KAMTHANE AQUA COLOUR TOP

START UP FORMULATION OF POLYURETHANE COATING FOR FLOORING WITH KAMTHANE K-1492

MILL BASE H IN SAND MILL

1) D.M.WATER	6.0	KGS
2) DISPERSE BYK 190	2.3	KGS
3) SURF 104 E 0R DC-67	0.6	KGS
4) DEFOAMER BYK 24	0..15	KGS
5) DEFOAMER TEGO 902 W	0.15	KGS
6) PG	1.0	KGS
7) MELZER 33	0.3	KGS
8) NITROSOL (HEC)	0.2	KGS
9) AMP-95	0.05	KGS
10) RUTILE R-902	17.00	KGS
11) MICRO SILICA	9.45	KGS
12) MICRO CALCITE	8.2	KGS
13) MICRO TALC	2	KGS
TOTAL	**47**	**KGS**

SOLID CONTENT OF THE MILL BASE : 81.5 %
TIO2 PERCENTAGE ON MILL BASE IS : 39.2 %

FINAL COATING

100 KGS BATCH SIZE

MILL BASE OF H OF 81.5% SOLIDS :	37 KGS	(81.5%)
KAMICRYL –61 (Pure Acrylic Co-polymer)	5 KGS	(50%)
K-1492 (35%) PU	55 KGS	(35%)
BYK-333	0.25 KGS	(100%)
DEFAOMER (AIREX 902W) TEGO	0.2 KGS	(20%)
VXL 4930	0.1 KGSI	
FORMALDEHYDE	0.1 KGS	(37%)
BUTYL CARBITOL/ TEXANOL	2.0 KGS	
SCT 275 PU THICKNER	0.3 KGS	(100%)
TOTAL	**100 KGS**	

FINAL SOLIDS : 51 %

RAW MATERIAL DETAILS;

1) NITROSOL HEC POWDER
2) AMP-95 REPLACEMENT OF AMMONIA BY PERFOCHEM PH; 24934627/ 28
3) BYK 190 --- DISPERSING AGENT 50% OF BYK
4) SURFYNOL 104E --- WETTING AGENT OF AIR PRODUCTS
6) DALPAD ---- COALAECING AGENT OF DOW OR TEXANOL
8) MELZER -33 ---- EXTERNAL DRY FILM PRESERVATIVE
9) SCT- 275 ---- PU THICKNER OF ROHM AND HAAS
10) CIBA 5151 ---- UV STABILIZER OF CIBA
11) DEFOAMER ---- BYL 19 AND BYK 24 USED IN 3:2 COMBINATION
12)BYK - 333 ----- SLIP AND MARR AGENT OF BYK CHEMIE
14) AIREX 902 W DEFOAMER BY TEGO
15) R-972 ANTISETILLING AGENT BY DEGUSSA.
16) TS-100 MATTING AGENT BY DEGUSSA.
17) VXL 4930 LEVELLING AGENT BY SIGNET

PLEASE NOTE: YOU CAN USE EITHER OF SURFACTANTS (WETTING AGENTS)

1) BYK 346 FROM BYK CHEMIE
2) DC-67 FROM DOW
3) SURFYNOL 104 E FROM AIR PRODUCTS

OR ANY OTHER GRADES OF THE SIMILAR TYPE

START UP FORMULATION OF K-1492 HIGH GLOSS

1) KAMTHANE K-1492	----------	85 KGS
2) WATER D.M.	----------	9.87 KGS
3) BYK 333	----------	0.35 KGS
4) BUTYL CARBITOL	----------	3.1 KGS
5) BYK 024	----------	0.34 KGS
6) TEGO 902 W DEFOAMER	----------	0.34 KGS
7) SURFYNOL 104 E	----------	0.7 KGS
8) SIGNET VXL 4930	----------	0.2 KGS
9) SCT –275 (PU THICKNER)	----------	0.1 KGS
TOTAL		**100 KGS**

ADD 1-6 UNDER HIGH SPEED IN THE ABOVE IN SERIES, AND CHECK ON GLASS PLATE FOR FISH EYE EFFECT .THEN REDUCE TO MEDIUM SPEED AND ADD 8, 9 AND 10.. LASTLY ADJUST THE ABOVE WITH WATER OR IF LESS WITH SCT-275 PU THICKNER FOR FINAL VISCOSITY OF 30-35 SECONDS IN B 4 FORD CUP.

START UP FORMULATION OF K-1492 MATT

1) KAMTHANE K-1492 (35%)	----------	64 KGS
2) WATER D.M.	----------	28.1 KGS
3) BYK 333	----------	0.3 KGS
4) DEFOAMER BYK 024	----------	0.45 KGS
5) DEFOAMER TEGO 902 W	----------	0.45 KGS
6) TS 100 DEGUSSA	----------	5.0 KGS
7) AEROSIL R-975	----------	0.810 KGS
8) SURFYNOL 104 E OR DC-67	----------	0.700 KGS
9) SIGNET VXL 4930	----------	0.200 KGS
TOTAL		**100 KGS**

ADD 1-5 UNDER HIGH SPEED IN THE ABOVE IN SERIES, AND IT IS VERY IMP TO CHECK ON GLASS PLATE FOR FISH EYE EFFECT AFTER WHICH ADDITION OF NO 6 AND 7 THEN CHECK WHETHER IT IS COMPLETELY DISSOLVED. .THEN REDUCE TO MEDIUM SPEED AND ADD 8 AND 9 AND MIX FOR MINIMUM 30 MINUTES. LASTLY ADJUST THE VISCOSITY TO 30 – 40 SECONDS IN B 4 FORD CUP WITH WATER.

PLEASE NOTE : ADD TS 100 AND R-975 SLOWLY

MIXED DEFOAMER : BYK 019 / BYK 024 ------- RATIO 3 / 2

START UP FORMULATION OF PU PRIMER

1) KAMTHANE K-1492	----------	60 KGS
2) WATER D.M.	----------	38 KGS
3) PROPYLENE GLYCOL	----------	1.0 KGS
4) DEFOAMER902 W	----------	0.15 KGS
5) BYK 024	----------	0.15 KGS
7) SURFYNOL 104 E	----------	0.7 KGS

TOTAL **100 KGS**

FINAL SOLIDS : 21 %

ADD 1-5 UNDER HIGH SPEED IN THE ABOVE IN SERIES, AND CHECK ON GLASS PLATE FOR FISH EYE EFFECT .THEN REDUCE TO MEDIUM SPEED AND ADD 7.

Technical Information

Kamthane K-1492

Kamthane K-1492 is an air dry, water-borne urethane, specifically designed for high performance uses, where hardness, flexibility, chemical and abrasion resistance are required. The aliphatic backbone of Kamthane K-1492 results in excellent UV resistance, permitting its use in exterior coating applications. Although Kamthane K-1492 provides good water and solvent resistance properties in properly formulated coating systems, these properties can be substantially enhanced, in certain critical applications, by addition of an air-dry crosslinking agent such as Aziridines, water based isocyanate hardners and Silanes.Crosslinkers improve the adhesion characteristics for special substrates.

For many applications, blends of Kamthane K-1492 urethane dispersions with water-borne acrylics have been found useful. Kamthane K-1492 shows good compatibility with some of Kamsons water-borne acrylics, and results in stronger adhesion to wood and certain plastics, as well as improved intercoat adhesion. Kamthane K-1492 can be used to formulate coating for all type of substrates; metals, plastics and wood.

KeyBenefits

- Hardness
- Abrasion Resistance
- Solvent Resistance
- Chemical Resistance
- Water Resistance
- Impact Resistance
- Flexibility
- Compatibility with many Acrylic Emulsions
- Good Adhesion to Polycarbonate

FILM PROPERTIES

Typical Properties

Type	Aliphatic polyurethane
Appearance	Translucent dispersion
Total solids, by weight,	34 %
pH	7.0 – 8.5
Viscosity, Brookfield, 25^{o}C,	200 - 400 cps
Specific gravity of solids @ 25^{o}C	1.14
Flash point, ^{o}F. Pensky-Martens closed cup	No flash point
Freeze/thaw stability Passes	5 Cycles
Mechanical stability	Satisfactory
Type of VOC	NMP
Shelf life	1 year

FILM PROPERTIES:

Kamthane K-1492 will produces films with exceptional toughness, flexibility and abrasion resistance. Clear coatings based on Kamthane K-1492 compare favorably with high performance conventional solvent-borne urethane lacquers.

Typical application and performance properties of clear films from KamthaneK-1492, are described in Tables I and II.

Table I

Application Properties of Clear Films*

Dry Time		**Sward Hardness Development**	
Set to touch	20 mins.	4 hours	12
		8 hours	28
Dry to touch	35 mins.	24 hours	38
		48 hours	40
Through dry	1 hr. 10 min.	1 week	44

Table II

Physical Performance Properties of Clear Films*
(After 7 days curing at ambient conditions)

Pencil hardness	3H
Taber abrasion (mg. loss per 1000 cycles, CS-17 wheel, 1000 gram load)	22
Impact resistance @ 30 ^{o}F, in-lb.	
Direct	160
Reverse	160
Free film properties	
100% modulus,	4000 psi
Tensile strength,	6500 psi
Elongation,	200 %

*Films cast on untreated cold rolled steel at 1 mil dry.

CHEMICAL, CORROSION AND HUMIDITY RESISTANCES

Clear coatings based on Kamthane K-1492 show excellent chemical and humidity resistance. Corrosion resistance, although adequate for many applications may be improved by the incorporation of air dry crosslinkers such as polyfunctional aziridines .If heat is available, water-reducible hexamethoxylated melamine resins can be used for crosslinking.

The chemical, corrosion and humidity resistances of unmodified Kamthane K-1492 are described in Table III.

TABLE III

Chemical Corrosion and Humidity Resistance
(1.0 mil dry films, on cold rolled steel, air dried 7 days)

Chemical Resistance

Toluene, 1 hour immersion	No Effect
Gasoline, 1 hour immersion	No Effect
Methylethylketone, 100 double rubs	No Effect
Glacial acetic acid, 1 hour spot test	Slt. Softening, recovers
1 N NaOH, 1 hour spot test	No Effect

Humidity Resistance
(100 ^{o}F, 100% RH, 700 hours)

Rusting (ASTM D610)	No Effect
Blistering (ASTM D714)	No Effect
Loss in gloss	No Effect

Salt Spray Resistance
100 Hours Unscribed
(5% NaCl, 95 ^{o}F)

Rusting (ASTM D610)	Trace (9)
Blistering (ASTM D714)	Few, #2

ADHESION CHARACTERISTICS

Kamthane K-1492 has outstanding adhesion to a wide variety of substrates. On certain plastics and wood, unmodified Kamthane K-1492 will not wet the substrate. Selected water miscible solvents as well as nonionic and anionic wetting agents can be used to improved the wetting properties.
Additionally, ambient crosslinking with polyfunctional aziridines and selected silanes are recommended for improving adhesion.

Table IV describes the adhesion characteristics of Kamthane K-1492 on metal and plastic substrates.

TABLE IV

Adhesion Characteristics of Kamthane K-1492 Clear Films
(1.0 mil dry films air dried seven days)

Metal		**Plastics**	
Untreated Cold Rolled Steel	Excellent	Polycarbonates	Excellent
Bonderite 100	Excellent	HDP	Selective*
Bonderite 1000	Excellent	ABS	Selective*
Tin Plate	Excellent	Nylon	Selective*
Untreated Aluminum	Excellent	Flexible Vinyl	Selective*
Anodized Aluminum	Excellent		

*The adhesion of Kamthane K-1492 to various plastics is dependent on the type of plastic and the treatment used on the plastic. For example, on vinyl, the adhesion can vary with the vinyl formulation or the amount of heat used to dry the coating. For most plastic applications, blending the Kamthane K-1492 with various water-borne acrylic resins will substantially improve adhesion.

Mar Agents

Normally Kamthane K-1492 exhibits excellent mar resistance. Where additional mar resistance is required , BYK 301, BYK 333 can be used.

Defoamers

The following defoamers are suggested for Kamthane K-1492.
Foammaster
Foammaster NS-1
Drewplus Y-200
Tego 902 W
BYK 024 and 019

Flow and Leveling

To obtain optimum leveling and substrate wetting with Kamthane K-1492, a surface active agent should be added. The following materials are recommended.

Triton GR-7M
DC-14
Fluorad FC 120
VXL 4930

Surface active agents :

Dow DC-67 (100%) ---------- 1.3 % on solids of resin
BYK-346 (50%) ---------- 1.6 % on solids of resin
Surfynol 104 E (50%) ---------- 1.6% on solids of resins

Crosslinking

Air dry crosslinkers such as Aziridine, water borne isocyanate hardners, silanes may be incorporated to optimize adhesion, corrosion and chemical resistance. In high bake applications, hexamethoxylated melamine resins, such as Cymel 303 can be used.

CX-100	6-9% by weight on dry resin
Cymel 303 or equivalent	10% by weight on dry resin
Waterborne isocyanate hardner	10 % by weight on dry resin

Thickening

There are two means of increasing the viscosity of formulations containing Kamthane K-1492. The first is to employ external thickeners. The second method is to add swelling solvents. Care should be taken in the addition of these solvents. Recommended procedures include good agitation, slow addition and where possible, predilution with water.

External Thickeners

Acrysol ASE-60	Strong Thickening
Modicol VD	Strong Thickening
Thickener LN	Moderate Thickening
PU thickner SCT-275	Moderate Thickening

Swelling Solvents

Ethylene Glycol Monobutyl Ether	Strong Swelling
n-Butanol	Strong Swelling
Methylethylketone	Moderate Swelling
Texanol	Moderate Swelling
Isopropanol	Moderate Swelling

Dispersant

For dispersing pigments in Kamthane K-1492 the following surfactants are recommended.

Triton CF-10 (100%)	1.0% solids on pigment
Tamol 165 (21.5%)	1.5% solids on pigment
Nopcosant K (34%)	1.5% solids on pigment
BYK 190 (50)	1.5% solids on pigment

Pigmentation

Kamthane K-1492 can be formulated into gloss and semi-gloss coatings. When preparing dispersions using high-speed equipment, special care must be taken to prevent gelation by avoiding heat build-up in the grind.

START UP FORMULATION OF POLYURETHANE FOR WALL COATING WITH KAMTHANE K-1492 FOR PHARMACEUTICAL INDUSTRIES

HYGIENE COATINGS

MILL BASE H IN SAND MILL

1) D.M.WATER	6.0	KGS
2) DISPERSE BYK 190	2.3	KGS
3) SURF 104 E/ DC-67	0.6	KGS
4) DEFOAMER (19/24 ## 3/2)	0.2	KGS
5) PG	1.0	KGS
6) MELZER 33	0.8	KGS
7) NITROSOL (HEC)	0.2	KGS
8) AMP-95	0.05	KGS
9) RUTILE R-902	17.00	KGS
10) MICRO SILICA	9.45	KGS
10) MICRO CALCITE	8.2	KGS
11) MICRO TALC	2	KGS
TOTAL	**47.5**	**KGS**

SOLID CONTENT OF THE MILL BASE : 81.5 %
TIO2 PERCENTAGE ON MILL BASE IS : 39.2 %

PU WALL GUARD (HIGH GRADE) : 100 KGS BATCH SIZE

MILL BASE H OF 81.5% SOLIDS :	37 KGS (81.5%)
KAMICRYL-61	10 KGS (50%)
K-1492 (35%) PU	40 KGS (35%)
BYK-333	0.3 KGS (100%
VXL 4930	O.2 KGS (100%)
DEFAOMER (AIREX 902W) TEGO	0.2 KGS (20%)
FORMALDEHYDE	0.1 KGS (37%)
BUTYL CARBITOL /TEXANOL	3.0 KGS
WATER	8.7 KGS
SCT 275 PU THICKNER	0.3 KGS (100%)
TOTAL	**100 KGS**

FINAL SOLIDS : 50 %

PU WALL GUARD (MEDIUM GRADE) : 100 KGS BATCH SIZE

MILL BASE H OF 81.5% SOLIDS :	37 KGS (81.5%)
KAMICRYL-61	25 KGS (50%)
K-1492 (35%) PU	25 KGS (35%)
BYK-333 ----------	0.3 KGS (100%
VXL 4930 ----------	O.2 KGS (100%)
DEFAOMER (AIREX 902W) TEGO------	0.2 KGS (20%)
FORMALDEHYDE ----------	0.1 KGS (37%)
BUTYL CARBITOL /TEXANOL ----------	3.0 KGS
WATER ----------	10 KGS
SCT 275 PU THICKNER----------	0.3 KGS (100%)
TOTAL	**101.3 KGS**

FINAL SOLIDS : 50 %

PU WALL GUARD (LOW GRADE) : 100 KGS BATCH SIZE

MILL BASE H OF 81.5% SOLIDS :	37 KGS (81.5%)
KAMICRYL-61	35 KGS (50%)
K-1492 (35%) PU	15 KGS (35%)
BYK-333 ----------	0.3 KGS (100%
VXL 4930 ----------	O.2 KGS (100%)
DEFAOMER (AIREX 902W) TEGO------	0.2 KGS (20%)
FORMALDEHYDE ----------	0.1 KGS (37%)
BUTYL CARBITOL /TEXANOL ----------	3.0 KGS
WATER ----------	12 KGS
SCT 275 PU THICKNER----------	0.3 KGS (100%)
TOTAL	**103.3 KGS**

FINAL SOLIDS : 50 %