DRYTHANE®

Drythane Thrills Builders!!

Drythane has received several lac square-feet orders from builders in NOIDA extension. The companies were mostly using a highly elastic, soft Polyurethane waterproofing from a Swiss multinational corporation. The products could be easily peeled off from the surface showing poor adhesion. Being weak films, they could also be easily damaged during construction activities. Therefore, the customers were quite unhappy with the results.

Drythane presented a totally new concept – an extremely tough and durable – liquid applied membrane which strongly bonds to the surface. We demonstrated the product on a test patch and even carried out on-site testing. In one case, the customer even tried strongly hitting the coating with a wooden pole to damage it but gave up after considerable effort.

Drythane @ 1.50 mm Thickness over 0.20 mm PIV Primer was selected by the companies. The coating is being applied on roof s, gardens, podiums, swimming pools, water storage tanks etc. All coated areas have been tested by ponding with absolutely zero defects.

Drythane is revolutionizing the waterproofing industry.

Contact :

Sachit Mann
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A-79. Sector 58, NOIDA 201 301, India
Tel : +918826458060
E-Mail : sachitmann@drythane.com
Website : www.drythane.com




Finally -The Rising Damp Problem Solved!!

Rising damp is caused by capillary suction of water through fine voids that occur in all masonry materials. Capillaries draw water from the soils beneath a building against the force of gravity leading to damp zones at the base of walls. In most cases, dampness contains some amount of salt. It must be noted that the main source of moisture rise is the availability of water in the soil, which in its natural form contains various types of soluble salts. In addition, sand used for plaster is often contaminated with Salt and there are reports of Saltwater being used for curing of bricks.

The slow process of absorption of water into block wall with subsequent evaporation leads to gradual deposit of salts in masonry walls. The masonry wall acts as a filter system for impure water as the various soluble salts are drawn into the wall and are left behind. These salts will cause:

a) A white fluffy deposit (efflorescence) to be left on the surface which causes the paint to bubble and peel off.

b) *Hidden salt crystallisation (cryptoflorescence) occurring within the pores below the masonry* surface. Fine pores cannot accommodate the increasing accumulations of salts and are eventually broken apart by the expansive forces of the crystal growth, causing the surface to decay and crumble.

c) Fungal and mould attack. According to the WHO (2009), some occupants of damp rooms are at risk of experiencing health problems such as respiratory infections, allergic rhinitis, and asthma.

Rising Damp is easily solved by application of 2.00 mm Drythane® layer on the DPC (Damp Proof Course) or Plinth *Beam at the time of construction*. Drythane® keeps out the water and salt forever. It is a permanent solution – you will never have to repaint or re-plaster on account of rising damp!!

Contact for details :

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Finally -A Solution To Waterproof Foundations!!

Sealing the foundation bottom of a building will prevent dampness from entering below ground levels such as basements. There are many technical difficulties in doing so:

a) Sheet applied materials have problems with joints which are simply not able to provide a watertight seal. They are very difficult to apply to complex geometries of the foundation.

b) Liquid membranes (High Elongation Polyurethane) are too weak and lack tensile strength (2 MPa) and hardness (10 Shore D). During the process of erecting the reinforcing steel for raft and columns, the membrane gets terribly damaged making the whole exercise futile.

Drythane® @ 1.50 – 2.00 mm provides the first real solution to foundation bottom waterproofing:

c) Seamless, liquid applied membrane without any joints to the *mortar surfaced PCC*.

d) Extremely tough with > 20 MPa tensile strength, 100% Elongation, 70 Shore D Hardness and extremely high abrasion resistance. Does not damage during installation of the reinforcing steel cage. Adhesion is > tensile strength of the concrete.

e) Usually roller applied, it can also be spray applied at 1,000 sq.m / day or more on prepared surface for fast job completion.

Contact for details:

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DRYTHANE® SPRAY EQUIPMENT

COSMOSTAR SD70 provides maximum performance in a revolutionary, compact, self-contained design. The SD70 makes spraying 100% Solids Polyurethane Coatings easy and affordable. Integrated Resin (70 Litre – heated) and Activator (20 Litre) tanks make loading and handling of materials from 20 Litre drums simple and easy. Optional 1:1 transfer pump can be used to handle and use 200 Litre drums. Ratios 2.5:1, 3:1 and 3.5:1 are available with change of lower cylinders.

Cosmostar SD 70 is recommended sprayer for application of Drythane®, 100% Solids (Zero VOC) Polyurethane Coating from Amchem Products Pvt. Ltd. Formulated specifically as a high-performance waterproofing membrane, Drythane® provides lifelong protection to concrete and other masonry. Once coated, the surface is completely impervious to water. For larger waterproofing projects, SD 70 can be used to spray 100 sq.m/hour or more instead of applying by paint roller. This greatly reduces cost and speeds up the work.

COSMOSTAR SD70 FLASH 7”

Air Motor Diameter	7” (FLASH)
Mixing Ratio by Volume (Resin:Activator)	3.5:1 (for Drythane®)
Pressure Ratio (Fluid to Air)	30:1
Volume / Cycle	168cc
Volume Flow Rates @40 Cycles / Min	6.72 LPM
Volume Flow Rates @60 Cycles / Min (Max)	10.08 LPM
Fluid Pressure @75 Psi Air Input	2250 Psi
Fluid Pressure @120 Psi Air Input	3600 Psi
Air Consumption @100 Psi CFM	34 scfm @ 3.8 LPM

MATERIAL CHARACTERISTIC

Solids Volume	100%	
Mix Ratio (Resin:Activator)	3.5:1 by Volume	
Recommended Dry Film Thickness	1500-2000 Microns	
Specify Gravity (Resin - Activator - Mixed)	1.23-1.23-1.23 Kgs/Litre 10.26-10.26-10.26 Lbs/Gallon	
Cure Time (Varies by application technique, thickness & temperature)		
Designation	Regular Set	Fast Set
Gel Time - Seconds	30-60	8-12
Tack Free - Minutes	90-150	45-60

SINCE 1979 COSMOSTAR

COSMOSTAR TECH LTD.
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Shulin District, New Taipei City 238, Taiwan
Tel: +886-2-28867799 | Fax: +886-2-28868991
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AMCHEM

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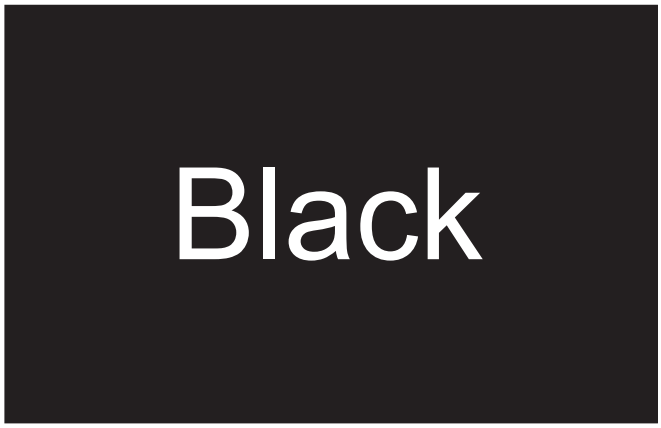
Red


Yellow


Black


Green

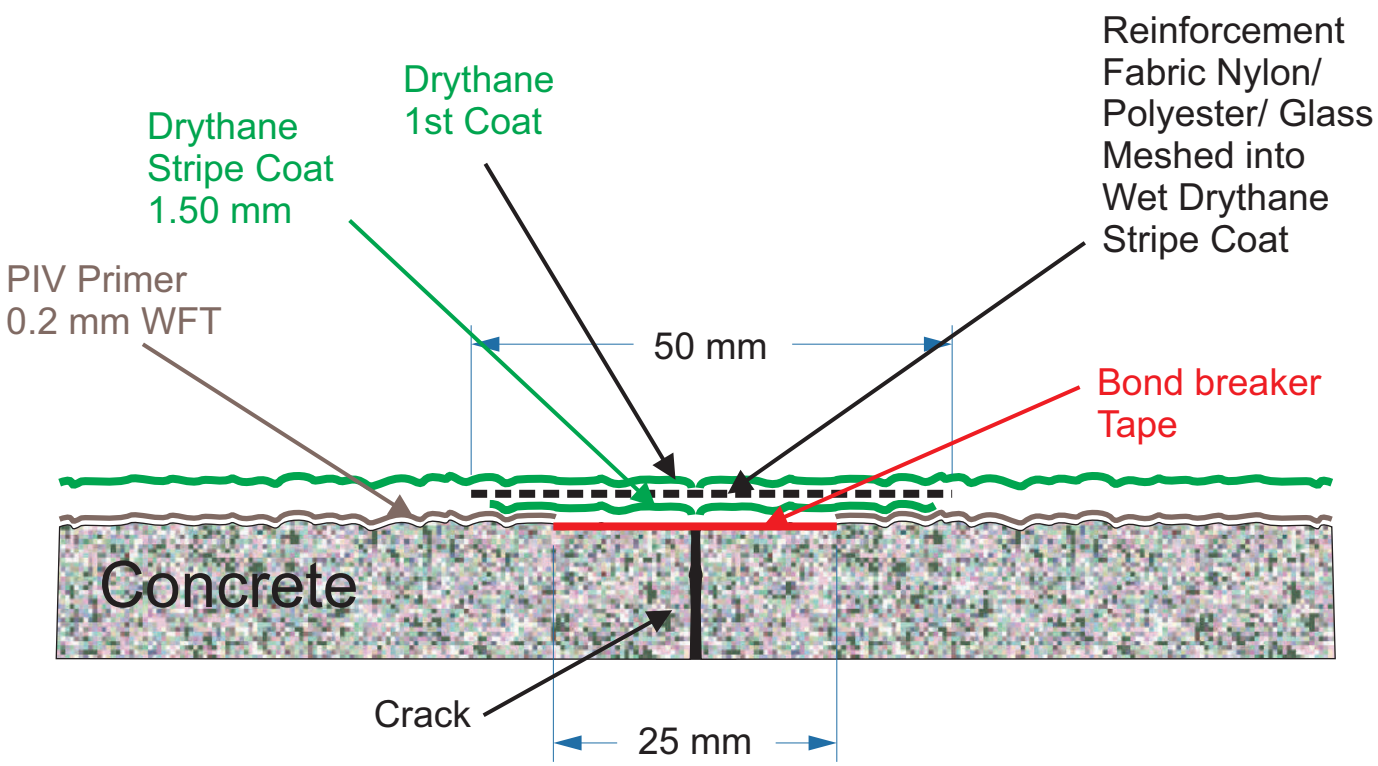

Blue


Grey

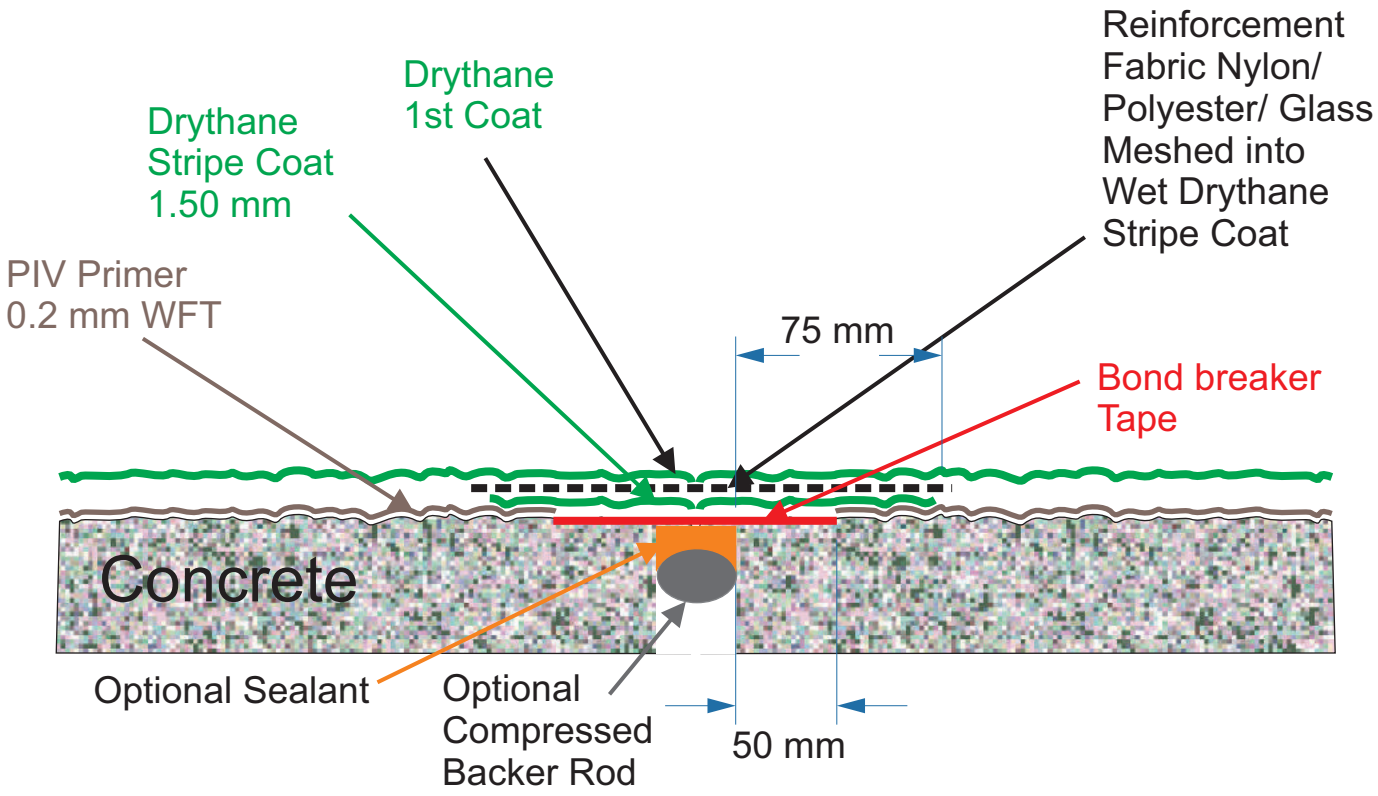

Cream


Custom

DRYTHANE®



Crack Treatment



Expansion Joint

NACE SP0892-2007
(formerly RP0892-2001)
Item No. 21060

Standard Practice

Coatings and Linings over Concrete for Chemical Immersion and Containment Service

Reaffirmed 2007-08-14
Revised 2001-10-03
Approved December 1992
NACE International
1440 South Creek Drive
Houston, Texas 77084-4906
+1 281/228-6200

ISBN 1-57590-136-6

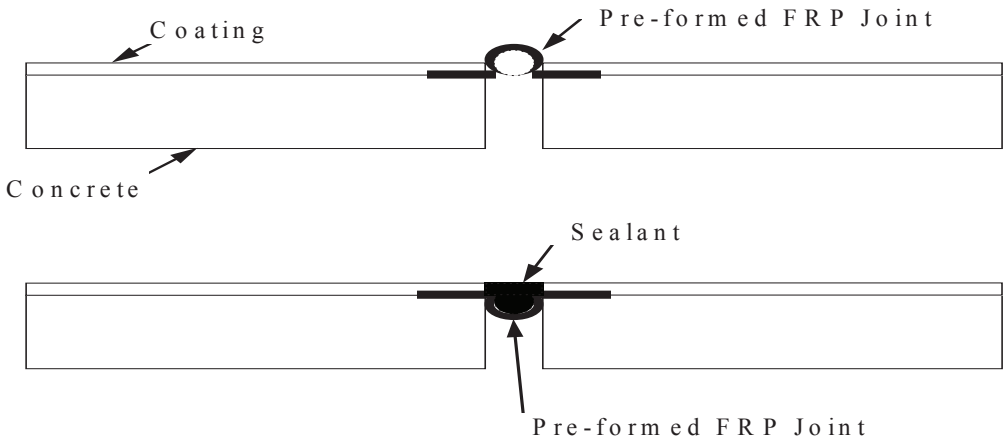


Figure 4
FRP Joint Sealant

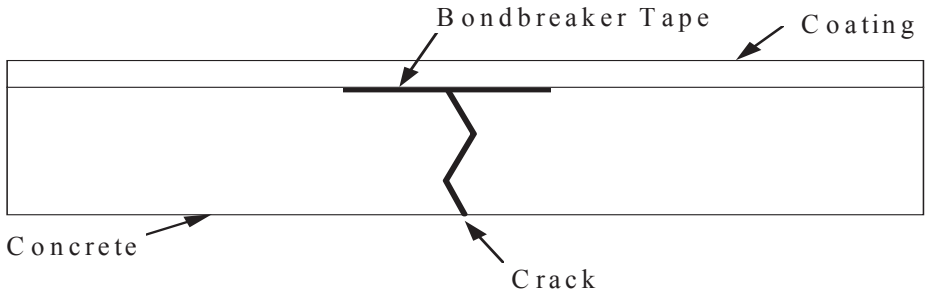


Figure 5
Bondbreaker over Crack

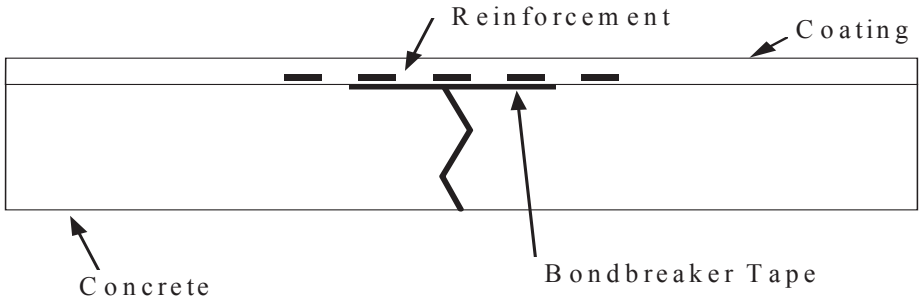


Figure 6
Reinforced Bondbreaker over Crack

Concrete Coatings – How Much Elongation Is Required?

Many coatings list their high elongation capability as a high-performance feature. This bulletin addresses the actual elongation requirement for performing different functions.

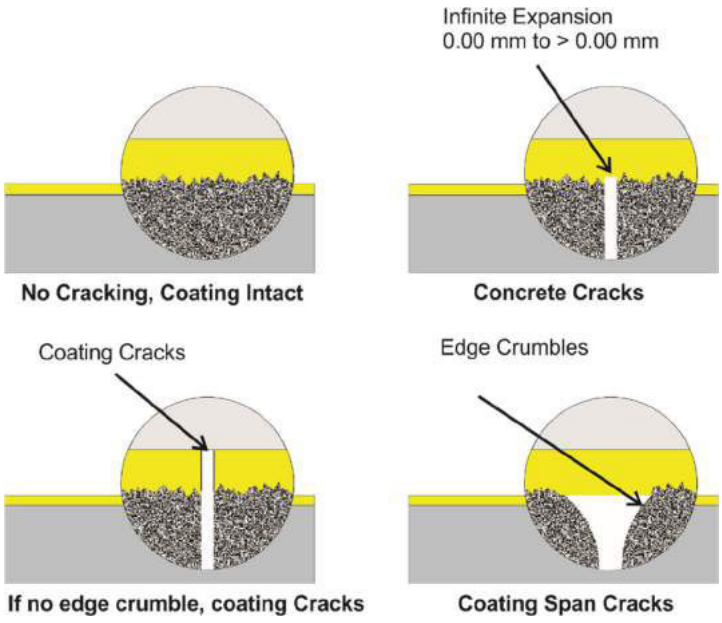
Thermal Expansion

Concrete has a coefficient of Thermal Expansion of 10 X 10^{-6}/C. Temperature change of 38C (45C summer - 7C winter) produces 1.7 cm expansion for every 30.5 m of concrete. **i.e. 0.05%.** Rigid coatings will put stress on the bonding surface during the process and eventually disbond. Flexible coatings will remain bonded – experience has shown that anything > 20% elongation does not apply stress on the bonding surface. It is also important that the coefficient of thermal expansion be like that of concrete so that the coating and surface contract and expand together.

Crack Spanning

The most important requirement for concrete coating is the ability to span microcracks **< 0.40 mm** caused by curing and loading of concrete. Water and corrosive ions permeation into the coating is primarily from within these cracks. If the coating cracks when these microcracks open under the coating, the whole purpose is negated.

How much elongation is required for producing this amount of crack spanning ability? 20%? 50%? 100%? 200%? Just elongation is not enough since at zero point there is infinite elongation (see below). Crack spanning is a complex process involving elongation and tensile strength which **causes the edge to crumble.** This is what prevents the coating from cracking.



It has been seen from testing that a coating with 35% elongation capability and 2,500 Psi Tensile Strength spans cracks up to 1.4 mm (Purethane 386/9000), i.e. much more than required. The very high elongation capability products 400%+ do not have any significant higher capability.

1K and 2K Very High Elongation Products (400%)

1 K products are linear because cross linked products cannot have long storage life. Hence, they have high elongation by *default*, not by design. Also, high elongation products are crystalline which means very high fall of elasticity in low temperatures. E.g. sub-zero temperatures. Hence, they need a high starting elongation level to retain a reasonable amount at low temperatures. High elongation products have very poor mechanical properties and are easily damaged. They need a protective masonry layer adding costs and weight. Chemical resistance (Concrete is Alkaline) is much lower so over the long term they tend to peel off.

Amorphous structured cross linked, thermoset products have low fall in elasticity in lower temperature. They are very tough, hard and difficult to damage.

Large Cracks and Expansion Joints

Large cracks and expansion joint present at the time of coating are treated using bond breaker techniques where the movement is spread over a very wide coating bridge. Ask for technical bulletin.

For additional data and clarifications, please call:

Shomendra Mann
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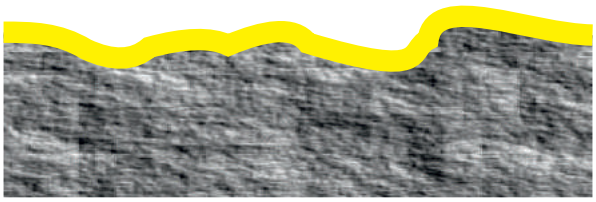
DRYTHANE®

Amshield™ Deck

PURETHANE®

CONCRETE DEFECTS AND EFFECT ON APPLIED COATING



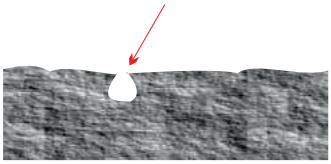
100% Solids Polyurethane Coatings have unlimited build capability which allows them to provide pinhole free coverage even over rough concrete with a sufficient film thickness. It covers peaks and valleys equally as depicted alongside.

However surface roughness and Bugholes in the concrete surface produce discontinuities and must be treated prior to coating.

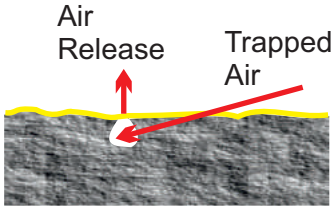
One of the ways to fix the problem is by use of PIV Primer which magically fills the holes !!.

Without Primer

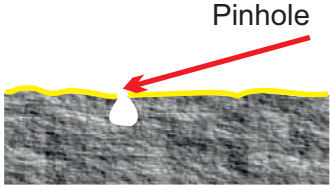
Bugholes



Bugholes are voids just beneath the concrete surface and result from air entrapment due to insufficient concrete vibration.



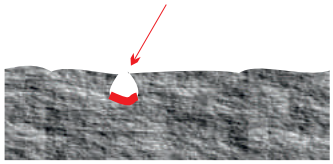
Blast cleaning opens up the thin crust covering the bughole leading to narrow mouth and larger bottom. The rapidly applied coating bridges over the top of the bughole.



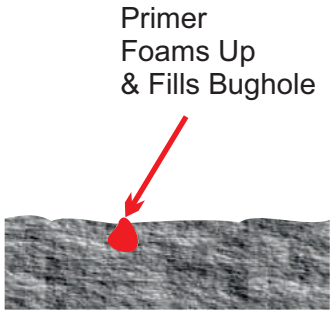
Exothermic heat generated by the reaction of the coating components causes the trapped air to expand and “blow out” through the coating, leading to a pinhole.

With Primer

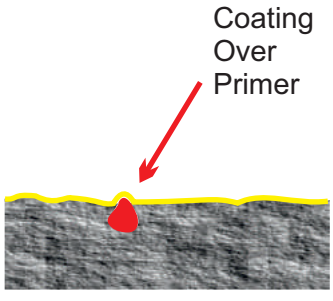
Primer



Small amount of primer enters the bughole and settles at the bottom.



It reacts with water in concrete and produces a tough Polyurethane Foam. The foam expands and fills up the bughole. The foam may protrude outside like a bump.



The coating now simply covers primer foam plug without producing a pinhole !!

COMPARATIVE OF DRYTHANE BLACK 1.2 WITH 1 COMPONENT POLYURETHANE WATERPROOFING

PROPERTY	DRYTHANE	1 COMPONENT PU	REMARKS
PRODUCT TYPE	Two Component, Chemical Cure (Resin & Activator)	Single Component, Moisture Cured Polyurethane	Single component moisture cured Polyurethane coatings have many problems related to curing/ spoiling of coating in the can (see below).
STANDARD	**ASTM D16, Type V**	**ASTM D16, Type II**	Separate product type with very different properties!
THICKNESS	1,200 Microns in 2 coats.	1,200 Microns in 2 coats.	Comparative with same thickness.
SOLVENT & COVERAGE	Zero Solvent (100% Solids) DFT = WFT 1.00 Sq.M @ 1.20 mm = 1.20 Litre	~ 50% Solvent DFT = ½ X WFT 1.00 Sq.M @ 1.20 mm = 2.40 Litre	You need to buy twice the materials in 1 K PU to get the same thickness as 2K PU !!
TOXICITY	Very Low. Can be used to line water storage tanks!!	High. Contains Tar.	Tar is cancer causing material.
FIRE HAZARD	None. Flash Point > 200 C	High. Contains Solvent. Flash Point 60 C.	1K PU is a fire hazard.
STORAGE STABILITY	Very High.	Poor.	There is no reaction in the 2K system in individual cans. The 1K PU has already been pre-reacted about 90% so has poor shelf life with gelling in container.
HUMIDITY AND TEMPERATURE DEPENDENCE	None. Will react mutually at all levels of humidity and temperature without film defects.	High. Will skin (surface cure) and blister in high humidity and temperature.	Reproduced from 1 K PU Datasheet – "surface to be dry for application as the material is cured in presence of moisture. Moisture level shall not be essentially more than 0.5%. Avoid application on very hot substrate & during very hot and windy conditions. Film formation may not be uniform and gradual under such circumstances & skinning on top surface may lead to formation of blisters and bubbles due to entrapped vapour from within the material.
DRYING TIME	1.50 Hour	10-12 Hours	Drythane allows fast project completion – in summers or winters.
PRIMER	Recommended to seal surface. PIV Damp Tolerant Solvent Free Primer is used.	Recommended to seal surface.	For concrete, primer is always recommended to seal and strengthen the surface. It also prevents outgassing from concrete in hot weather.
PROPERTIES *(Tested at respective system thickness)*			
Adhesion ASTM D 4541	> Tensile of Concrete (>2 MPa)	~ 0.50 MPa (70 Psi)	Concrete substrate will break in Drythane pull off adhesion tests.
Tensile Strength ASTM D 638	~ 20 MPa (2,900 Psi)	~ 2 MPa (290 Psi)	Drythane is extremely tough film. 1K PU easily damaged.
Hardness ASTM D – 2240	~ 65 Shore D	~ 10 Shore D	Drythane is hard yet flexible. 1K PU easily damaged.
Elongation ASTM D 638	~ 100%	~ 500%	Both elastic and will span cracks but 1K PU overtly soft and rubbery.
Abrasion Resistance ASTM D 4060	Weight Loss Typical 100 mgs	Not Reported	1 K is damaged easily. Drythane extremely tough.
Water Vapor Transmission ASTM E – 96	~ 2 gms / sq.m / 24 hour	~ 20 gms / sq.m / 24 hour	1K PU will allow large amounts of water vapour to pass through.
Water Absorption ASTM D 570	~ 0.50% (saturation Weight Gain)	Not Reported	Drythane can be used for permanent immersion in water (pools, tanks, fountains etc) but 1 K PU cannot be used.

12 Year Limited Warranty For DRYTHANE® Black

Amchem's Drythane coatings are manufactured to the highest standards to provide reliable protection. Drythane materials are guaranteed to be free from manufacturing defects and when applied by Amchem's crew from defects in workmanship, and the coated surface is warranted against cracking, peeling, chipping, blistering and degrading from the date of original installation and extending to a period not to exceed 12 years (Twelve years) under normal weather and atmospheric conditions.

Acts and/or omissions that will void the subject warranty include:

- Damage to the product by user. Damage caused by sharp tools, cutting, abrasion, solvents, heat > 70C, are all excluded from this warranty. Any alteration to the product itself by the property owner, or any third party with or without consent will cause the warranty to be void. This includes but is not limited to any on-site cutting or welding, damage due to improper use or design, abuse or misuse, vandalism and acts of God.
- Cracking (other than small shrinkage cracks) or other concrete failure.
- Ingress of water through the negative side (from below the Drythane Coated Concrete).
- Plumbing leakage causing ingress from the negative side (from below the Drythane Coated Concrete).

If you believe the installed Drythane has exhibited failure under the conditions of this warranty, provide written notification to Amchem specifying the nature of the defect within sixty days of any occurrence of damage. Notification of defect must be accompanied by proof of purchase, a copy of all maintenance records, and photographs of the damage and current site conditions. Amchem reserves the right to inspect and test the coating to determine the validity of the claim. Amchem reserves the right to deny any claim based on lack of evidence of claimed damage and/or cause of claimed damage.

If any portion of the Drythane is found to be defective due to reasons of product quality and improper application by Amchem, we will replace the defective portion free of cost. For roof lawns, this shall include the locational removal and replacement of grass, non-woven fabric, drain board etc.

The above constitutes the complete warranty by Amchem. Except as provided herein, Amchem makes no warranty or guarantee, express or implied, including without limitation, WARRANTIES OF FITNESS AND MERCHANTABILITY. Amchem neither assumes nor authorizes any other person or agent to assume any other liability in connection with the Drythane products. In no event shall Amchem be liable for consequential, special, or incidental damages arising out of or connected with the purchase or use of this product. This warranty shall be subject to and shall be enforced and construed according to the laws of India.

For Amchem Products Pvt. Ltd.

Shomendra Mann
Director
8th September 2018

AMCHEM
PRODUCTS PVT. LTD
A-79, Sector 58, NOIDA 201301, INDIA
Tel 91-120-2580121,Fax 0120-2581351
E Mail : info@amchemproducts.com

ಸಿಎಸ್ಐಆರ್–ಕೇಂದ್ರೀಯ ಆಹಾರ ತಾಂತ್ರಿಕ ಸಂಶೋಧನಾಲಯ, ಮೈಸೂರು – ೫೭೦ ೦೨೦, ಭಾರತ
सीएसआईआर – केंद्रीय खाद्य प्रौद्योगिक अनुसंधान संस्थान, मैसूरु ५७० ०२०,भारत
CSIR - Central Food Technological Research Institute, Mysuru 570 020, India

एफएसएक्यूसीएल/एटीएसएफ05/सीएससी 007/2019 FSAQCL/ATSF 05/CSC 007/2019

03.05.2019

डॉ। आलोक कुमार श्रीवास्तव
मुख्य वैज्ञानिक और ग्राहक सेवा सेल के प्रभारी
प्रधान, एफएस और एक्यूसीएल
Dr. Alok Kumar Srivastava
Chief Scientist & Incharge of Customer Service Cell
Head, FS & AQCL

SPEED POST

M/s. Amchem Products Pvt. Ltd.,
A-79, Sector 58, Noida 201301, India
Phone: 91-11-84580121

महोदय/Sir,

विषय: टेस्ट रिपोर्ट - संबंधित/Sub: Test Report for PU Coating- Drythane- reg

संदर्भ: आपका पत्र दिनांकित 17.01.2019/Ref: Your letter dated: 17.01.2019

हमने आपके पत्र में आपके द्वारा मांगी उपरोक्त नमूने का विश्लेषण किया है। विश्लेषण के परिणाम संलग्न परीक्षण रिपोर्ट में दिए गए हैं।

We have carried out the analysis of the above sample as sought by you in your letter. The results of the analysis are given in the enclosed Test Report.

आपका भुगतान का आधिकारिक रेसीट आपको शीघ्र ही भेजा जाएगा |
Official Receipt of the payment will be send you soon.

हम आपको हमारी सेवाओं का लाभ उठाने के लिए धन्यवाद देते है और भविष्य में भी विश्लेषण सम्बन्धी आवश्यकताओं ध्यान देने का आश्वासन देते हैं।

We thank you for availing our services and assure you of our best attention in future as well.

आपका आभारी, / Yours faithfully,

(आलोक कुमार श्रीवास्तव /Alok Kumar Srivastava)

Phone : 0821-2514972

ई–मेल : E-mail : csc@cftri.res.in

सी एस आई आर – केन्द्रीय खाद्य प्रौद्योगिक अनुसंधान संस्थान, मैसूर – 570 020

CSIR-Central Food Technological Research Institute
Mysore - 570 020, INDIA

CFTRI CUSTOMER SERVICE CELL

CSC0007-2019

TEST REPORT

ULR	T	C	5	2	5	3	1	9	0	0	0	0	0	0	0	7	F

0	3	0	5	1	9

Name & Address of the Customer	:	**M/s. Amchem Products Pvt. Ltd., A 79, Sector 58, Nodia 201307, India.**	Certificate No. TC 5253
Request Reference	:	Your letter dated on: 17.01.2019	
Name of the Product/Sample@	:	**PU Coating - Drythane**	
Sample Receipt Date	:	01.04.2019	**Page 1 of 1**

SAMPLE NOT DRAWN BY US

Test Parameter	Simulant (Temp/ Time)	Amount of Extractives mg/in^2	Limits as per USFDA – 175.300 mg/in^2	Test Method
Global Migration Test	Distilled Water (49°C/24 hrs.)	0.01	1.8 mg/in^2 for single use 18 mg/in^2 for repeated use	USFDA – 175.300 1st April 2018

SV : SA = 1 : 1

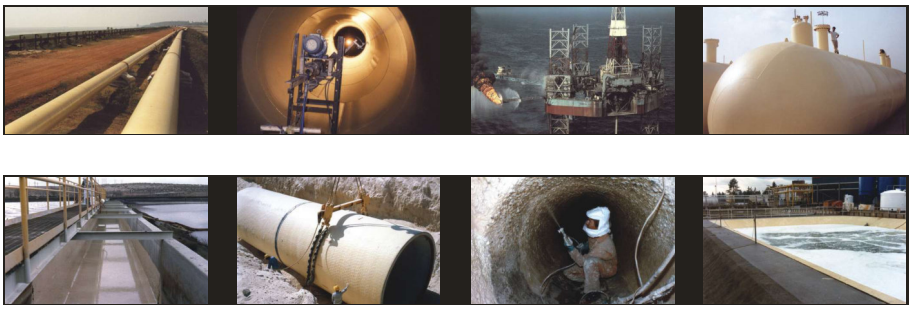
Conclusion: The values are within the limits specified as per USFDA 175.300, 1st April 2018, for intended use for contact with aqueous foods/water for repeated use at room temperature filling and storing.

@Information as given by the customer.

Please Note: The results contained in this Test Report relate only to the sample tested. This Report is intended only for your guidance and not valid for legal purposes or for advertisement.

HEAD
Food Safety & Analytical Quality Control Laboratory
CFTRI, MYSORE

BRIEF COMPANY PROFILE
AMCHEM PRODUCTS PVT. LTD



Activity

- Manufacturer of Purethane®, 100% Solids Polyurethane Coatings.
- Application of Purethane® at project sites in Power, Oil & Gas, Water & Wastewater sectors.
- Date of Commencement of Business: 17-05-1993

Technology

- Initial technology for Purethane® 386/9000 acquired from Exportech Inc., USA in 1993 on outright sale basis. Purethane® 386/9000 is the **original, proven**, 100% Solids Polyurethane Coating with the **longest and most extensive track record**. Several million square meters of steel and concrete substrates have been coated for leading international companies including fortune 500 companies such as Exxon Corp., Mobil, Tektronix, as well as U.S Govt. agencies such as United States Navy, U.S Coast Guard, City of Los Angeles etc.

- Subsequently conducted extensive research and developed state of the art products such as Purethane® AR Primer, Purethane® PLX, Purethane® NXT, Purethane® FLX and Drythane®.

Promoters

Names of Directors	Designation	Age	Experience	Educational Qualifications
Harbhajan Singh Mann	Managing Director	83.9	53 Years	P.Sc. Staff College Wellington
Raj Mann	Director	55.1	34 Years	B.Com. (Hons.), Delhi Univ., Bhagat Singh College
Deepender Mann	Director	53.3	33 Years	B.Sc. (Hons.) Chemistry, Delhi Univ., Ramjas College
Shomendra Mann	Director	51.8	33 Years	B.Sc. (Hons.) Chemistry, Delhi Univ., St. Stephens College

Locations

Office & Plant(s) with Capacities	Address
Head Office & Plant 1	A 79 Sector 58, NOIDA 201307 *2.0 Million Litres / Annum*
Plant 2 (Under Construction)	98, Ecotech XII, Greater NOIDA 201306 *6.4 Million Litres / Annum*
Application Services	All over India using mobile crews

Manufacture

- Manufacturer of Purethane® - 100% Solids Polyurethane, Polyurea & Hybrid Coatings with the longest and most extensive track record in North America, Japan, Korea & the Middle East.
- ISO 9001 certified manufacturing plant in NOIDA, India. Over **50,00,000** (Up to May 2019) Litres of Purethane® materials supplied for **projects in India and overseas** to customers like NTPC, BPCL, IOCL, HPCL, Singapore PUB etc.
- **Internationally reputed manufacturer**. Major accomplishments include material supply for lining approx. 84 Kms Large Dia (Mostly 2.2 m) Dia **Potable Water Pipe in Singapore**. More than **7,47,060 Litres** Purethane® have been supplied till date. Vendor selection made after due scrutiny of credentials by **CH2M Hill, USA**, the leading international engineering company.

Services

- ISO 9001 certified turnkey application of Purethane® products for select projects – **single point responsibility** source for high performance coating.
- Network of **skilled licensed applicators** trained and equipped by Amchem.
- Comprehensive surface preparation and coating **application know how** exceeding NACE / SSPC standards. Large inventory of specialized application equipment. (Annexure 1). Over 150 highly skilled personnel for specialized surface preparation and coating application.
- Extensive use of high output **automated** blast cleaning and coating application equipment for pipeline external and internal coating. Developed in house.
- **Provided skilled applicators and technicians** for application of Purethane® coating on 84 Kms Large Dia (Mostly 2.2 m) Potable Water Pipes. Work carried out in **Singapore, Malaysia and Indonesia**.
- **Total completed and ongoing projects by Amchem and Licensed Applicators total 3.08 Crore (30.80 Million) Sq. Feet of coating.**

Pioneer & Market Leader

The entire market for 100% Solids Polyurethane Coatings in India has been developed single handedly by Amchem. We have technically educated customers, done trials, first off projects and won the trust by performing on the ground, year after year. Projects inspected after 15 years of service have shown the quality of our goods and services.

- **First Seawater Cooling Tower** in India coated for NTPC at Simadhri. Today Purethane® Coatings are the industry standard with over 51,70,000 Sq. Ft application in Cooling Towers.

- **First Power Plant Cooling Pipeline** in India. Today Purethane® Coatings are the industry standard with over 20,00,000 Sq. Ft application in, Cooling Water Pipes, Make Up Water Pipes.

- **First Oil & Gas Mounded Bullet in** India. Today Purethane® Coatings are the industry standard with over 65 projects done.

- **First Cross Country Pipeline Rehabilitation** in India. Today Purethane® Coatings are the industry standard with over 132 Kms projects done and 124 Kms ongoing.

- **First New Cross Country Pipeline** coated at site for M/s Bharat Petroleum Corp. Ltd., Haldia in 2001. This has an impeccable 15 year track record.

- **First Sewage Treatment Plant** coated for M/s UP Jal Nigam at Pilkhuwa, Meerut Road

- **First Cross Country Irrigation Water Pipeline** done for Jindal Saw/ MEIL/ Karnataka Minor Irrigation Department where 120 Kms of upto 2.4m Dia Pipeline have been coated. This path breaking project is setting up an example for other water/ irrigation departments across the country.

- **First Ductile Iron Pipe Lining as per EN 15655 with Electrosteel Casting Ltd** Amchem running full facility for internal Polyurethane lining of Ductile Iron Pipes.

Amchem has to its credit, the world's largest Polyurethane Coating projects i.e. Singapore NEWater Pipeline (2.2m Dia X 86 Kms) and Karnataka KOLAR project (2.4m Dia X 120 kms).

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Equipment For Application and Testing

S.No.	Particulars	Quantity	Units
	Surface Preparation Equipment		
1	Portable Diesel Driven Air Compressor Screw Type ; **450 cfm @ 150 Psi** (Ingersoll Rand)	7	No's
2	Blast Cleaning Pots - 500 Kgs. (MEC)	6	No's
3	Bulk Blasting Pot – **10 MT**, Multiple Nozzle (Amchem, with Schmidt USA Valves & Controls).	1	No's
4	Bulk Blasting Pot – **5 MT**, Multiple Nozzle (Amchem, with Schmidt USA Valves & Controls).	7	No's
5	Pipe Rotator (Set) With AC Drive Controls	1	Set
6	Linear Travel Cart With AC Drive Controls	1	Set
7	Internal Automated Blast Cleaning Rig With AC	12	Set
	Coating Equipment		
1	Plural Component Airless Spray Equipment Complete With Accessories : Make Graco Inc., USA. System to comprise 5:1 Feed Pumps (2 Nos), 56:1 Proportioner (1No's), 23:1 Purge Pump (1Nos) Mixer Manifold, Static Mixer, Spray Guns, Hoses etc. Full set of spares are carried.	11	Sets
2	Single Component Airless Spray Equipment	1	Set
3	Priming Guns	12	Sets
4	Pipe Rotator (Set) With AC Drive Controls	1	Set
5	Linear Travel Cart With AC Drive Controls	1	Set
6	Internal Automated Coating Rig With AC Controls	12	Set
7	Air Compressor 125 cfm (ELGI)	1	No's
8	Air Compressor 300 cfm (Atlas Copco)	1	No's
	Test Equipment		
1	Raytek Infra Red Non Contact Surface Thermometer	7	No's
2	Surface Profile Gauge - 2 Microns (Elcometer / Baker)	7	No's
3	Digital Psychrometer Testo	7	No's
4	Wet Film Gauge : 0 - 80 mils (Nordson)	1	No's
5	Magnetic Mil Gauge : 0 - 80 mils (Positest)	5	No's
	Digital Magnetic Ml Gauge : 0 – 200 Mils (Electrophysik)	2	No's
6	Durometer : 0 - 100 D (Shore Instruments)	7	No's
7	Tinker Rasor High Voltage Holiday Detector :6-16 KV	1	No's
	SUB High Voltage Holiday Detector : 2-10 KV	7	No's
8	Positest AT-CM Hydraulic Portable Adhesion Tester	6	No's
	Elcometer F 106 Portable Adhesion Tester	1	No's
9	Press O Film Profile Gauge	1	No's
	High Reach / Access Equipment		
1	JLG (USA) 40 RTS Rough Terrain Scissor Lift	2	No's
2	JLG (USA) AM 24 Manlift	1	No's
3	JLG (USA) 600 AJ Articulating Boom	2	No's

COMPLETED AND ONGOING PROJECTS

Date 27-06-2019

BY AMCHEM CREWS

S.No	Client	Year	Works	Area – Sq.Ft
	Completed			
	Pipeline - External & Internal			
1	Jindal SAW Ltd / BHEL / Maitree Power Bangladesh	2019	Internal Lining Of 1.2 – 3.3m Dia Seawater Transmission	2,12,100
2	Electrosteel Casting Ltd	2019	Ductile Iron Pipe For Export (Internal)	11,63,425
3	IOCL / Shri Maruti Infratech Pvt. Ltd	2019	IOCL district hoogly	16,527.36
4	IOCL / Narain & Co.	2019	BKPL Allahabad site	6,240.80
5	IOCL / Narain & Co.	2019	IOCL HMRBM Project site	50,399.84
6	PHED Rajasthan/ L&T/ Jindal SAW Ltd	2019	Water Pipeline 0.70m Dia, External, Snap set	13,65,000
7	PHED Rajasthan/ L&T	2019	Water Pipeline 0.70m Dia, Weld Joints	35,000
8	IOCL / Shakti Engineers PWRJT16012 C&E	2018	Rehab. of Cross Country Pipeline Gauridad/Abu Road	3,37,685
9	IOCL / Jay Gauri PWRJT 16044	2018	Rehab. of Cross Country Pipeline BKPL Barauni	20,613
10	IOCL / Ram Baran Singh ERPL/CONT/2016-17/04 F	2018	Rehab. of Cross Country Pipeline BKPL Barauni	51,533
11	IOCL / Narain & Co. PWRJT16012 I	2018	Rehab. of Cross Country Pipeline Chaksu	1,85,507
12	IOCL / Shri Maruti Infratech Pvt. Ltd PWRJT16065 Gr.I / 24"	2018	Rehab. of Cross Country Pipeline	1,75,453
13	IOCL / Sen Brothers	2018	Rehab. of Cross Country Pipeline ERPL	86,200
14	IOCL / Jay Gauri Projects Pvt. Ltd PWRJT16012 J	2017	Rehab. of Cross Country Pipeline Dausa	1,01,559
15	IOCL / Shri Maruti Infratech Pvt. Ltd PWRJT16012 Gr.D/ 28"	2017	Rehab. of Cross Country Pipeline Surendranagr	85,077
16	IOCL / Shri Maruti Infratech Pvt. Ltd / MJPL 16"	2016	Rehab. of Cross Country Pipeline Sohna	1,37,417
17	IOCL / Jay Gauri Projects Pvt. Ltd	2016	Rehab. of Cross Country Pipeline Devli Ula	72,140
18	IOCL / Narain & Co.	2016	Rehab. of Cross Country Pipeline Abu Road	1,92,720
19	IOCL / Shakti Engineers	2016	Rehab. of Cross Country Pipeline Gauridad	1,44,283
20	IOCL / Jay Gauri Projects Pvt. Ltd	2016	Rehab. of Cross Country Pipeline Surendra Ngr	2,13,779
21	IOCL / Advance Infrastructure Ltd	2016	Rehab. of Cross Country Pipeline Ramsar	1,06,185
22	IOCL / Ideal Enterprises	2014	28" X 9.80 Km Cross Country Pipeline	2,35,600
23	APGENCO Krishnapatnam / Megha Engineering (MEIL)	2014	Joints-12.71 Km of Of 1.8-2.2m Dia Seawater Pipe	25,000
24	APGENCO Krishnapatnam / Tata Projects Ltd	2014	3.7 m Dia to 0.9 m Dia Seawater Pipelines (2mm)	3,00,000
25	APGENCO Krishnapatnam / Megha Engineering (MEIL)	2013	12.71 Km of Of 1.8 and 2.2m Dia Seawater Pipeline (Mill Coating at MEIL) (2mm)	7,35,000
26	NTECL / IVRCL Infrastructures & Projects Ltd	2014	2.2 to 3.2 m Dia Seawater Pipelines (2mm thickness)	4,85,000
27	NTCEL / Gammon India Ltd	2012	2.2 m Dia Seawater Pipelines (2mm thickness)	54,000
28	NTPC Simadhri / Kirloskar Brothers Ltd	2012	3.2 m Dia Seawater Pipelines (2mm thickness)	2,90,477
29	NTPC Simadhri / ERA Infra Engg.	2012	2.2 m Dia Pipe Lining (2mm thickness)	60,000
30	Singapore PUB / Kwong Lee	2008	2.2 m Dia NEWater Pipeline & Other Projects. Materials	53,20,000
31	BPCL / Durgapur Equipments	2006	8" & 10" Dia API 5 L Grade Buried Pipe	20,481
32	BPCL / Expo Gas Containers	2003	16" Dia API 5 L Grade Buried Pipe	29,239
33	BPCL / Expo Gas Containers	2001	5 Km of 24" & 16" Buried Petroleum Pipeline (Haldia Jetty	87,349
34	Indian Oil Corporation NOIDA	2001	Re-habilitation of Buried Crude Pipeline At Vadinar &	4,812
35	Cherrington Asia (India) Pvt. Ltd New Delhi	2000	Internal Lining Of Steel Pipes For Sewage Line , 48" Dia	4,462
36	Gas Authority of India NOIDA	1999	Steel Pipeline Cathodic Protection Simulator	1,000
37	FAB GmbH Germany	1997	40" Dia HDD Gas Steel Pipeline For Gazprom, Russia	28,793
	Mounded Bullets			
1	BPCL / G.R Engg., Kochi Refinery	2010	Mounded LPG Bullets	72,000
2	HPCL – MITTAL ENERGY / GGSR / Fabtech Projects	2010	Mounded LPG Bullets	2,43,000
3	IOCL Illyangudi / Fabtech Works	2009	Mounded LPG Bullets	12,800
4	BHARAT OMAN / G.R Engg., Bina Refinery	2009	Mounded LPG Bullets	1,30,000
5	HPCL / Fabtech Engineers, Vizag Refinery	2009	Mounded LPG Bullets	1,25,372
6	BPCL / Fabtech Engineers, Fatuha	2008	Mounded LPG Bullets	20,344
7	HPCL / Fabtech Engineers, Rajamundhry	2007	Mounded LPG Bullets	17,337
8	IOCL / G.R Engg., Mathura Refinery	2007	Mounded LPG Bullets	63,319
9	MRPL / Fabtech Engineers, Mangalore	2007	Mounded LPG Bullets	59,724
10	HPCL / Fabtech Engineers, Kondapalli	2007	Mounded LPG Bullets	18,263
11	HPCL / Fabtech Engineers, Hoshiarpur	2007	Mounded LPG Bullets	18,304
12	IOCL / Fabtech Engineers, Gujarat Refinery	2006	Mounded LPG Bullets	83,700
13	IOCL / Fabtech Works, Pondicherry	2006	Mounded LPG Bullets	10,520
14	HPCL / Fabtech Engineers, Unnao	2006	Mounded LPG Bullets	16,275
15	IOCL / G.R Engg., Kondapalli	2006	Mounded LPG Bullets	18,152
16	HPCL / Fabtech Engineers / Patna	2005	Mounded LPG Bullets	16,882
17	BPCL / Fabtech Engineers / Cherlapalli	2005	Mounded LPG Bullets	25,964
18	Deepak Fert. / Taloja	2005	Mounded LPG Bullets	39,945
19	HPCL / Fabtech Engineers, Mahul	2005	Mounded LPG Bullets	13,561
20	BPCL / Fabtech Engineers, Rajkot	2005	Mounded LPG Bullets	8,089
21	BPCL / G.R Engg. , Vijaywada	2004	Mounded LPG Bullets	13,389
22	BPCL / G.R Engg. , Solur	2004	Mounded LPG Bullets	20,149
23	BPCL / Fabtech Engineers, Pune	2004	Mounded LPG Bullets	20,150
24	IOCL / N.R Patel & Co, Shimoga	2003	Mounded LPG Bullets	30,451
25	HPCL / Fabtech Engg., Pampore	2003	Mounded LPG Bullets	39,517
26	IOCL / Fabtech Engg., Quilon	2003	Mounded LPG Bullets	18,213
27	IOCL / Sharp Tanks, Coimbatore	2003	Mounded LPG Bullets	18,083
28	IOCL / Sharp Tanks, Una	2003	Mounded LPG Bullets	17,811
29	IOCL / G.R Engg., Chengelpet	2003	Mounded LPG Bullets	30,247
	Concrete Cooling Towers			
1	DVC/ Reliance Industries	2015	2 X 500 MW Cooling Tower (2mm thickness)	15,45,250
2	APGENCO Krishnapatnam / Tata Projects Ltd	2014	500 MW Cooling Towers (2mm thickness) (NDCT-1 Part, NDCT Full)	8,93,000
3	NTPC Jhajjar / Gammon India Ltd	2012	3 X 500 MW Cooling Tower (2mm thickness)	20,08,200
4	NTPC / NBCC	2002	Simadhri 2 X 500 MW TPP Seawater NDCT plus 2.4 & 3.2	6,42,868

				m Dia Steel Pipe.	
	Others				
1	Larsen & Toubro Ltd / UP Jal Nigam Ltd		2017	Lining Sewage Treatment Plant - Rampur	37,116
2	UP Jal Nigam Ltd		2015	Lining Sewage Treatment Plant - Pilkhua	33,275
3	M. W New Delhi		1998	Concrete Waterproofing For Roof Garden	1,300
4	T&A Erectors Pvt. Ltd NOIDA		1998	Concrete Raft Under Building SAB Shopping Mall (NOIDA)	11,000
5	Oriole Design New Delhi		1997	MDF Board Wooden Flooring For Godrej Centenary	12,457
6	Vivid Developers Pvt. Ltd New Delhi		1996	Concrete Rooftop	2,700
				TOTAL COMPLETED	**1,88,48,784**
	Ongoing				
1	Narain & Co		2019	BKPL 12.75" Dia X 16.89 Km Pipeline Rehabilitation	1,85,000
2	Narain & Co		2019	HMRMB 12.00" Dia X 16.98 Km Pipeline Rehabilitation	98,400
3	Shri Maruti Infratech (P) Ltd		2019	HMRMB 12.00" Dia X 3.25 Km Pipeline Rehabilitation	33,500
				TOTAL Ongoing	**3,16,900**
				GRAND TOTAL	**1,91,65,684**

BY LICENSED APPLICATORS

	Completed				
	Pipeline - External & Internal				
	Site	**Applicator / User**			
1	Tuticorin Power Project	Megha Engineering Ltd	2018	Seawater Pipeline For Thermal Power Project	7,07,400
2	Karnataka Minor Irrigation	Jindal SAW Ltd	2018	Upto 2.4 m dia X 120 Km KOLAR Wastewater Pipeline	31,16,634
3	Karnataka Minor Irrigation	Megha Engineering Ltd	2018	Upto 2.4 m dia X 120 Km KOLAR Wastewater Pipeline	20,05,126
4	IOCL ERPL	Sen Brothers	2018	Rehab. of Cross Country Pipeline ERPL	1,56,400
5	IOCL PWRJT 15056	Jay Gauri Projects Pvt. Ltd	2018	Pipeline Rehabilitation	93,781
6	IOCL PWRJT16012 Grp. G	Jay Gauri Projects Pvt. Ltd	2018	Pipeline Rehabilitation	1,38,719
7	IOCL ERPL/16-17/04 Grp. G	Jay Gauri Projects Pvt. Ltd	2018	Pipeline Rehabilitation	2,59,719
8	IOCL PWRJT 16044	Jay Gauri Projects Pvt. Ltd	2018	Pipeline Rehabilitation	1,23,668
9	IOCL PWRJT 16065 Grp. A	Jay Gauri Projects Pvt. Ltd	2018	Pipeline Rehabilitation	1,68,326
10	IOCL PWRJT 16065 Grp. B	Jay Gauri Projects Pvt. Ltd	2018	Pipeline Rehabilitation	1,68,326
11	IOCL PWRJT 16065 Grp. D	Jay Gauri Projects Pvt. Ltd	2018	Pipeline Rehabilitation	1,92,382
12	IOCL PWRJT 16065 Grp. J	Jay Gauri Projects Pvt. Ltd	2018	Pipeline Rehabilitation	1,67,573
13	IOCL Group A	Jay Gauri Projects Pvt. Ltd	2015	Pipeline Rehabilitation	2,58,700
14	IOCL Beawer	Jay Gauri Projects Pvt. Ltd	2015	Pipeline Rehabilitation	10,000
15	IOCL Ahmedabad	Jay Gauri Projects Pvt. Ltd	2015	Pipeline Rehabilitation	10,000
16	IOCL Rajkot	Ideal Enterprises	2014	Pipeline Rehabilitation	1,04,500
17	IOCL Chaksu	Jay Gauri Projects Pvt. Ltd	2014	Pipeline Rehabilitation	39,800
18	Hamon Sriram Cottrel	Pro Shield Engineers	2014	Seawater Pipe Lining	5,800
19	Simapuri Energy	Pro Shield Engineers	2014	Seawater Pipe Lining	1,23,720
20	IOCL Vadinar	Maa Bhawani	2013	Pipeline Rehabilitation	24,900
21	IOCL SMPL	Jay Gauri Projects	2012	18" X 10 Km Cross Country Pipeline	1,54,500
22	IOCL Vadodara	Shree Ambha Associates	2012	8.6" X 12 Km Cross Country Pipeline	88,900
23	NTECL Vallur - Technofab	Pro Shield Engineers	2012	Seawater Pipe Lining	45,185
24	NTECL Vallur-Gammon	Pro Shield Engineers	2012	Seawater Pipe Lining	1,12,960
25	JSW Ratnagiri	Pro Shield Engineers	2011	Seawater Concrete Duct	1,18,342
26	IOCL SMPL	Jay Gauri Projects	2009	24"X 7.5 Km Cross Country Pipeline	1,54,500
27	IOCL SMPL	Shree Ambha Associates	2009	24"X 7.5 Km Cross Country Pipeline	1,54,500
	Mounded Bullets				
					Updated till 27-june-2019
1	HPCL Champaran (Bihar)	Maximum Coating Solutions	2019	Mounded LPG Bullets	5,553.54
2	IOCL Trisundi	Fab-Tech Works & Constr. Pvt. Ltd	2019	Mounded LPG Bullets	1,909.03
3	HPCL Yediyur	Fab-Tech Works & Constr. Pvt. Ltd	2019	Mounded LPG Bullets	27,767.74
4	IOCL Maneri	Spar Engineering and Infrastructure	2019	Mounded LPG Bullets	2,776.77
5	IOCL Korba	Sharp Tanks & Structurals (P) Ltd	2019	Mounded LPG Bullets	52,758.71
6	BPCL Hazira	Fabtech Works & Constructions	2019	Mounded LPG Bullets	14,578.06
7	IOCL Raninagar	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	8,330.32
8	IOCL Bongaigaon	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	38,874.83
9	IOCL Erode	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	16,660.65
10	IOCL Trisundi	Fabtech Works & Constructions	2019	Mounded LPG Bullets	1,041.29
11	IOCL Gauridad	Jay Gauri Projects Pvt. Ltd	2019	Mounded LPG Bullets	22,214.19
12	HPCL Champaran	Maximum Coating Solution	2019	Mounded LPG Bullets	11,107.09
13	Bathinda	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	24,990.96
14	IOCL Maneri	Spar Engineering	2019	Mounded LPG Bullets	8,330.32
15	BPCL Khurda	Fabtech Projects & Engineers Ltd.	2019	Mounded LPG Bullets	8,330.32
16	IOCL Paradeep	Fabtech Works & Constructions	2019	Mounded LPG Bullets	74,972.90
17	BPCL Baitalpur	Fabtech Projects & Engineers Ltd.	2019	Mounded LPG Bullets	2,776.77
18	IOCL Gauridad	Jay Gauri Projects Pvt. Ltd	2019	Mounded LPG Bullets	5,553.54
19	IOCL Bhitargarh	Sharp Tanks & Structurals Ltd	2019	Mounded LPG Bullets	52,758.70
20	IOCL Nagpur	Anwesha	2019	Mounded LPG Bullets	30,544.51
21`	IOCL Gwalior	Sharp Tanks & Structurals Ltd	2019	Mounded LPG Bullets	16,660.65
22	SAIL Burdwan	Sonal Fabricators	2019	Mounded LPG Bullets	6,941.93
23	IOCL Goindwal	Sharp Tanks & Structurals Ltd	2019	Mounded LPG Bullets	1,388.38
24	BPCL Durgapur	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	8,330.32

25	IOCL Pondicherry	KOSAN SFPL	2019	Mounded LPG Bullets	12,700.00
26	IOCL Maneri	Spar Engineering	2019	Mounded LPG Bullets	12,700.00
27	SAIL Burdwan	Sonal Fabricators	2019	Mounded LPG Bullets	6,300.00
28	HPCL Bhojpur	Sonal Fabricators	2019	Mounded LPG Bullets	25,300.00
29	IOCL Gwalior	Sharp Tanks & Structurals Ltd	2019	Mounded LPG Bullets	17,300.00
30	IOCL Goindwal	Sharp Tanks & Structurals Ltd	2019	Mounded LPG Bullets	17,300.00
31	BPCL Bhopal	Sharp Tanks & Structurals Ltd	2019	Mounded LPG Bullets	12,200.00
32	IOCL Malanpur	Sharp Tanks & Structurals Ltd	2019	Mounded LPG Bullets	31,400
33	IOCL Bhitargarh	Sharp Tanks & Structurals Ltd	2019	Mounded LPG Bullets	48,100
34	IOCL Varanasi	Sharp Tanks & Structurals Ltd	2019	Mounded LPG Bullets	33,000
35	IOCL Korba	Fabtech Works & Constructions	2019	Mounded LPG Bullets	31,600
36	BPCL Solapur	Fabtech Works & Constructions	2019	Mounded LPG Bullets	250
37	BPCL Baitalpur	Fabtech Works & Constructions	2019	Mounded LPG Bullets	10,100
38	BPCL Solapur	Fabtech Works & Constructions	2019	Mounded LPG Bullets	17,300
39	IOCL Amethi	Fabtech Works & Constructions	2019	Mounded LPG Bullets	31,600
40	BPCL Patna	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	8,700
41	BPCL Deoria	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	11,500
42	IOCL Gorakhpur	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	24,400
43	BPCL Khurda	Fabtech Projects & Engineers Ltd.	2019	Mounded LPG Bullets	7,600
44	BPCL Burdwan	Fabtech Projects & Engineers Ltd.	2019	Mounded LPG Bullets	7,600
45	NRL Assam	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	42,000
46	Mombassa	Supreme Offshore	2019	Mounded LPG Bullets	40,200
47	IOCL Nagpur	Anwesha	2019	Mounded LPG Bullets	27,900
48	HPCL Karimanagar	Anwesha	2019	Mounded LPG Bullets	16,000
49	IOCL Salem	Anwesha	2019	Mounded LPG Bullets	63,200
50	BPCL Satara	Sharp Tanks & Structurals Ltd	2019	Mounded LPG Bullets	13,500
51	IOCL Kondapally	Sharp Tanks & Structurals Ltd	2019	Mounded LPG Bullets	34,500
52	BPCL Wai	Sharp Tanks & Structurals Ltd	2019	Mounded LPG Bullets	14,400
53	BPCL Jalgaon	Sharp Tanks & Structurals Ltd	2019	Mounded LPG Bullets	23,000
54	BPCL Raipur	Sharp Tanks & Structurals Ltd	2019	Mounded LPG Bullets	18,100
55	HPCL Mysore	Fabtech Works & Constructions	2019	Mounded LPG Bullets	29,000
56	BPCL Cherlapally	Fabtech Works & Constructions	2019	Mounded LPG Bullets	25,900
57	HPCL Metagalli	Fabtech Works & Constructions	2019	Mounded LPG Bullets	38,500
58	IOCL Guwahati	Fabtech Works & Constructions	2019	Mounded LPG Bullets	20,000
59	IOCL Gorakpur	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	34,500
60	BPCL Pune	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	17,300
61	IOCL Leh	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	23,000
62	BPCL Pallakad	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	54,545
63	HPCL Panagarh	Fabtech Works & Constructions	2019	Mounded LPG Bullets	26,573
64	IOCL Gurgaon	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	21,517
65	IOCL Leh	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	39,806
66	BPCL Lucknow	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	10,758
67	IOCL Cochin	IOT Anwesha	2019	Mounded LPG Bullets	50,134
68	CPCL Chennai	IOT Anwesha	2019	Mounded LPG Bullets	1,43,500
69	UPL	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	5,800
70	BPCL Kochi	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	1,50,000
71	Mombassa	Mahathi Enterprises	2019	Mounded LPG Bullets	35,400
72	IOCL Chelari	Fabtech Works & Constructions	2019	Mounded LPG Bullets	5,800
73	IOCL Guwahati	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	20,100
74	BPCL Rajkot	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	5,800
75	IOCL Tirunelveli	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	28,700
76	IOCL Paradeep	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	1,26,300
77	IOCL Bangalore	Pro Shield Engineers	2019	Mounded LPG Bullets	43,100
78	IOCL Coimbatore	Pro Shield Engineers	2019	Mounded LPG Bullets	13,000
79	IOCL Sekmai	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	20,100
80	IOCL Dimapur,Bishalgarh	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	20,100
81	IOCL Mysore	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	34,500
82	IOCL Raipur	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	23,000
83	HPCL Paharpur	Fabtech Works & Constructions	2019	Mounded LPG Bullets	24,900
84	IOCL Chelari	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	28,700
85	BPCL Jaipur	Jay Gauri Projects Pvt. Ltd	2019	Mounded LPG Bullets	20,200
86	BPCL Salempur	Jay Gauri Projects Pvt. Ltd	2019	Mounded LPG Bullets	10,100
87	IOCL Pune	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	27,600
88	IOCL Pampore	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	40,200
89	HPCL Nasik	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	17,300
90	BPCL Goa	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	5,400
91	HPCL Bhatinda	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	82,300
92	IOCL Muzzafarpur	Fabtech Works	2019	Mounded LPG Bullets	30,100
93	USTPL Hyderabad	Shree Ambha Associates	2019	Mounded LPG Bullets	9,600
94	HPCL Purnia	Shree Ambha Associates	2019	Mounded LPG Bullets	16,700
95	HPCL Raipur	Shree Ambha Associates	2019	Mounded LPG Bullets	23,900
96	BPCL Pithampur	Jay Gauri Projects Pvt. Ltd	2019	Mounded LPG Bullets	10,100
97	BPCL Nasik	Jay Gauri Projects Pvt. Ltd	2019	Mounded LPG Bullets	20,200
98	BPCL Lalru	Jay Gauri Projects Pvt. Ltd	2019	Mounded LPG Bullets	36,200
99	BPCL Dharwad	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	20,200
100	BPCL Bangalore	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	30,500
101	BPCL Chennai	Fabtech Projects & Engineers Ltd	2019	Mounded LPG Bullets	30,500
102	IOCL Illyangudi	Fabtech Works	2019	Mounded LPG Bullets	12,800
				TOTAL COMPLETED	**1,13,73,495**
	Ongoing				

2	IOCL / PWRJT16065 J	Jay Gauri Projects Pvt. Ltd	Ongoing	Pipeline Rehabilitation	1,44,300
3	IOCL / NRPL PNP 17132 A	Jay Gauri Projects Pvt. Ltd	Ongoing	Pipeline Rehabilitation	84,400
4	IOCL / NRPL PNP 17132 B	Jay Gauri Projects Pvt. Ltd	Ongoing	Pipeline Rehabilitation	1,00,000
				Total Ongoing	3,28,700
				GRAND TOTAL APPLICATORS	1,17,02,195
	COMBINED				
1				Completed	3,02,22,279
2				Ongoing	6,45,600
3				GRAND TOTAL	3,08,67,879

PURETHANE®

Amshield® Deck

DRYTHANE®

Leaders In 100% Solids
Polyurethane Coating Technology

Amchem Products Pvt. Ltd

- Manufacturer Of 100% Solids Polyurethane Coating
- Turnkey Application Service in India

Coating Manufacture

- Manufacturing since 1995
- Manufactured and sold > 5,000,000 Litres
- Two ISO 9001 Certified plants in India.
- 6.0 Million Litres/ Annum single shift basis.
- Meeting AWWA C222, EN 10290, EN 16189, EN15655, Singapore SS 375 etc.

BSi British Standards

ANSI American National Standards Institute

AWWA STANDARD

Application

- Turnkey application services in India since 1995
- Applied > 35,000,000 Sq. Ft in India & SEA.
- 150 Application crew on company rolls.
- Large inventory of application equipment.
- Customised equipment for automation developed “in house” for pipeline coating & lining.
- Application expertise available to customers.

World's Largest Projects For PU

- 2.2 X 84 Kms, Singapore NEWater Project.
- 2.4 X 120 Kms, Karnataka Minor Irrigation Department Water Project.
- Worlds first Seawater Cooling Tower. Coating of 5,200,000 Sq. Ft Concrete Cooling Towers
- Coating of > 300 Kms Cross Country Oil & Gas Pipeline (Rehabilitation)
- Coating of > 80 LPG Mounded Bullet Projects

Original Technology from USA

PURETHANE®

Technology for 386/ 9000 & application acquired from Zebron Corp., USA in 1996

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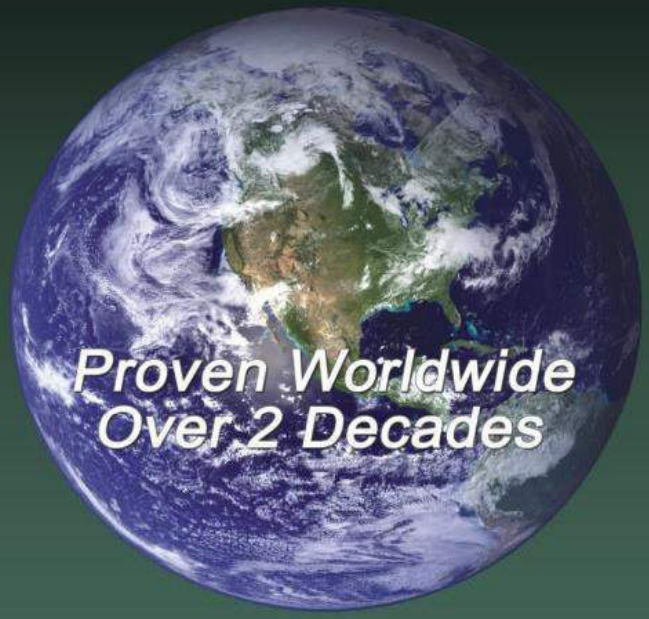
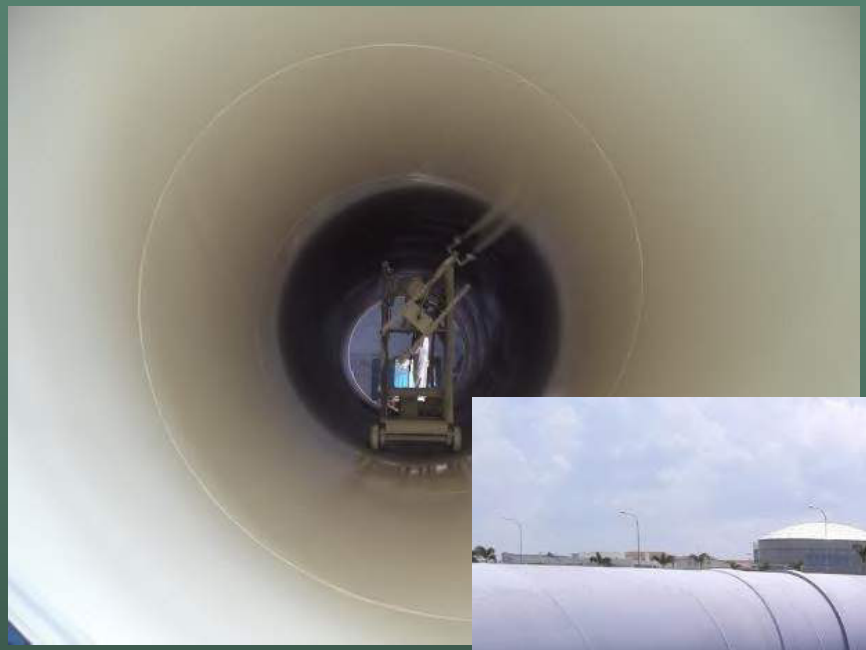


The *Original, Proven*

100% Solids
Polyurethane Coatings

TYPICAL PROJECT PHOTOS

TYPICAL PROJECT PHOTOS



TYPICAL PROJECT PHOTOS

TYPICAL PROJECT PHOTOS

Product Portfolio – Steel Surfaces

Designation	End Use	Certifications
NXT	100% Solids, Rigid, Polyurethane Internal Lining & External Coating for Mild Steel Pipes & Tanks and Ductile Iron Pipes. For Water, Wastewater, Seawater, Petroleum & Chemical Storage Service. Direct to Metal.	AWWA C 222 Carbon Steel Pipe EN 15189 – Ductile Iron External EN 15655 – Ductile Iron Internal
PLX	100% Solids, Rigid, Polyurethane Buried and Offshore Pipeline External Coating for Oil & Gas Industry. Direct to Metal.	EN 10290 – Oil & Gas Pipe External
386/ 9000	MULTIPURPOSE COATING WITH 35+ YEAR WORLDWIDE TRACK RECORD. For Steel & Concrete Primed, Elastomeric.	AWWA C 222 Carbon Steel Pipe
AR Primer	Tough, durable Primer for 386/9000	-

Product Portfolio – Concrete

Designation	End Use
FLX	Chemical Resistant, 100% Solids Polyurethane, Impermeable Barrier for Concrete In Immersion, Splash & Buried Service
PIV Primer	Penetrating, Sealing, Damp Tolerant Primer for FLX

DRYTHANE DIVISION

Solvent Free, Thick Film, Liquid Roller Applied, Polyurethane Waterproofing Membrane






DRYTHANE®

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Join hands for success in your market !

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To Whom It May Concern

This is to certify that the product tested by KTA-TATOR INC., USA vide KTA Project No.330380-1 is DRYTHANE®. The provisional trademark at the time of testing was PURETHANE® DECK.

For Amchem Products Pvt. Ltd.
Director

Shomendra Mann
15/05/2017

Results of Physical Testing of Purethane® DECK

KTA Project No. 330380-1

Presented to:

Mr. Shomendra Mann
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Chrissy M. Stewart
Chemist
September 12, 2013

CMS/CR:kdw
JN330380-1
CIN: 306156
(330380-1 Amchem.doc)

TABLE OF CONTENTS

INTRODUCTION

In accordance with KTA-Tator, Inc. (KTA) Proposal No. PN120637, subsequent signed Authorization to Proceed (ATP) dated April 12, 2013, and prepayment received on May 9, 2013, KTA has performed various physical tests on coated samples provided by Amchem Products Pvt. Ltd (Amchem) designated as Purethane® DECK coating. The results of the testing are contained in this report.

SAMPLES

The samples listed in Table 1, "Samples" were received from Amchem on May 1, 2013. It should be noted that at no time did KTA personnel witness the coating application or preparation of the samples.

Table 1 – Samples

KTA Sample ID	Sample Description
330380-T1D	Two steel panels measuring 4″ x 4″ with center hole coated with Purethane® DECK
330380-T2D	
330380-F1D	Two 22 gage panels coated one side with Purethane® DECK
330380-F2D	
330380-FF1D	Two free films measuring 8″ x 24″ coated with Purethane® DECK
330380-FF2D	
330380-IR2	One canister containing Purethane® DECK
330380-IR3	One canister containing Activator 9000

LABORATORY INVESTIGATION

The laboratory investigation consisted of performing various physical tests on a coating membrane, reportedly Purethane® DECK. The following tests were performed: water absorption, water vapor permeability, abrasion resistance, tensile strength and elongation, flexibility, hardness and chemical resistance. In addition to the physical tests, infrared spectra of the liquid materials labeled Purethane® DECK and Activator 9000 were obtained. The test descriptions and the results of the testing are provided below.

Water Absorption

The water absorption of the free film sample was measured in accordance with Procedure 7.4 (Long Term Immersion) of ASTM D 570-98, "Standard Test Method for Water Absorption of Plastics." Three bars measuring 3″ x 1″ were cut from the free film and the thickness of each bar was measured using Mitutoyo Digimatic Calipers. The samples were conditioned in an oven maintained at 50°F for 24 hours. After conditioning, the samples were returned to room temperature and weighed. The samples were then submerged in deionized water maintained at

laboratory conditions (approximately 70°F). The samples were removed from the water following 24 hours, one week and every two weeks thereafter. The samples were wiped dry of any excess water, weighed and immediately replaced in the water. A table containing detailed results as well as graphical interpretation of the data can be found in Appendix 1. The percent increase in weight is reported in Table 2, "Water Absorption Data." The percent increase in weight was determined using the following equation:

*Increase in weight (%) = (wet weight – conditioned weight)/conditioned weight*100*

Table 2 – Water Absorption Data

Replicate	Average Thickness (inches)	Increase in Weight (%)					
		24 hours	Week 1	Week 3	Week 5	Week 7	Week 9
WA1D	96.5	0.2150	0.4437	0.5641	0.5882	0.5813	0.5968
WA2D	101.2	0.2020	0.4332	0.5616	0.5924	0.5804	0.5890
WA3D	102.1	0.1997	0.4319	0.5536	0.5926	0.5715	0.5861

Water Vapor Permeability

Seven discs of the coating (one designated as the blank) were cut from the free film sample and tested for water vapor permeability using the inverted water method (Method BW) of ASTM E96-10, "Standard Test Methods for Water Vapor Transmission of Materials." The thickness of each disk was measured in four spots using Mitutoyo Digimatic Calipers. Each disc was sealed with wax to a 4″ diameter glass dish filled ¾ of the way with deionized water. The dishes were then weighed, inverted and maintained at approximately 70°F and 50% relative humidity for a period of 30 days. The length of testing was dictated by the test method. The results of the testing are reported in Table 3, "Water Vapor Permeability Results." A table containing daily weights of the samples and other pertinent data can be found in Appendix 2.

Method ASTM E96-10 specifies that the calculation of permeability can be done only when the test specimen is not less than ½″ thick. The test specimens were less than 1½″ thick. The results for permeability were supplied as a courtesy.

Table 3 – Water Vapor Permeability Results

Sample ID	Average Thickness (mils)	WVT (g/day-m^2)	Average WVT (g/day-m^2)	Combined Average WVT (g/day-m^2)	WVP (metric perms)	Average WVP (metric perms)	Combined Average WVP (metric perms)	Permeability (perm inch)	Average Permeability (perm-inch)	Combined Average Permeability (perm-inch)
P2D	87.4	1.27	2.84	1.85	0.142	0.316	0.208	1.9×10^{-2}	4.5×10^{-2}	2.94×10^{-2}
P3D	100.9	4.11			0.457			7.0×10^{-2}		
P4D	86.9	3.12			0.347			4.6×10^{-2}		
P5D	88.3	1.31	0.85		0.154	0.100		2.1×10^{-2}	1.38×10^{-2}	
P7D	95.5	0.39			0.045			6.6×10^{-3}		

Abrasion Resistance

Taber abrasion resistance was determined in accordance with ASTM D4060-10, "Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser." Duplicate 4″ x 4″ panels coated on one side were weighed then subjected to 1000 cycles using a 1000g load and CS-17 abrasion wheels. Post weights were acquired for the samples, and the weight loss (in mg) reported. The results of the testing are contained in Table 4, "Taber Abrasion Resistance Results."

Table 4 – Taber Abrasion Resistance Results

Sample ID	Weight Loss (mg)	Average Weight Loss (mg)
330380-T1D	93	100
330380-T2D	106	

Tensile Strength and Elongation

Tensile strength and elongation were determined in accordance with ASTM D412-06, "Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers – Tension." The samples were maintained at ambient laboratory conditions (70 ± 2° F and 50 ± 5% RH) for a minimum of 24 hours before testing. Ten specimens were cut into a dumbbell shape from the free film using Die C. The specimens were pulled with a Tinius Olsen Universal Testing Machine at a rate of 2.0 inches per minute. The tensile strength was calculated using the force required to break the specimens along with the width and thickness of each. The percent elongation was calculated using the original gage length and the extension of the grips at sample rupture. The dimensions of the sample were measured using Mitutoyo Digimatic Calipers. The individual results of five replicates are reported along with the average in Table 5, "Results of Tensile Strength Testing

Table 5 – Results of Tensile Strength and Elongation Testing

Replicate	Cross-Sectional Area (in^2)	Force to Rupture (lbf)	Extension (in)	Tensile Strength (psi)	Average Tensile Strength (psi)	Percent Elongation (%)	Average Percent Elongation (%)
TS3D	0.0196	57	1.238	2908	2487	123.8	100.0
TS4D	0.0219	51	0.856	2329		85.6	
TS6D	0.0216	53	1.034	2454		103.4	
TS7D	0.0216	50	0.882	2315		88.2	
TS8D	0.0218	53	0.990	2431		99.0	

Flexibility

Flexibility testing was performed on Panels F1 and F2 in accordance with ASTM D522-93(08), "Standard Test Method for Mandrel Bend Test of Attached Organic Coatings," Method B. Coating thickness measurements were obtained on five spots on each sample using a DeFelsko PosiTector® 6000 non-destructive electronic coating thickness gage. The coating

thickness averages ranged from 61.0 – 69.4 mils thick. The panels were bent 180° over a ½″ mandrel and a 1″ mandrel then examined visually for cracking. No cracking was evident on any of the replicates at either mandrel size.

Hardness

The hardness of the coating was evaluated in accordance with ASTM D2240-05(10), "Standard Test Method for Rubber Property – Durometer Hardness." Using a Shore D durometer, five readings were obtained from the free film sample. The sample had an average hardness of 64.2.

Chemical Resistance

Chemical resistance was assessed in accordance with AWWA C222-08, "Polyurethane Coatings for the Interior and Exterior of Steel Water and Pipe Fittings," which references ASTM D 543-06, "Standard Test Method for Resistance of Plastics to Chemical Reagents." The chemical solutions used for the testing included 10% sulfuric acid, 30% sodium chloride, 30% sodium hydroxide, and No. 2 diesel fuel. The average changes in mass and dimensions of three replicates were calculated after 30 days immersion at ambient temperature. The C222-08 standard specifies a requirement of "5% change in mass, length or width after 30 days immersion, maximum." The results of the testing are provided in Table 6, "Chemical Resistance Data." Detailed results of the testing are provided in Appendix 3.

Table 6 – Chemical Resistance Data

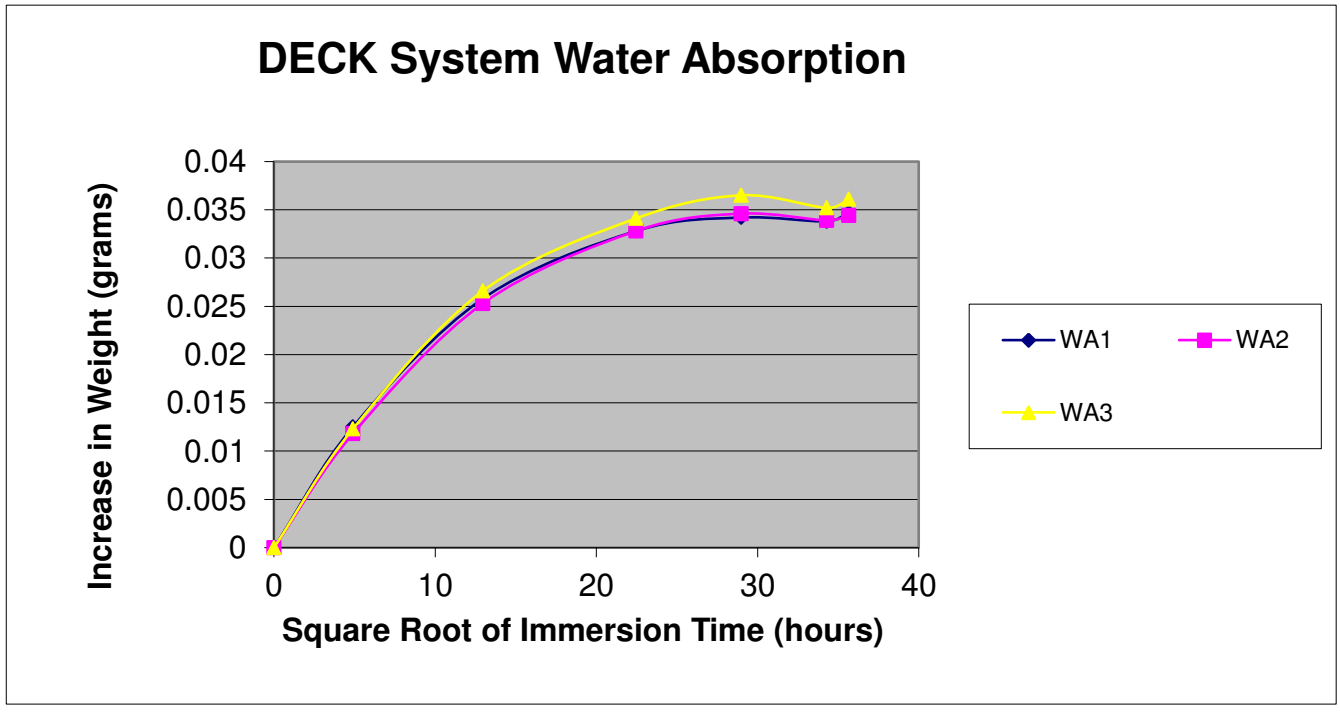
Chemical Reagent	Replicate	% Δ Width	% Δ Length	% Δ Weight
30% Sodium Chloride	CR1D	0.204	- 0.046	0.191
	CR2D	0.859	- 0.044	0.201
	CR3D	- 0.723	0.006	0.193
10% Sulfuric Acid	CR4D	0.429	- 0.034	0.349
	CR5D	0.033	- 0.117	0.350
	CR6D	0.339	- 0.006	0.092
30% Sodium Hydroxide	CR7D	0.049	- 0.775	0.648
	CR8D	- 0.235	- 0.755	-0.005
	CR9D	- 0.596	- 0.867	1.219
No. 2 Diesel Fuel	CR10D	2.143	3.361	10.800
	CR11D	3.246	3.449	10.045
	CR12D	3.253	3.881	11.636

Infrared Spectroscopy

Infrared spectroscopic analysis was performed using a Mattson Galaxy Model 3020 Fourier transform infrared spectrometer. This technique involved placing a small amount of material between two potassium bromide (KBr) salt plates. The salt plates were then placed in the optical path of the spectrometer and spectra were obtained over the range of 4000 to 400 cm^{-1}. The spectra obtained are provided in Appendix 4.

APPENDIX 1

330380 Amchem DECK System				
Water Absorption (Long Term)				
	Conditioned Weights:	5.8141	5.8406	6.1592
Days	**√ [Immersion Time] (Hours$^{1/2}$)**	**Increase in Weight WA1D (g)**	**Increase in Weight WA2D (g)**	**Increase in Weight WA3D (g)**
0	0	0	0	0
1	4.898979486	0.0125	0.0118	0.0123
7	12.9614814	0.0258	0.0253	0.0266
21	22.44994432	0.0328	0.0328	0.0341
35	28.98275349	0.0342	0.0346	0.0365
49	34.2928564	0.0338	0.0339	0.0352
53	35.665109	0.0347	0.0344	0.0361



APPENDIX 2

Amchem 330380 DECK-1										
ASTM E96/96M, Procedure BW-Inverted Water Method at 73.4°F and 50% Relative Humidity										
Purethane® DECK										
Date	Hours	Cup P2D (g)	Cup P2D (grain)	Cup P3D (g)	Cup P3D (grain)	Cup P4D (g)	Cup P4D (grain)	LANK (P8D) (g	LANK (P8D) (grain	Temperature (°F)	%Relative Humidity
7/2/13 2:55 PM	0.00	312.559	4822.79	323.055	4984.74	306.480	4728.99	135.480	2090.46	70.0	50.0
7/3/13 2:37 PM	23.70	312.494	4821.78	322.930	4982.81	306.434	4728.28	135.480	2090.46	70.2	54.7
7/5/13 3:12 PM	72.28	312.419	4820.63	322.719	4979.55	306.362	4727.17	135.480	2090.46	70.0	50.0
7/8/13 2:52 PM	143.95	312.341	4819.42	322.658	4978.61	306.292	4726.09	135.479	2090.44	70.2	56.4
7/9/13 3:21 PM	168.43	312.331	4819.27	322.647	4978.44	306.270	4725.75	135.479	2090.44	70.2	56.2
7/10/13 2:55 PM	192.00	312.320	4819.10	322.633	4978.23	306.246	4725.38	135.476	2090.39	70.2	51.8
7/11/13 3:26 PM	216.52	312.292	4818.67	322.620	4978.03	306.217	4724.93	135.476	2090.39	70.1	56.5
7/12/13 2:36 PM	239.68	312.274	4818.39	322.605	4977.80	306.187	4724.47	135.473	2090.35	70.3	53.8
7/15/13 2:46 PM	311.85	312.234	4817.77	322.451	4975.42	306.107	4723.23	135.471	2090.32	71.3	56.4
7/16/13 4:00 PM	337.08	312.229	4817.69	322.415	4974.86	306.090	4722.97	135.473	2090.35	69.5	55.2
7/17/13 2:42 PM	359.78	312.223	4817.60	322.344	4973.77	306.075	4722.74	135.474	2090.36	69.1	59.5
7/18/13 2:59 PM	384.07	312.217	4817.51	322.300	4973.09	306.063	4722.55	135.475	2090.38	68.1	55.9
7/19/13 3:31 PM	408.60	312.208	4817.37	322.165	4971.01	306.042	4722.23	135.477	2090.41	70.4	54.7
7/22/13 4:37 PM	481.70	312.178	4816.91	321.574	4961.89	305.930	4720.50	135.476	2090.39	71.7	55.8
7/23/13 3:23 PM	504.47	312.163	4816.68	321.418	4959.48			135.477	2090.41	71.8	55.2
7/24/13 2:50 PM	527.92	312.144	4816.38	321.301	4957.67			135.471	2090.32	72.0	49.0
7/25/13 3:52 PM	552.95	312.111	4815.87	321.231	4956.59			135.471	2090.32	71.9	44.8
7/26/13 2:57 PM	576.03	312.085	4815.47	321.178	4955.78			135.469	2090.29	69.2	46.6
7/29/13 3:19 PM	648.40	312.027	4814.58	321.117	4954.84			135.469	2090.29	72.1	45.4
7/30/13 2:46 PM	671.85	312.010	4814.31	321.091	4954.43			135.468	2090.27	69.2	48.6
7/31/13 3:27 PM	696.53	312.010	4814.31	321.069	4954.09			135.470	2090.30	71.4	51.5
8/1/13 4:24 PM	721.48	311.987	4813.96	320.978	4952.69			135.470	2090.30	69.8	49.3

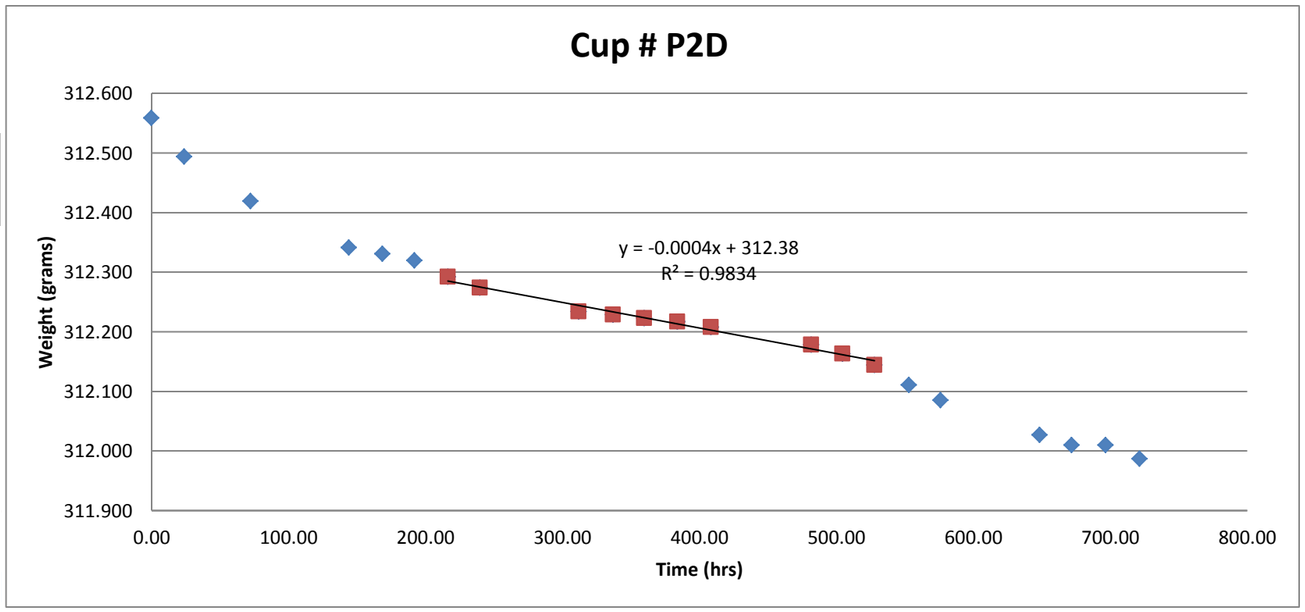
Method of coating application and curing procedure used	Prepared by client
Type of film support used	N/A
Design of cup	glass dish
Type or composition of sealant	wax blend (40% paraffin/60% microcrystalline wax)

Dish	P2D	P3D	P4D	BLANK (P8D)
Material Thickness (in)	0.0874	0.1009	0.0869	0.0925
Radius (in)	2.00	2.00	2.00	2.00

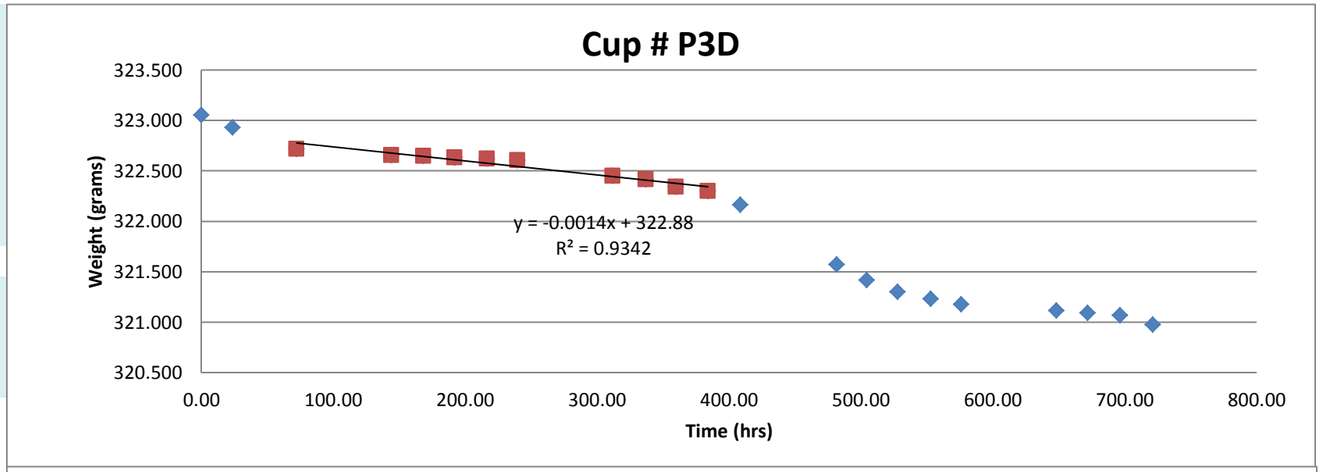
CALCULATIONS

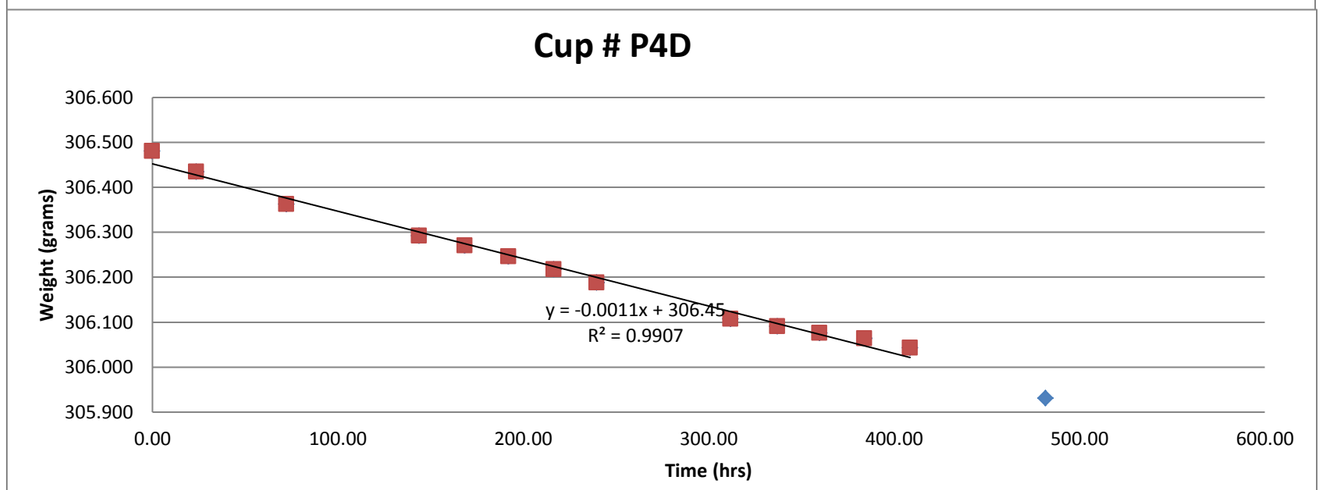
Temperature (°F)	70.4	
Relative humidity in test chamber	52.6	%
Relative humidity in dish	100	%
Humidity change (as a decimal)	0.47	
Vapor Pressure	18.971	mm Hg
	0.747	in Hg

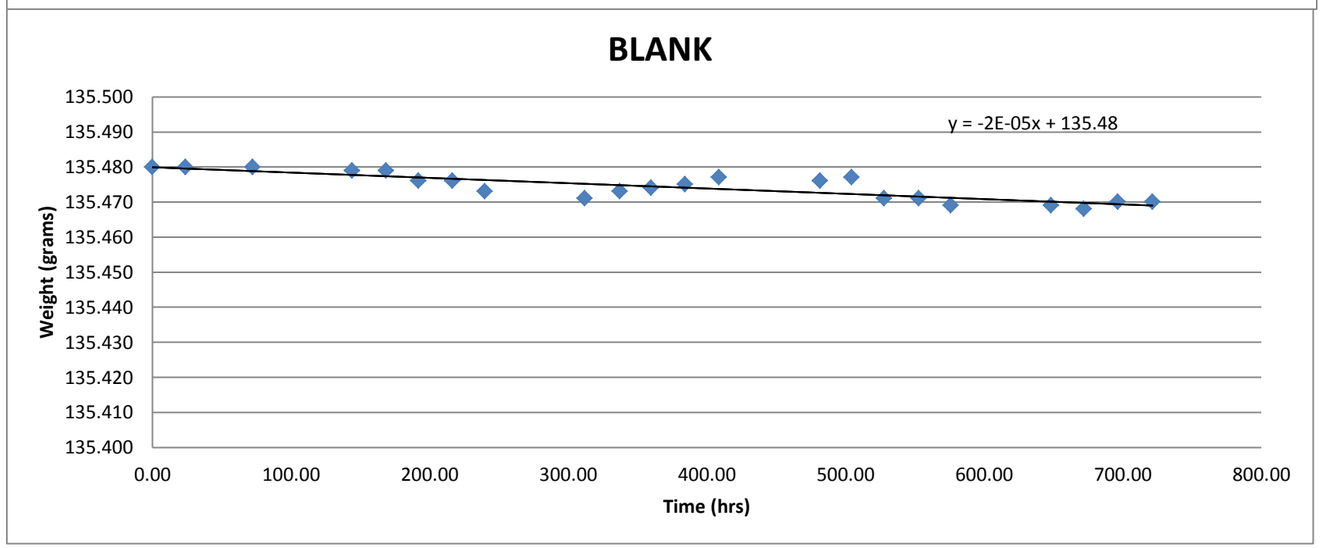
	P2D	P3D	P4D	BLANK (P8D)
Radius (m)	0.0508	0.0508	0.0508	0.0508
Area (m^2)	0.00811	0.00811	0.00811	0.00811
Slope (grams/hr)	4.31E-04	1.39E-03	1.06E-03	1.51E-05
Area (ft^2)	0.0873	0.0873	0.0873	0.0873
Slope (grains/hr)	0.00664	0.02144	0.01628	0.00023



WVT(g/h-m^2)	0.053	0.171	0.130	0.002
WVT(g/day-m^2)	1.27	4.11	3.12	0.04
WVP (g/hr-m^2-mm Hg)	5.9E-03	1.9E-02	1.4E-02	2.1E-04
WVP (metric perm)	0.142	0.457	0.347	0.005
WVP (g/Pa-s-m^2)	1.2E-08	4.0E-08	3.0E-08	4.3E-10
Permeability (g-cm/hr-m^2-mm Hg)	1.3E-03	4.9E-03	3.2E-03	4.9E-05
Permeability (g-cm/day-m^2-mm Hg)	3.1E-02	1.2E-01	7.7E-02	1.2E-03
Permeability (g/Pa-s-m)	2.7E-11	1.0E-10	6.7E-11	1.0E-12
WVT(grains/h-ft^2)	0.076	0.246	0.187	0.003
WVP (perm)	0.215	0.694	0.527	0.008
Permeability (perm inch)	1.9E-02	7.0E-02	4.6E-02	7.0E-04
Permeability (perm mil)	18.79	70.01	45.78	0.70







RESULTS

METRIC AVERAGES:

WVT(g/h-m^2)	0.118
WVT(g/day-m^2)	2.84
WVP (g/hr-m^2-mm Hg)	1.3E-02
WVP (metric perm)	0.316
WVP (g/Pa-s-m^2)	2.7E-08
Permeability (g-cm/hr-m^2-mm Hg)	3.1E-03
Permeability (g-cm/day-m^2-mm Hg)	7.5E-02
Permeability (g/Pa-s-m)	6.5E-11

ENGLISH AVERAGES:

WVT(grains/h-ft^2)	0.169
WVP (perm)	0.479
Permeability (perm inch)	4.5E-02
Permeability (perm mil)	44.86

Method E96 specifies that the calculation of permeability can be done only when the test specimen is not less than 1/2 in. thick. The test specimens were less than 1/2 in. thick. The results for permeability were supplied as a courtesy.

Analyst KMS date 9/1/2013

QC Review by CR date 9/11/2013

TL2392F1, R0, 9/27/2012

Amchem 330380 DECK-2											
ASTM E96/96M, Procedure BW-Inverted Water Method at 73.4°F and 50% Relative Humidity											
Purethane® DECK											
Date	Hours	Cup P5D (g)	Cup P5D (grain)	Cup P6D (g)	Cup P6D (grain)	Cup P7D (g)	Cup P7D (grain)	LANK (P8D) (g	LANK (P8D) (grain	Temperature (°F)	%Relative Humidity
7/2/13 2:55 PM	0.00	354.455	5469.24	315.545	4868.86	342.197	5280.10	135.480	2090.46	70.0	50.0
7/3/13 2:37 PM	23.70	354.413	5468.59	315.323	4865.43	342.164	5279.59	135.480	2090.46	70.2	54.7
7/5/13 3:12 PM	72.28	354.377	5468.04	314.791	4857.23	342.111	5278.77	135.480	2090.46	70.0	50.0
7/8/13 2:52 PM	143.95	354.329	5467.30	313.773	4841.52	342.102	5278.63	135.479	2090.44	70.2	56.4
7/9/13 3:21 PM	168.43	354.324	5467.22	313.448	4836.50	342.101	5278.62	135.479	2090.44	70.2	56.2
7/10/13 2:55 PM	192.00	354.321	5467.17	313.034	4830.11	342.099	5278.59	135.476	2090.39	70.2	51.8
7/11/13 3:26 PM	216.52	354.316	5467.10	312.701	4824.98	342.096	5278.54	135.476	2090.39	70.1	56.5
7/12/13 2:36 PM	239.68	354.306	5466.94	312.379	4820.01	342.091	5278.46	135.473	2090.35	70.3	53.8
7/15/13 2:46 PM	311.85	354.281	5466.56	311.306	4803.45	342.080	5278.29	135.471	2090.32	71.3	56.4
7/16/13 4:00 PM	337.08	354.288	5466.66	310.910	4797.34	342.078	5278.26	135.473	2090.35	69.5	55.2
7/17/13 2:42 PM	359.78	354.286	5466.63	310.523	4791.37	342.077	5278.25	135.474	2090.36	69.1	59.5
7/18/13 2:59 PM	384.07	354.273	5466.43	310.128	4785.28	342.078	5278.26	135.475	2090.38	68.1	55.9
7/19/13 3:21 PM	408.43	354.278	5466.51	309.699	4778.66	342.077	5278.25	135.477	2090.41	70.4	54.7
7/22/13 4:37 PM	481.70	354.268	5466.36	308.274	4756.67	342.075	5278.22	135.476	2090.39	71.7	55.8

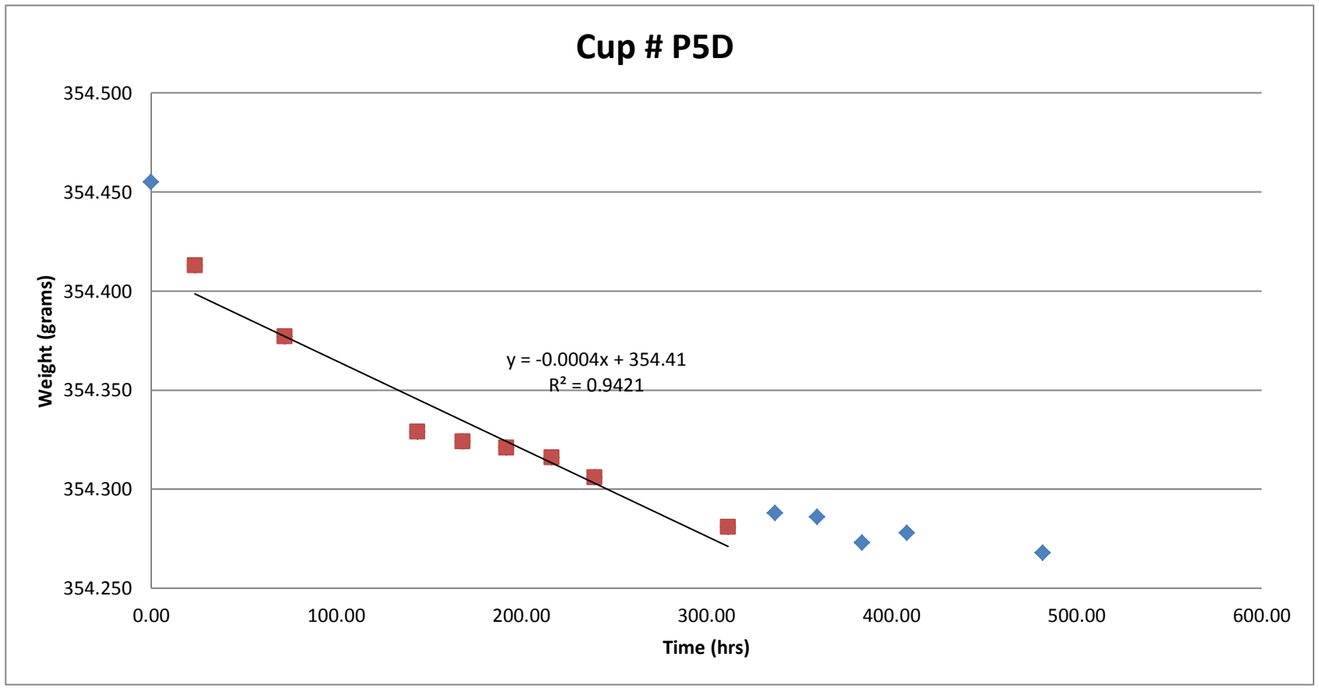
Method of coating application and curing procedure used	Prepared by client
Type of film support used	N/A
Design of cup	glass dish
Type or composition of sealant	wax blend (40% paraffin/60% microcrystalline wax)

Dish	P5D	P6D	P7D	BLANK (P8D)
Material Thickness (in)	0.0883	0.0853	0.0955	0.0925
Radius (in)	2.00	2.00	2.00	2.00

CALCULATIONS

Temperature (°F)	70.1	
Relative humidity in test chamber	54.8	%
Relative humidity in dish	100	%
Humidity change (as a decimal)	0.45	
Vapor Pressure	18.778	mm Hg
	0.739	in Hg

	P5D	P6D	P7D	BLANK (P8D)
Radius (m)	0.0508	0.0508	0.0508	0.0508
Area (m^2)	0.00811	0.00811	0.00811	0.00811
Slope (grams/hr)	4.42E-04	1.41E-02	1.30E-04	1.35E-05
Area (ft^2)	0.0873	0.0873	0.0873	0.0873
Slope (grains/hr)	0.00682	0.21775	0.00201	0.00021
WVT(g/h-m^2)	0.055	1.741	0.016	0.002
WVT(g/day-m^2)	1.31	41.78	0.39	0.04
WVP (g/hr-m^2-mm Hg)	6.4E-03	2.0E-01	1.9E-03	2.0E-04
WVP (metric perm)	0.154	4.920	0.045	0.005
WVP (g/Pa-s-m^2)	1.3E-08	4.3E-07	3.9E-09	4.1E-10
Permeability (g-cm/hr-m^2-mm Hg)	1.4E-03	4.4E-02	4.6E-04	4.6E-05
Permeability (g-cm/day-m^2-mm Hg)	3.5E-02	1.1E+00	1.1E-02	1.1E-03
Permeability (g/Pa-s-m)	3.0E-11	9.2E-10	9.6E-12	9.6E-13



WVT(grains/h-ft^2)	0.078	2.495	0.023	0.002
WVP (perm)	0.234	7.464	0.069	0.007
Permeability (perm inch)	2.1E-02	6.4E-01	6.6E-03	6.6E-04
Permeability (perm mil)	20.64	636.27	6.59	0.66

RESULTS

METRIC AVERAGES:

WVT(g/h-m^2)	0.604
WVT(g/day-m^2)	14.49
WVP (g/hr-m^2-mm Hg)	7.1E-02
WVP (metric perm)	1.706
WVP (g/Pa-s-m^2)	1.5E-07
Permeability (g-cm/hr-m^2-mm Hg)	1.5E-02
Permeability (g-cm/day-m^2-mm Hg)	3.7E-01
Permeability (g/Pa-s-m)	3.2E-10

ENGLISH AVERAGES:

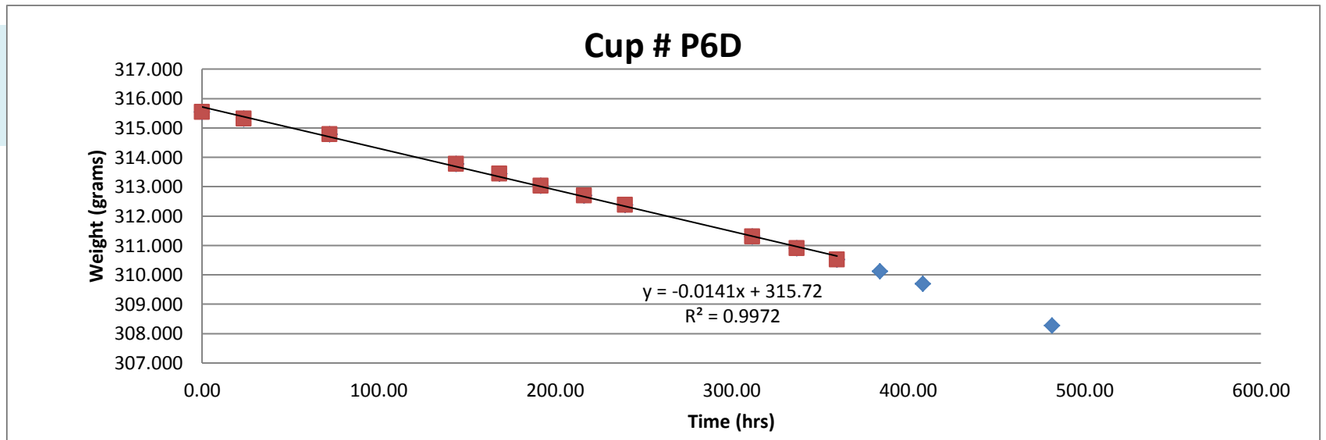
WVT(grains/h-ft^2)	0.865
WVP (perm)	2.589
Permeability (perm inch)	2.2E-01
Permeability (perm mil)	221.17

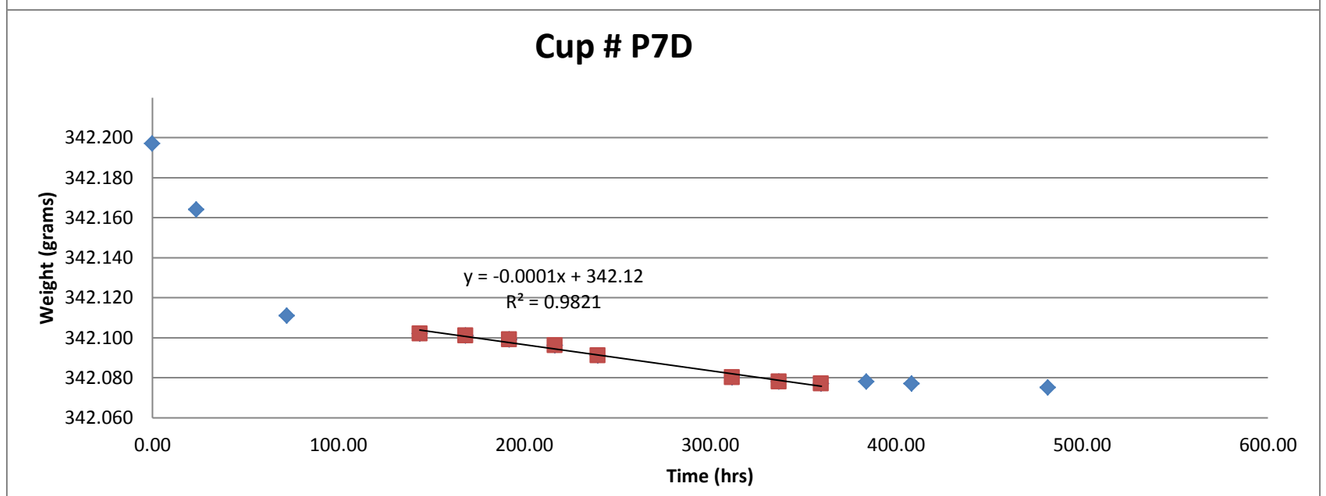
Method E96 specifies that the calculation of permeability can be done only when the test specimen is not less than 1/2 in. thick. The test specimens were less than 1/2 in. thick. The results for permeability were supplied as a courtesy.

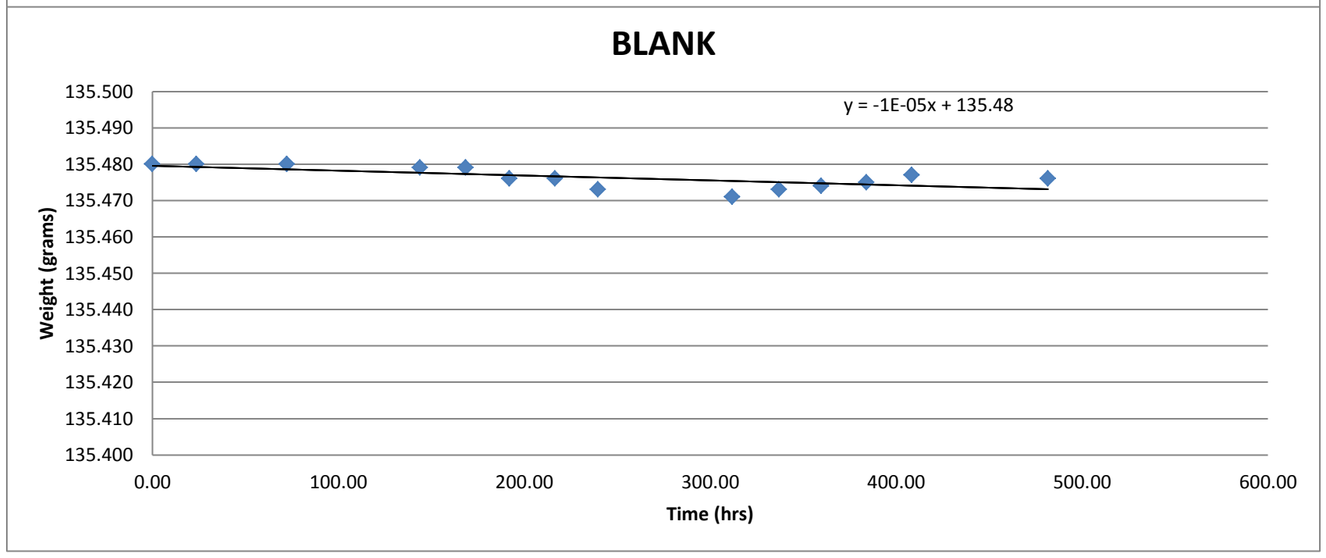
Analyst KMS date 9/1/2013

QC Review by CR date 9/11/2013

TL2392F1, R0, 9/27/2012



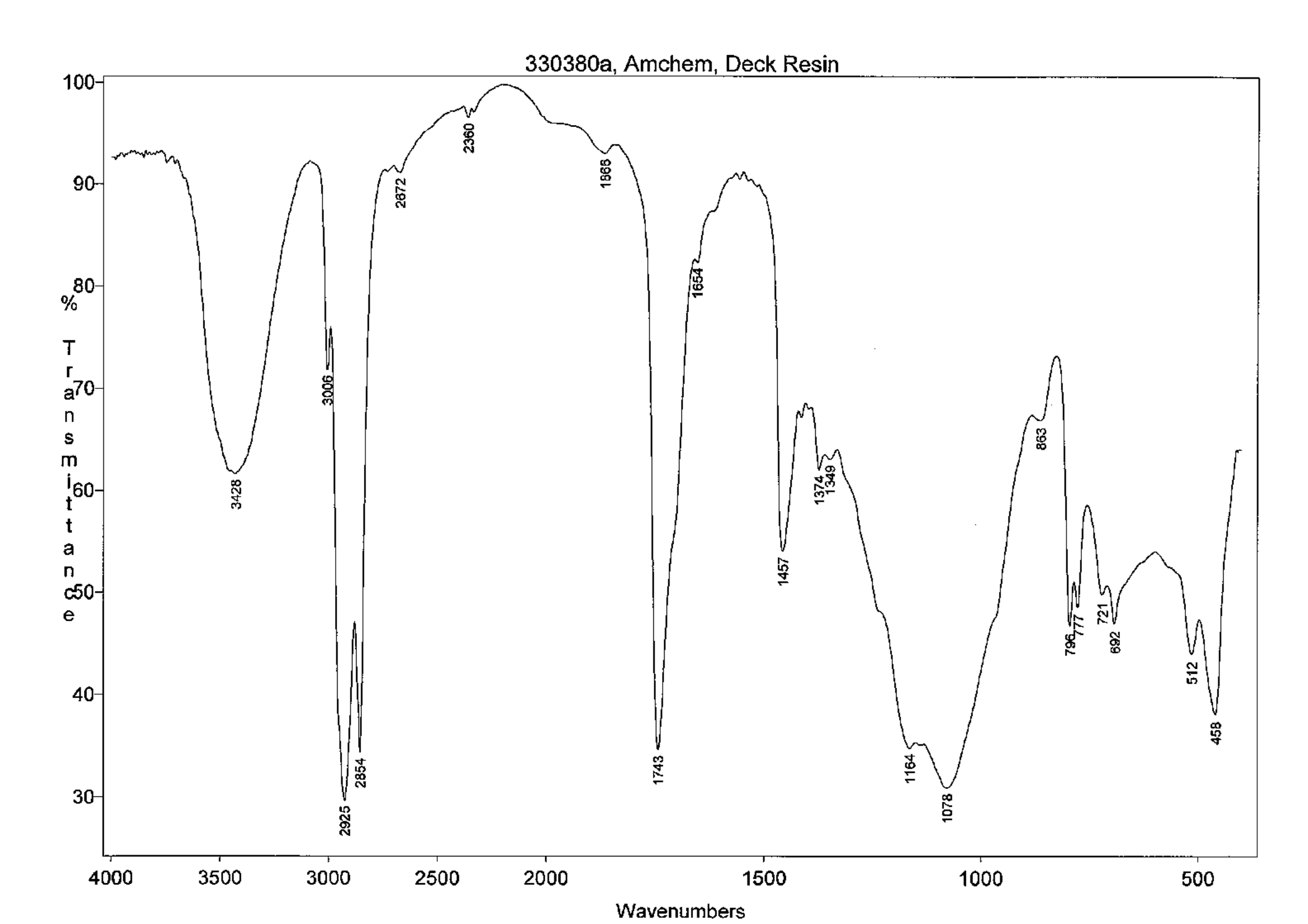




APPENDIX 3

Sample	Test Solution	Initial Weight	Final Weight	Δ Weight	Initial Thickness	Final Thickness	Δ Thickness	Initial Width	Final Width	Δ Width	Initial Length	Final Length	Δ Length	% Δ Weight	%Δ Thickness	%Δ Width	% Δ Length
CR1D	30% NaCl	14.967	14.995	0.029	0.103	0.101	-0.002	1.423	1.426	0.003	4.996	4.994	-0.002	0.191	-1.846	0.204	-0.046
CR2D		14.744	14.774	0.030	0.099	0.101	0.002	1.468	1.480	0.013	5.036	5.034	-0.002	0.201	1.715	0.859	-0.044
CR3D		14.600	14.628	0.028	0.101	0.101	0.000	1.438	1.428	-0.010	4.964	4.965	0.000	0.193	0.000	-0.723	0.006
CR4D	10% H_2SO_4	13.684	13.732	0.048	0.093	0.094	0.001	1.493	1.499	0.006	4.970	4.968	-0.002	0.349	0.971	0.429	-0.034
CR5D		15.137	15.190	0.053	0.100	0.101	0.000	1.495	1.496	0.000	4.966	4.960	-0.006	0.350	0.199	0.033	-0.117
CR6D		15.402	15.416	0.014	0.102	0.101	-0.001	1.476	1.481	0.005	4.995	4.995	0.000	0.092	-0.686	0.339	-0.006
CR7D	30% NaOH	15.572	15.673	0.101	0.106	0.105	-0.001	1.436	1.436	0.001	5.018	4.980	-0.039	0.648	-1.130	0.049	-0.775
CR8D		15.622	15.621	-0.001	0.106	0.106	0.000	1.444	1.441	-0.003	4.995	4.957	-0.038	-0.005	0.379	-0.235	-0.755
CR9D		15.353	15.541	0.187	0.102	0.100	-0.002	1.494	1.485	-0.009	4.988	4.945	-0.043	1.219	-2.344	-0.596	-0.867
CR10D	No. 2 Diesel Fuel	14.689	16.275	1.586	0.100	0.100	0.000	1.456	1.487	0.031	4.969	5.136	0.167	10.800	-0.300	2.143	3.361
CR11D		15.444	16.996	1.551	0.102	0.106	0.004	1.485	1.533	0.048	4.964	5.136	0.171	10.045	3.718	3.246	3.449
CR12D		14.367	16.038	1.672	0.096	0.101	0.005	1.491	1.540	0.049	4.963	5.156	0.193	11.636	5.208	3.253	3.881

APPENDIX 4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70
60
50
40
30
% Transmittance
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3006
2925
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2360
1866
1743
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1457
1374
1349
1164
1078
863
796
777
721
692
512
458
4000
3500
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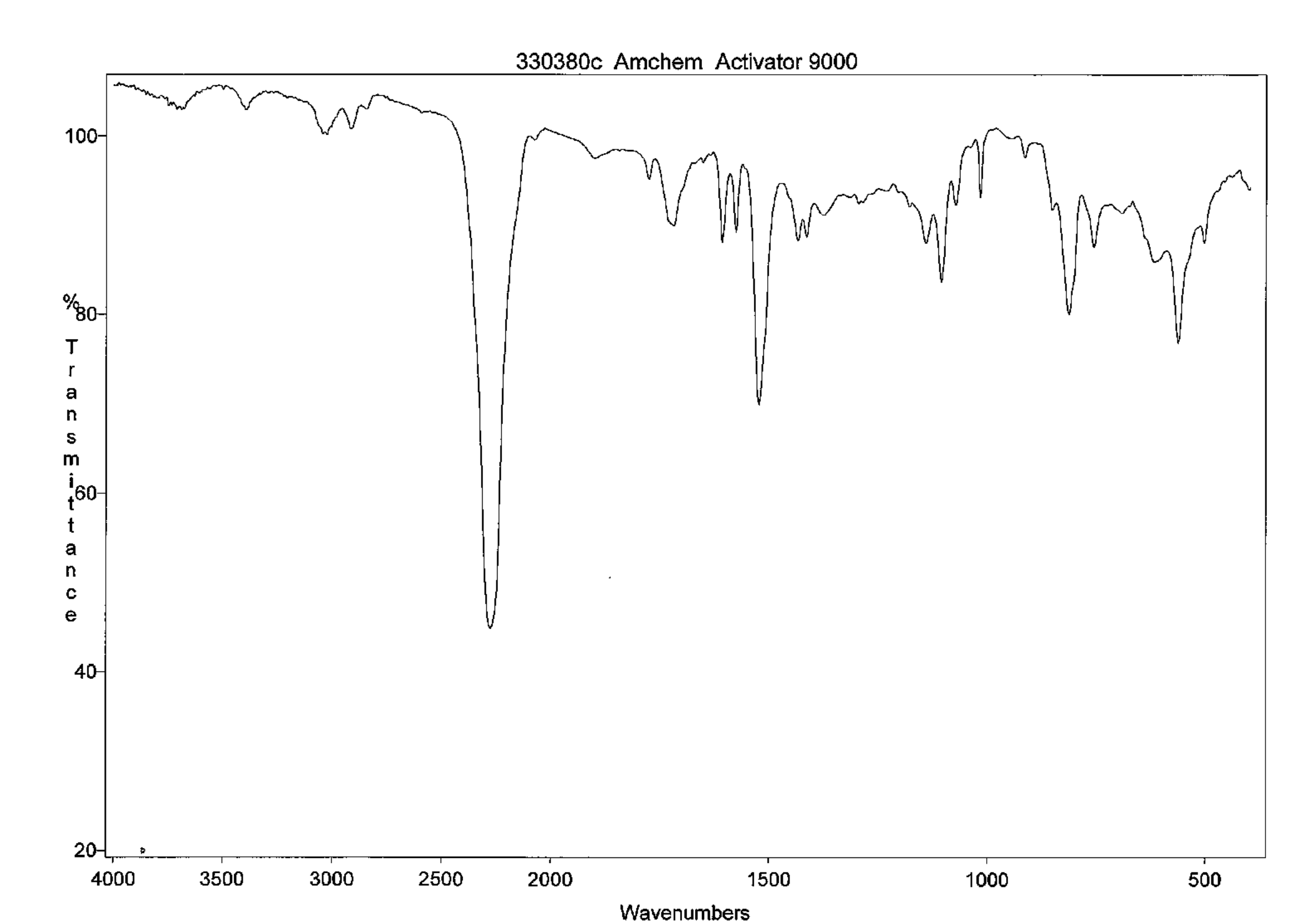
Wavenumbers
Operator: KMS
Resolution: 4.0
Scans: 32
Date: Fri Jun 21 14:01:14:31 2013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60
40
20
% Transmittance
4000
3500
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2500
2000
1500
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500
Wavenumbers
Operator: KMS
Resolution: 4.0
Scans: 32
Date: Thu Aug 29 09:10:45:81 2013

ATTACHMENT

September 12, 2013

Mr. Shomendra Mann
Amchem Products Pvt. Ltd
A-79, Sector 58
NOIDA 201 307
India

SUBJECT: Sample Disposal

Dear Mr. Mann:

Your final report has been issued with this letter. Since this project is completed, samples will be discarded due to space limitation. Please respond to 412-788-1300, extension 239 within 30 days if you wish to have your samples returned. If we do not hear from you at this time, the samples will be discarded. Handling cost for the sample return is the cost of shipping plus 15% of shipping.

Thank you for doing business with KTA-Tator, Inc.

Sincerely,

KTA-Tator, Inc.

Chrissy M. Stewart
Chemist

CMS/kdw
JN330380-1

DRYTHANE®

INSTALLATION GUIDE

AMCHEM
PRODUCTS PVT. LTD
A-79, Sector 58, NOIDA 201301, India
Tel : 91-120-2580121, Fax 91-120-2581351
E Mail : info@amchemproducts.com
Website :www.amchemproducts.com

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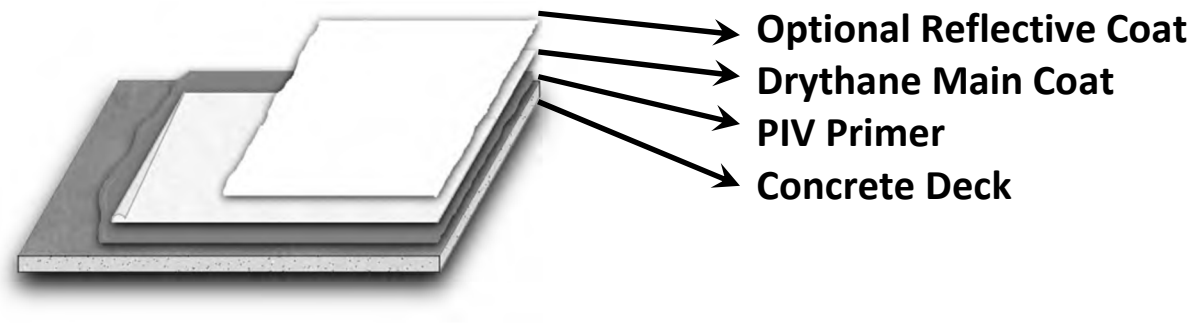
A General overview



The Drythane system comprises of three coats of liquid applied 100% Solids (Solvent Free) Polyurethane Coating system:

1. **Primer**: Applied @ approx. 150 Micron (0.15 mm) Thickness. This primer penetrates the concrete surface, reacts with moisture, seals & strengthens the top concrete layer.
2. **Main Coat**: Applied @ approx. 1,000 – 2,000 Micron (1.00 to 2.00 mm) Thickness, depending upon surface roughness etc. For a very smooth surface one coat of 1.00 mm may suffice. However, for most applications, a second coat of 1.00 mm will be required. If the surface is extremely rough, an intermediary layer of Fibreglass tissue may be imbedded into the first coat while it is still wet and then the second coat is applied after 2-24 hours.
3. **Reflective Coat**: This is optional and applied at typically 500 – 750 Micron (0.500 to 0.750 mm) thickness. Reasons why the customer may want to use this:
    - If the customer wants a colour fast surface for aesthetics reasons.
    - This coat reflects heat/ solar rays to keep the building cool underneath.

B Storage & Handling

1. Store in a cool dry location indoors at ambient temperatures (5 – 40C). Do not allow to freeze.
2. Keep away from rain and wet weather.
3. Do not store partially used drums – use completely.
4. The Primer *Activator* and Main Coat *Activator* will react with atmospheric moisture. Hence do not keep open materials for long periods without using the same.

C Weather Restrictions

1. Drythane must not be applied under rainy conditions or when rain is imminent.
2. Drythane must not be applied when ambient temperature is below 4°C.
3. Surface temperature must be at least 3°C more than the dew point.
4. Hot weather will reduce the pot life of materials due to increase in reactivity. Hence use mixed materials in a timely manner in extremely hot weather.
5. Apply Main coat during times of falling temperature (such as late afternoon) to avoid outgassing of air from the surface.

D Personal Protective Equipment

1. Mixed materials are tough polymers which very strongly bond to surfaces. Hence avoid contact with skin by wearing personal protective equipment such as disposable gloves, clear goggles etc.
2. Although Drythane materials have been made using very safe ingredients, the following remedial measures may be used for accidental contact:

Eye contact	Flush with water for 15 minutes. If irritation persists, get medical attention.
Skin contact	Wash area of contact thoroughly with hand cleaner followed by soap and water. If irritation, rash or other disorders develop, get medical attention.
Ingestion	Get medical attention. Do not induce vomiting.
Inhalation (Activator Only)	May cause sensitisation by inhalation. The activator is a respiratory irritant and potential respiratory sensitizer: repeated inhalation of vapour or aerosol at levels above the occupational exposure limit could cause respiratory sensitisation. However, the very high vapour pressure of the liquids ensures very little availability of the vapour making it very safe for normal usage. In *sensitised* persons, a hyper-reactive response to even minimal concentrations of activator may develop. Such people should be kept away from these materials. If inhaled, remove to fresh air. Treatment is symptomatic for primary irritation or bronchospasm. If breathing is laboured, oxygen should be administered by qualified personnel.

E Tools and Equipment

SNo.	PHOTO	DESCRIPTION	USAGE
1		Power Washer 3,000 Psi with Accessories	To clean the surface from dirt, loose material, organic matter etc. by high pressure water.
2		Electric Paint Mixer 1600W	To mix liquid Resin and Activator.
3		Paint Mixer 60 *400 mm	Replaceable mixing tool for the paint mixer.
4		Synthetic Foam Paint Roller, 9 inch	Roller for smooth surfaces. For rough surfaces you can use a nap roller with longer length nep.
5		Cage Roller Frame 9 Inch	The roller cage can be used with several roller foams and need not be disposed after a single use.
6		Aluminum Extension Pole 1.2 m	For reaching longer lengths, add the extension pole to the roller frame.
7		Plastic Paint Tray 9 inch	For putting the mixed materials for use with the paint roller. The tray is sized for the roller and provides an even amount on coating to the roller.

8		Rubber Squeegee V Notched 45 cm	For roughly spreading the poured mixed materials onto the surface (prior to using the roller).
9		Notched Trowel 300 X 95 mm	For roughly spreading the poured mixed materials onto the surface (prior to using the roller) – for tight corners / hand held work.
10		Spiked Shoes 147 X 296 mm, Ht 26 mm	For walking on wet coated areas without slipping or disturbing the coating.
11		Paint Brush 4"	For applying in tight corners of limited access areas.
12		Nylon Washing Broom 16" With Wood Handle	For washing the surface with soap water.

F Coverage & Estimation of Materials

Coverage of the various layers is as under:

Item		Area (Sq.Metre)	Thickness (mm)	Consumption (Litres)
Primer		1	0.20	0.20
Main Coat 1.20 mm	First Coat	1	0.60	0.60
	Second Coat	1	0.60	0.60
Main Coat 1.50 mm	First Coat	1	0.75	0.75
	Second Coat	1	0.75	0.75
Main Coat 2.00 mm	First Coat	1	1.00	1.00
	Second Coat	1	1.00	1.00
Optional Reflective Coat		1	0.45	0.45

The packaging has been designed as such to provide exact thickness to grids of **8.00 Sq.Metres** as explained under :

Item	Resin (Litres) In One Can	Activator (Litres) In One Can	Combined (Litres)	Area (Sq.Metre)	Resultant Thickness Per Coat
Primer	0.80	0.80	1.60	8.00	0.20
Main Coat 1.20 mm	3.73	1.07	4.80	8.00	0.60
Main Coat 1.50 mm	4.67	1.33	6.00	8.00	0.75
Main Coat 2.00 mm	6.22	1.78	8.00	8.00	1.00
Optional Reflective Coat	2.50	1.00	3.50	8.00	0.45

G Surface Preparation

Concrete

DRYTHANE can be used directly over concrete with PIV primer. Allow new concrete to fully cure for a minimum of 28 days (a concrete dryness test should be performed before application). Remove defective concrete, honeycombs, cavities, joint cracks, voids and other defects by routing to sound material.

Surface Preparation

1. **Applied Over Existing Coatings/ Water-proofing** - Broom clean existing coated substrate with industrial soap and water to remote dirt and grime. Let dry fully.

2. **Applied Over Concrete** : Clean substrate of contaminants such as dirt, debris, oil, grease, fungus etc that can affect adhesion of fluid-applied membrane by power washing at minimum 3,000 psi. Allow to dry thoroughly.

3. **Cracks –** Make a V groove using a grinding tool along the crack. This groove will be filled by the Drythane material during application.

H Mixing

Primer

1. Pour full contents of the Activator into the Resin bucket. Stir with a flat metals strip stirrer for around 2 minutes until the colour of the mixture is clear.
2. Make sure to mix areas around side walls and bottom of pail. Improper mixing will result in non-curing material. Do not break down kits into smaller quantities –MIX ENTIRE KIT. Do not mix part quantities with approximation.
3. After mixing, pour the full contents into the roller tray.

Main Coat & Reflective Coat

1. Use the supplied mixer or a heavy-duty power drill with supplied mixer attachment. Cordless drills are not recommended and may not properly mix the materials.
2. Mix Resin for 2 minute before adding Activator. Insert the head fully into the liquid and avoid creating a vortex / air entrainment.
3. Add entire contents of the Activator into the Resin bucket. After adding activator power mix the combined materials for a minimum of two minutes moving the mix blade from top to bottom. Make sure to mix areas around side walls and bottom of pail. Improper mixing will result in non-curing material. Never fully invert empty pails in attempt to drain material will result in use of non-curing material.
4. Do not break down kits into smaller quantities –MIX ENTIRE KIT AS SUPPLIED. Do not mix part quantities with approximation as this will create improper curing material.
5. After mixing, pour and spread the full contents onto the surface. **Do not keep mixed materials in the bucket as the pot life will be greatly reduced and material will set.**

I Priming

1. Substrate must be free of laitance and dust. Surface may be damp but with no visible water.
2. Blow air using an industrial blower to remove dust.
3. Allow the mixed primer to rest for 3 minutes and apply by roller. Apply one kit per 8 Sq.M area.
4. Protect primed area from rain and moisture. Do not over-apply primer.

J Coating (Main Coat & Reflective Coat)

1. Divide the surface to be coated into grids of 8 Sq.M (preferable 1m wide X 8 metres length).
2. Pour mixed materials evenly throughout the length as shown below. Using the ***notched trowel*** spread evenly along the width.
3. Use masking tapes to prevent coating of unintended surface and resulting in a neat finish.

4. Thereafter spread the material evenly on the demarcated surface using the ***roller***. For smooth surfaces use the foam roller for a fine finish. For very rough surfaces, use a long nap hair roller.

5. Apply a second coat of 1 mm after overnight cure of the first coat of 1 mm. Blow away any dust which has settled on the surface overnight using industrial blower.
6. The reflective topcoat is to be applied after overnight cure of the second main coat. Blow away any dust which has settle on the surface overnight using industrial blower.
7. **If > 2 days have elapsed between coats, first roughen the surface using 3M Scotch Brite or similar abrasive before blowing with air to remove dirt and abrasive residue. Thereafter apply the second coat.**

K Rough Surface / Fibreglass Use

1. Drythane is a very tough film and does not require reinforcement. However, if the surface is very rough ***material consumption*** can be excessive and this can be reduced by way of intermediate reinforcement using Fibreglass fabric.
2. Apply the first coat of 1 mm and while the coat is still wet, embed the fibreglass fabric onto the wet surface. Press with a roller to evenly wet the fabric. After overnight cure, apply a second coat of 1 mm. Blow away any dust which has settle on the surface overnight before applying the second coat.
3. The use of fibreglass is also useful in areas with weak substrates and over cracks/ joints as it forms a bridge over the defect. In case of crack movement underneath the coating, the coating does not get affected.

L Verticals & Drains

1. Prior to priming/ coating the main areas, the verticals, drains, cracks and protrusions must be attended. Intersection between the roof and vertical walls must be formed into a curve (gola) and Drythane applied, preferably using fibreglass between two layers.
2. Drains : Roughen and clean the edge of the drain and at least 4 inches inside. Apply primer and main coat along the edges and inside the drain to at least 3 inches. Apply fibreglass onto wet main coat and embed fully using paint brush. Apply a second coat to completely seal the drain edge.

M Testing & Repair

Testing

1. After visual inspection, pond the area with water to see signs of leakage/ dampness, if any, from the ceiling below. In the event of a leak, rectify the coating surface from that location.

Repair of Coating

1. Clean the damaged area with cloth and if necessary soap and water. Allow to dry.
2. Roughen and area of 50 mm for overlap around the damaged area using **3M Scotch Brite or** sandpaper and wipe with clean cloth.
3. Apply primer using a brush/ roller (including overlap area) and allow to dry.
4. Apply main coat using brush/ roller (including overlap area) and allow to dry.

For further technical assistance e -mail techsupport@drythane.com

October 24, 2019
Email: *info@amchemmail.com*

Mr. Shomendra Mann
Director
Amchem Products, Pvt. Ltd.
A-79, Sector 58
Noida, India 201 307

SUBJECT: Results of Crack Bridging Testing in Accordance with BS EN 1062-7:2004; KTA-Tator, Inc. Project No. 390631

Dear Mr. Mann:

In accordance with KTA-Tator, Inc. (KTA) Proposal No. PN1910480 and payment in full received on August 23, 2019, crack bridging testing was performed in accordance with BS EN 1062-7:2004 on the submitted coating material. This coating was designated as "Drythane" by Amchem Products, Pvt. Ltd. The samples were submitted directly to Testing, Engineering, and Consulting Services, Inc. (TEC Services) located in Lawrenceville, GA who was subcontracted to perform this testing. TEC Services reports that the coating had a total displacement at failure average of 2.13 mm. The detailed test results are appended.

If you have any questions concerning the testing or this report, please contact me by telephone at 412.788.1300 extension 182, or by email at kstanczyk@kta.com.

Sincerely,

KTA-TATOR, INC.

Kaley Stanczyk

Kaley M. Stanczyk
Project Manager/Chemical Technician

Appendix – TEC Services Report

KMS/MAS:edg

Appendix

October 17, 2019

Ms. Kaley Stanczyk
KTA-Tator, Inc.
115 Technology Drive
Pittsburgh, PA 15275

Phone: (412) 788-1300
Fax: (412) 722-0976
Email: KStanczyk@KTA.com

Subject: **Report of BS EN 1062-7**
Sample ID: Drythane Primer & Coating
TEC Services Project No. TEC 16-1267
TEC Lab No. 19-1174

Dear Ms. Stanczyk:

Testing, Engineering and Consulting Services, Inc. (TEC Services) is an AASTHO R18, ANS/ISO/IEC 17025:2005 and Army Corp of Engineers accredited laboratory. TEC Services is pleased to submit this report on the testing of the subject submitted product at our Lawrenceville, GA facility. The product was received in September of 2019. Our services were performed in accordance with the terms and conditions of our Service Agreement (TEC 16-1267). Testing was performed in accordance with below references standards. The test results presented only pertain to the sample tested.

BS EN 1062-7

Three crack bridge samples were prepared in accordance with the manufacture's instructions with 1 hour between application of primer and main coat. It is our understanding that the product is intended to be tested as a Class A1 material. The samples were cured for 10 days at ambient room temperatures prior to testing. Samples was tested at speed of 0.05 mm/min until failure.

Table 1 – Product Information

Product Name	Drythane Primer	Drythane Main Coat
Conditioning Temperature	75F	75F
Curing Temperature	75F	75F
Mix Proportions by Weight	1.00 | 1.28	3.50 | 1.00
Mixer Type	Hand	Hand
Mixing Time	3 minutes	3 minutes
Number of Coatings	1 Coat	1 Coat
Application Rate (kg/m^2)	0.22	1.84

Table 2 – BS WN 1062-7 – Crack Bridge Test Results

Sample ID	Sample 1	Sample 2	Sample 3	**Average**
Total Displacement at Failure (mm)	2.27	1.55	2.57	**2.13**

We appreciate the opportunity to provide our services to you on this project. Please do not hesitate to contact us at your convenience if you have any questions about this report or if we may be of further assistance.

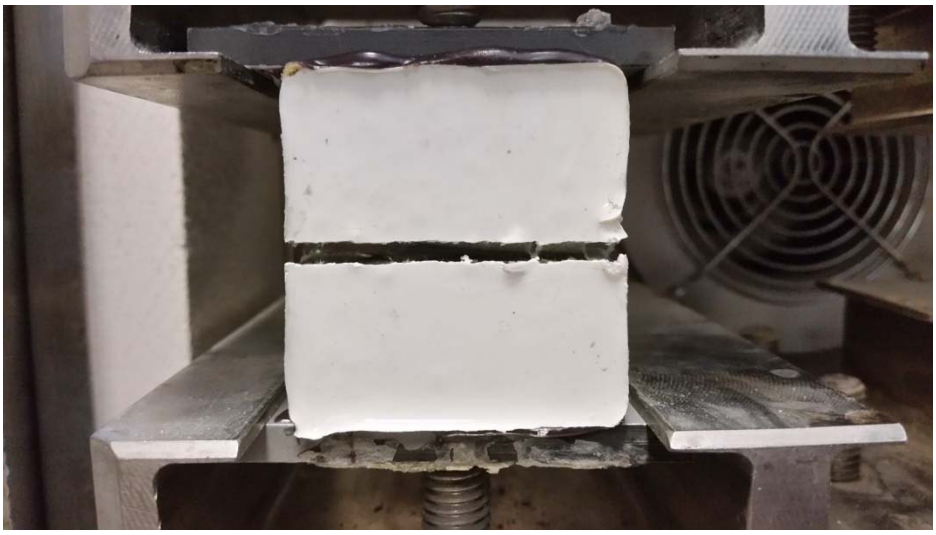
TESTING, ENGINEERING & CONSULTING SERVICES, INC.

Tom Dang
Project Manager

James. G. McCants III
Laboratory Manager, Chemist

Attachments: Photos 1-3

Picture 1 – Sample 1 Failure



Picture 2 – Sample 2 Failure

Picture 3 – Sample 3 Failure