^2

To discuss ink formulation in detail, please call Kustom Group at (859) 485-8600.

FOR YOUR PROTECTION:

Hybrid Kure Vehicle

Improved UV Hybrid Ink Formulary Guide

For best results, we recommend making the ink in a 2-step process. First, make a dry grind pigment concentrate based off of the suggested formula on the next page. Commercial flush can also be used. Then use:

4 Color Process Finished Ink Formulation

Materials	Yellow Ink	Red Ink	Blue Ink	Black Ink
Yellow Base	30 – 40%			
Red Base		45 – 55%		2 – 4%
Blue Base			40 – 50%	2 – 4%
Black Base				30 – 40%
KS-296 Gel	35 – 45%	20 – 30%	25 – 35%	30 – 40%
KS-291/KS-236 Freeflow	5 – 10%	5 – 10%	5 – 10%	5 – 10%
KS-203/KS-308 Photoinitiator*	1 – 3%	1 – 3%	2 – 4%	3 – 5%
KS-244 EOTMPTA	2 – 4%	1 – 3%	1 – 3%	1 – 3%
KS-279 Stabilizer	0.5 – 1%	0.5 – 1%	0.5 – 1%	0.5 – 1%

Mix these materials together using a high-speed mixer, taking care not to exceed 140°F. KS-266 should be used to adjust tack to the desired level. Typically, TDA is used when formulating with a more conventional system (higher percentage of KB-448), KS-244 is used with a more UV-based system (higher percentage of KS-302). Choose the free flow depending on the properties needed. Use KS-291 for better cure or KS-307 to increase flow and blanket stability. KS-244 can also be used to increase cure speed, regardless of the ratio of conventional to UV-based materials in the formula.

KS-279 is a unique additive that can be used to improve roller and blanket stability while making it easier to clean the press rollers. Using KS-279 above the prescribed levels can slow cure.

For the best possible results, the use of KS-626 High Gloss UV Coating over the hybrid inks is strongly recommended.

*For better economics, use KS-203. If more cure is needed for darker colors, use a blend of KS-203 and KS-308. Make sure to test for finished ink properties.

Hybrid Dry Grind Base Starting Formula

This formula can be used in place of the flush in the accompanying hybrid ink formulas:

Dry Pigment	30 – 42%
KB-448 Hybrid Grinding Vehicle	0 – 60%
KS-302 UV/Hybrid Universal Grinding Vehicle	0 – 60%
KB-149 (TDA) and/or KS-244 (EOTMPTA)	4 – 6%

KB-448 is a non-reactive UV-compatible grinding vehicle with excellent clean up, roller stability and litho properties, but it has slow UV cure response.

KS-302 is a UV-reactive grinding vehicle with good cure response and minimal gloss-back. Versus other ***UV-reactive*** vehicles, KS-302 has excellent clean up, roller stability and litho properties.

KB-448 and KS-302 can be used alone or in combination with each other, depending on the specific properties required.

Typically, TDA is used when formulating with a more conventional system (higher percentage of KB-448), KS-244 is used with a more UV-based system (higher percentage of KS-302). KS-266 can also be used to increase cure speed, regardless of the ratio of conventional to UV-based materials in the formula.

Technical Data Sheet

KS-296

UV/Hybrid Low Tack Gel Vehicle

Product Description

KS-296 is a unique development in UV/Hybrid vehicle technology. KS-296 has a lower tack, and higher structure versus our most popular UV gel for paper, KS-276. KS-296 is specifically formulated with a higher melt resin system then traditional UV vehicles, and will hold up better to the heat and shear of today's high speed UV, and UV waterless presses. Inks formulated with KS-296 will maintain viscosity and structure to exhibit better misting and superior litho properties without the need for dry additives. KS-296 is formulated for easier cleanup on most hybrid rubber compounds. For this reason, cure response may need to be enhanced for some applications. In these cases 5-10% of KS-299 or KS-261 epoxy acrylate vehicles should be sufficient. Typical applications include commercial sheetfed and folding carton work on paper, paperboard and other substrates. For additional information regarding formulary assistance and applications, please contact your KUSTOM SERVICES, INC. representative.

Performance Characteristics

- Excellent ink/water balance
- Excellent choice for UV waterless ink
- Lowest tack, highest structured UV/Hybrid gel available
- Reduces misting and maintains viscosity without the use of dry additives
- Formulated for easy cleanup with less aggressive press washes
- Exceptional hold-out

Physical Properties

• Viscosity	400 – 600 Poise
• Yield	4200 – 5200 dynes/cm^2
• Tack	13 – 15 @ 400 rpm/1 minute
• Specific Gravity	1.11
• Solids	> 99%

Suggested Starting Ink Formulary

Please refer to the SUGGESTED INK FORMULARY bulletin for starting ink formulations. These are intended as starting formulae only. Substrate, press and other variables must be addressed by the formulator for each application.

Storage and Handling Information

Care should be taken not to expose radiation curable products to temperatures exceeding 100°F for prolonged periods of time or to direct sunlight. Storage must be in a cool, shaded, well-ventilated and dry area. To do otherwise might cause uncontrollable polymerization of the product with generation of heat. Do not store this material under an oxygen-free atmosphere. This material should not be stored for more than six (6) months.
Certain precautions should be taken when handling this product. Please refer to the Material Safety Data Sheet (MSDS) for further details. This product contains materials that may cause moderate skin injury (reddening and swelling) and/or sensitization. Since irritation may not occur immediately, contact can go unnoticed. Consult the MSDS for appropriate equipment prior to using this or any other materials referred to in this Technical Data Sheet.

Technical Data Sheet

KS-291

Kustom Kure UV Freeflow Vehicle

Product Description

KS-291 is the recommended companion freeflow vehicle for our most popular UV gel for paper, KS-276. KS-291 along with KS-276 is part of a versatile energy cure vehicle system recommended for most UV/EB paste ink applications including lithographic inks, hybrid inks, letterpress inks, business form inks, carton inks, and label inks. Suitable for most paper, paperboard, and foil coated substrates. For additional information regarding formulary assistance and applications, please contact your KUSTOM SERVICES, INC. representative.

Performance Characteristics

- Good cure response
- Excellent printability
- Excellent ink/water balance
- Reduced misting and enhanced gloss without the use of dry additives
- Formulated for easy clean up with less-aggressive press washes

Physical Properties

• Viscosity	400 – 600 Poise
• Tack	24 - 28 @ 400 rpm/1 minute
• Specific Gravity	1.12
• Solids	> 99%

Suggested Starting Ink Formulary

Please refer to the SUGGESTED INK FORMULARY bulletin for starting ink formulations. These are intended as starting formulae only. Substrate, press and other variables must be addressed by the formulator for each application.

Storage and Handling Information

Care should be taken not to expose radiation curable products to temperatures exceeding 100°F for prolonged periods of time or to direct sunlight. Storage must be in a cool, shaded, well-ventilated and dry area. To do otherwise might cause uncontrollable polymerization of the product with generation of heat. Do not store this material under an oxygen-free atmosphere. This material should not be stored for more than six (6) months.

Certain precautions should be taken when handling this product. Please refer to the Material Safety Data Sheet (MSDS) for further details. This product contains materials that may cause moderate skin injury (reddening and swelling) and/or sensitization. Since irritation may not occur immediately, contact can go unnoticed. Consult the MSDS for appropriate equipment prior to using this or any other materials referred to in this Technical Data Sheet.

Technical Data Sheet

KS-236

Gelled Fatty Acid Modified Hexa-Functional Polyester

Product Description

KS-236 properties include good pigment wetting, fast cure, and good lithographic performance. Good choice for hybrid with easy cleanup. KS-236 may have adhesion potential to some flexible plastic substrates. Typical applications include commercial sheet-fed and folding carton work on paper, paperboard and select plastic stocks. For additional information regarding formulary assistance and applications, please contact your KUSTOM SERVICES, INC. representative.

Performance Characteristics

- Improves transfer properties and roller stability
- Easy cleanup properties for use in hybrid ink.
- Excellent cure response
- Excellent printability
- Reduced misting versus typical straight polyester acrylates.

Physical Properties

• Viscosity	100 – 300 Poise
• Yield	1000 – 3000 dynes/cm^2
• Tack	4 – 8 @ 400 RPM @ 1 minute
• Specific Gravity	1.01
• Solids	> 99%

Suggested Starting Ink Formulary

Please refer to the SUGGESTED INK FORMULARY bulletin for starting ink formulations. These are intended as starting formulae only. Substrate, press and other variables must be addressed by the formulator for each application.

Storage and Handling Information

Care should be taken not to expose radiation curable products to temperatures exceeding 100°F for prolonged periods of time or to direct sunlight. Storage must be in a cool, shaded, well-ventilated and dry area. To do otherwise might cause uncontrollable polymerization of the product with generation of heat. Do not store this material under an oxygen-free atmosphere. This material should not be stored for more than six (6) months.

Certain precautions should be taken when handling this product. Please refer to the Material Safety Data Sheet (MSDS) for further details. This product contains materials that may cause moderate skin injury (reddening and swelling) and/or sensitization. Since irritation may not occur immediately, contact can go unnoticed. Consult the MSDS for appropriate equipment prior to using this or any other materials referred to in this Technical Data Sheet.

Technical Data Sheet

KS-626

High Gloss UV Coating

Product Description

KS-626 is recommended for use as a UV coating to be applied in-line via anilox or roll coater over UV or hybrid UV ink systems. Typical applications include commercial sheet-fed printing on paper or paperboard substrates where excellent gloss and minimal gloss-back are desired. For additional information regarding assistance and applications, please contact your KUSTOM SERVICES, INC. representative.

Performance Characteristics

- Excellent gloss and clarity
- Excellent cure response
- Not considered imprintable, foil-stampable, glueable, etc.

Physical Properties

- Viscosity 21 - 24 sec. #3 Zahn
- Specific Gravity 1.11
- Solids > 99%

End Use Considerations

KS-626 should be evaluated in the laboratory using the actual ink system and substrate to ensure that leveling, intercoat adhesion, gloss and other performance characteristics are acceptable. In general, UV coatings may not exhibit complete intercoat adhesion over some ink systems. A primer may be considered for use if this property needs to be improved.

Storage and Handling Information

Care should be taken not to expose radiation curable products to temperatures exceeding 100°F for prolonged periods of time or to direct sunlight. Storage must be in a cool, shaded, well-ventilated and dry area. To do otherwise might cause uncontrollable polymerization of the product with generation of heat. Do not store this material under an oxygen-free atmosphere. This material should not be stored for more than six (6) months.

Certain precautions should be taken when handling this product. Please refer to the Material Safety Data Sheet (MSDS) for further details. This product contains materials that may cause moderate skin injury (reddening and swelling) and/or sensitization. Since irritation may not occur immediately, contact can go unnoticed. Consult the MSDS for appropriate equipment prior to using this or any other materials referred to in this Technical Data Sheet.

DATE REVISED: 01/30/2015

Technical Data Sheet

KS-244

Kustom Kure EOTMPTA

Product Description

KS-244 is recommended as a tack reducer for UV-curable lithographic and flexographic inks where high performance and fast cure are desired. Typical applications include inks for use on plastic, metal, paper, paperboard and other substrates. For additional information regarding formulary assistance and applications, please contact your KUSTOM SERVICES, INC. representative.

Performance Characteristics

- Good cure speed without brittleness
- Good solvency
- 100% reactive in UV ink systems

Physical Properties

• Viscosity	55 – 65 cps
• Specific Gravity	1.03
• Solids	100%

Suggested Starting Ink Formulary

Please refer to the SUGGESTED INK FORMULARY bulletin for starting ink formulations. These are intended as starting formulae only. Substrate, press and other variables must be addressed by the formulator for each application.

Storage and Handling Information

Care should be taken not to expose radiation curable products to temperatures exceeding 100°F for prolonged periods of time or to direct sunlight. Storage must be in a cool, shaded, well-ventilated and dry area. To do otherwise might cause uncontrollable polymerization of the product with generation of heat. Do not store this material under an oxygen-free atmosphere. This material should not be stored for more than six (6) months.

Certain precautions should be taken when handling this product. Please refer to the Material Safety Data Sheet (MSDS) for further details. This product contains materials that may cause moderate skin injury (reddening and swelling) and/or sensitization. Since irritation may not occur immediately, contact can go unnoticed. Consult the MSDS for appropriate equipment prior to using this or any other materials referred to in this Technical Data Sheet.

Technical Data Sheet

KS-279

Polymerization Inhibitor

Product Description

KS-279 is a hindered amine based inhibitor and is recommended as an in-container stabilizer. It acts as an effective free radical scavenger, and helps prevent polymerization in UV-curable materials. For additional information regarding formulary assistance and applications, please contact your KUSTOM SERVICES, INC. representative.

Performance Characteristics

- Effective in-container polymerization inhibitor in a liquid form.
- Gelled Version of KS-381
- Effective free radical scavenger.
- Recommended usage is 1.0 – 2.0% by weight.

Physical Properties

- Viscosity 1 – 3 sec. (Laray Rod Only)
- Specific Gravity 1.12
- Solids >99%

Suggested Starting Ink Formulary

Please refer to the SUGGESTED INK FORMULARY bulletin for starting ink formulations. These are intended as starting formulae only. Substrate, press and other variables must be addressed by the formulator for each application.

Storage and Handling Information

Care should be taken not to expose radiation curable products to temperatures exceeding 100°F for prolonged periods of time or to direct sunlight. Storage must be in a cool, shaded, well-ventilated and dry area. To do otherwise might cause uncontrollable polymerization of the product with generation of heat. Do not store this material under an oxygen-free atmosphere. This material should not be stored for more than six (6) months.

Certain precautions should be taken when handling this product. Please refer to the Material Safety Data Sheet (MSDS) for further details. This product contains materials that may cause moderate skin injury (reddening and swelling) and/or sensitization. Since irritation may not occur immediately, contact can go unnoticed. Consult the MSDS for appropriate equipment prior to using this or any other materials referred to in this Technical Data Sheet.

Technical Data Sheet

KS-307

Kustom Kure Low Viscosity Polyester Dispersion Vehicle

Product Description

KS-307 is Fatty Acid Modified Hexa-functional Polyester. KS-307 is recommended as an additive for flow or use to enhance flexibility and pigment wetting in place of epoxy acrylate. KS-307 has good pigment wetting, litho properties, and cure speed.
For additional information regarding formulary assistance and applications, please contact your KUSTOM SERVICES, INC. representative.

Performance Characteristics

- Excellent pigment wetting
- Good Litho Properties
- Good reactivity and low viscosity

Physical Properties

• Viscosity	65 – 85 Poise
• Specific Gravity	1.10
• Solids	> 99%

Suggested Starting Ink Formulary

Please refer to the SUGGESTED INK FORMULARY bulletin for starting ink formulations. These are intended as starting formulae only. Substrate, press and other variables must be addressed by the formulator for each application.

Storage and Handling Information

Care should be taken not to expose radiation curable products to temperatures exceeding 100°F for prolonged periods of time or to direct sunlight. Storage must be in a cool, shaded, well-ventilated and dry area. To do otherwise might cause uncontrollable polymerization of the product with generation of heat. Do not store this material under an oxygen-free atmosphere. This material should not be stored for more than six (6) months.

Certain precautions should be taken when handling this product. Please refer to the Material Safety Data Sheet (MSDS) for further details. This product contains materials that may cause moderate skin injury (reddening and swelling) and/or sensitization. Since irritation may not occur immediately, contact can go unnoticed. Consult the MSDS for appropriate equipment prior to using this or any other materials referred to in this Technical Data Sheet.

Technical Data Sheet

KS-302

Kustom Kure UV Flushing and Grinding Vehicle

Product Description

KS-302 is recommended as a dispersion vehicle ideal for hybrid applications. KS-302 is a versatile energy cure vehicle recommended for most UV/EB paste ink applications including lithographic inks, hybrid inks, letterpress inks, business form inks, carton inks, and label inks. KS-302 is especially effective for hard-to-disperse pigments such as Lithol Rubine, Carbon Black and Alkali Blue, among others. Typical applications include commercial and folding carton work on paper, paperboard and other substrates. For additional information regarding formulary assistance and applications, please contact your KUSTOM SERVICES, INC. representative.

Performance Characteristics

- Very effective with hard-to-disperse pigments
- Formulated for easy cleanup with less aggressive press washes, ideal for hybrid applications
- Excellent flow properties with higher viscosity
- Excellent pigment wetting

Physical Properties

• Viscosity	400 – 700 Poise
• Specific Gravity	1.11
• Solids	> 99%

Suggested Starting Ink Formulary

Please refer to the SUGGESTED INK FORMULARY bulletin for starting ink formulations. These are intended as starting formulae only. Substrate, press and other variables must be addressed by the formulator for each application.

Storage and Handling Information

Care should be taken not to expose radiation curable products to temperatures exceeding 100°F for prolonged periods of time or to direct sunlight. Storage must be in a cool, shaded, well-ventilated and dry area. To do otherwise might cause uncontrollable polymerization of the product with generation of heat. Do not store this material under an oxygen-free atmosphere. This material should not be stored for more than six (6) months.

Certain precautions should be taken when handling this product. Please refer to the Material Safety Data Sheet (MSDS) for further details. This product contains materials that may cause moderate skin injury (reddening and swelling) and/or sensitization. Since irritation may not occur immediately, contact can go unnoticed. Consult the MSDS for appropriate equipment prior to using this or any other materials referred to in this Technical Data Sheet.

Technical Data Sheet

KB-149

Tridecyl Alcohol (TDA)

Product Description

KB-149 is been used in the ink industry for many years as a sweetner solvent to reduce thixotrophy and increase flow. **KB-149** is a very effective tack reducer.

Physical Properties

Property	
Molecular Weight:	200
Density, g/mL:	0.84
Boiling Point, C (F):	252 (486)
Appearance:	Clear Liquid

Technical
Data Sheet

KB-448

Hybrid Flushing/Grinding Varnish

Product Description

KB-448 is a soy-based vehicle developed specifically as a flushing/grinding medium for the development of hybrid energy curable inks**. KB-448** exhibits excellent compatibility when used in conjunction with **Kustoms' Hybrid Letdown Vehicle System.**

Performance Characteristics

- Building block for high gloss hybrid ink system for in-line UV coating.
- Superior litho properties versus most energy curable inks
- Excellent pigment wetting properties

Physical Properties

Tack @ 400 RPMs/1':	19.0-23.0
Viscosity in Poises:	550-650
Yield Value in Dynes/cm2:	N/A
% Solids:	98-100