



# Migrating Corrosion Inhibitor Surtreat TPS-V™

## Technical Data Sheet

Surtreat International  
1010 Executive Court, Suite 280, Westmont, IL 60559  
Phone 630.986.0780 | Fax 630.986.0653

### PRODUCT DESCRIPTION:

Surtreat TPS V is a water-based concrete admixture that protects steel reinforcing in concrete from corrosion. This organic amine ester salt vapor phase penetrating corrosion inhibitor will protect steel from carbonation and chloride ion attack. Designed for use as an admixture to the concrete mix, TPS V will form a passivating film on the surface of the reinforcing steel which will prevent corrosion. TPS V has the same active ingredients and performance of the previously known product – Surtreat XV.

Surtreat TPS V complies to the test method of ASTM G 109.

### RECOMMENDED USES:

Surtreat TPS V is useful on all types of concrete structures reinforced with steel. Typical applications include: Pre-cast, Pre-stressed and Post-Tension Structures, Bridges, Roads and Highways, Marine and Oceanfront Buildings, Parking Garages, Beams, and Pillars.

### ADVANTAGES:

Surtreat TPS V provides corrosion inhibition to concrete reinforced structures that will extend its useful life.

### APPLICATION:

Surtreat TPS V is added to the concrete mix at the batching plant, directly to the ready-mix truck or portable mixers, and directly into repair mortars. Add 0.60 liter/m<sup>3</sup> and mix thoroughly.

Please adjust the concrete mix design by reducing the addition of water by 0.45 of a litre per one litre of Surtreat added to the concrete or mortar.

### PROPERTIES:

Surtreat TPS V properties are as follows:

Appearance:	Milky Liquid
Specific Gravity:	Approximately 0.94
pH:	Approximately 6.5
Solid Content:	Approximately 9.5

### PERFORMANCE:

Surtreat TPS V has active ingredients that demonstrate to inhibit steel corrosion in the presence of high chloride contaminated concrete. Surtreat TPS V will not have any detrimental effect on normal concrete performance. Surtreat TPS V complies to the test method of ASTM G 109.

### PACKAGING AND STORAGE:

Surtreat TPS V is available in 20 liter pails and 210 liter drums. The shelf life is 12 months in a sealed container. Store at 5.0-35 degrees Celsius. Do not allow product to freeze.

### TECHNICAL ADVICE:

The Technical Department is available to assist you in the correct use of our products and its resources are at your disposal entirely without obligation.

### SAFETY PRECAUTIONS:

- FOR INDUSTRIAL USE ONLY.
- KEEP OUT OF THE REACH OF CHILDREN.
- NOT FOR INTERNAL CONSUMPTION.
- IF WATER ALLOWED TO EVAPORATE, WILL FORM A FINE WHITE POWDER. AVOID BREATHING DUST OR EXCESSIVE CONTACT WITH EYES AND SKIN. CONSULT MATERIAL DATA SHEET (MSDS) FOR MORE INFORMATION.

*Information contained in this data sheet is based on knowledge considered to be true and correct and is offered for the user's consideration, investigation and verification, but we do not warrant the results to be obtained. No statement, recommendation or suggestion is intended for any use which will infringe any patent or copyright.*

### **Surtreat TPS V (USA) is supplied in the Gulf Region by:**



GULF CONCRETING PRODUCTS  
P.O. Box 43010 Abu Dhabi ; 50012 Fujairah, UAE  
Tel. No. +971 2 6273998 | Fax No. +971 2 6273994  
Email: [info@gcpuae.ae](mailto:info@gcpuae.ae) | Website: [www.gcpuae.com](http://www.gcpuae.com)



CROWN CONCRETING PRODUCTS LLC  
P.O. Box 43010 Abu Dhabi, UAE  
Tel. No. +971 2 6273998 | Fax No. +971 2 6273994  
Email: [crown@gcpuae.ae](mailto:crown@gcpuae.ae)



# Migrating Corrosion Inhibitor Surtreat TPS-V™

## Material Safety Data Sheet

Surtreat International

1010 Executive Court, Suite 280, Westmont, IL 60559

Phone 630.986.0780 | Fax 630.986.0653

### SECTION I – PRODUCT IDENTIFICATION

Product Name: TPS V

Product Description: TPS V is a water dispersion of a solid organic amine ester salt-based vapor phase migratory corrosion inhibitor. It is designed to be used as an admixture to reinforced concrete to inhibit rebar corrosion.

### SECTION II – HAZARDOUS INGREDIENTS

Ingredient Name (s)	Weight Percent	Occupational Exposure Limits				
		CAS #	TLV	STEL	PEL	Content
N/A	N/A	N/A	N/A	N/A	N/A	N/A

### SECTION III – PHYSICAL DATA

Boiling Point: 212 °F

Specific Gravity: Approximately 0.94

Flash Point: N/A (Water-based)

pH: Approximately 6.5

Solubility: Isopropyl Alcohol

Appearance: White aqueous suspension

Vapor Pressure (mm Hg): N/A

Vapor Density (Air=1): N/A

Evaporation Rate (Butyl Acetate=1): N/A

### SECTION IV – PHYSICAL DATA

HMIS Hazard Rating – 0 (Minimal)

Flash Point: Non flammable

Method: N/A

Auto-Ignition Temperature: N/A

Limits of Flammability: LEL: N/A UEL: N/A

Extinguishing Media: This material is not expected to burn.

### SECTION V – REACTIVITY DATA

HMIS Hazard Rating – 1 (Slight)

Stability: Stable

Conditions and Materials to Avoid: Flammable hydrogen gas may be produced on prolonged contact with metal such as aluminum, tin, lead, and zinc. Avoid contact with glass and reactive materials.

Hazardous Decomposition or by products: None known.

### SECTION VI – ENVIRONMENTAL AND DISPOSAL DATA

Precautions to be taken in handling and storage: Keep product from freezing. If frozen, thaw and agitate before use.

Steps To Be Taken In Case Material Is Released Or Spilled: Wear suitable protective equipment. Contain spill and collect with absorbent material or process and transfer to a suitable container. Ventilate area. Avoid contact.

Waste Disposal: Does not contain any hazardous chemicals as defined in 40 CFR 260. Handle disposal in manner which complies with local, state and federal regulations.

### SECTION VII – HEALTH HAZARD DATA

HMIS Hazard Rating: 1 (Slight)

Primary route of entry: Inhalation, Skin and Eye Absorption

#### Effects of Overexposure:

Inhalation: May cause irritation to respiratory tract.

Eye Contact: Contact may cause irritation.

Skin Contact: Prolonged contact may cause slight irritation.

Ingestion: May cause irritation to the esophagus and stomach.

Chronic: None known. Does not contain carcinogenic material as defined by OSHA Hazardous Communication Act 1910, 1200. Materials are not known mutagenic, teratogenic, or reproductive health hazards.

Medical conditions known to aggravation by exposure: Asthma, lung and skin diseases.

### SECTION VIII – EMERGENCY AND FIRST AID DATA

Inhalation: If breathing is difficult due to inhalation of vapor or mist, move person to fresh air. If you feel ill, seek medical advice.

Eye contact: In case of eye contact, flush immediately with plenty of water for 20 minutes and seek medical advice.

Skin contact: Wash thoroughly with soap and water. If irritation persists, seek medical advice.

Ingestion: Drink plenty of water and induce vomiting. If unconscious, do not give anything. Seek medical attention immediately.

### SECTION IX – SPECIAL PROTECTION INFORMATION

Use with adequate ventilation. Avoid mist or direct contact with eyes, skin and clothing. Wear suitable protective goggles, rubber/latex gloves, and clothing. In case of insufficient ventilation, use NIOSH/OSHA approved respirators with an organic vapor cartridge. Wash clothing prior to re-use. Avoid contact with glass, aluminum and painted surfaces. May cause permanent spotting. In confined spaces, rooms, tanks, or areas where concern for TLV's are important, reference OSHA Regulations CFR 29 1910.134 for recommended respiratory protection.

### SECTION X – ADDITIONAL INFORMATION

This product does not contain materials listed by the state of California as known to cause cancer, birth defects, or reproductive harm. This product contains no volatile organic compounds. This product contains no toxic chemical(s) subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA) and 40 CFR Part 372.



## Migrating Corrosion Inhibitor Surtreat TPS-V™

### Limited Warranty Notice

Every reasonable effort is made to apply Surtreat® exacting standards both in the manufacture of our products and in the information that we issue concerning these products and their use. We warrant our products to be of good quality and will replace any products proved defective. Satisfactory results depend not only upon quality products, but also upon many factors beyond our control. Therefore, except for such replacement, Surtreat® MAKES NO WARRANTY OR GUARANTEE, EXPRESS OR MERCHANTIBILITY, RESPECTING ITS PRODUCTS, and Surtreat® shall have no other liability with respect thereto. Any claim regarding product defect must be received in writing within one (1) year from the date of shipment. No claim will be considered without such written notice or after the specified time interval. User shall determine the suitability of the products for the intended use and assume all risks and liability in connection herewith. Any authorized change in the printed recommendations concerning the use of the products must bear the signature of the Surtreat® Technical Manager.

### Surtreat TPS V (USA) is supplied in the Gulf Region by:



GULF CONCRETING PRODUCTS  
P.O. Box 43010 Abu Dhabi : 50012 Fujairah, UAE  
Tel. No. +971 2 6273998 | Fax No. +971 2 6273994  
Email: [info@gcpuae.ae](mailto:info@gcpuae.ae) | Website: [www.gcpuae.com](http://www.gcpuae.com)



CROWN CONCRETING PRODUCTS LLC  
P.O. Box 43010 Abu Dhabi, UAE  
Tel. No. +971 2 6273998 | Fax No. +971 2 6273994  
Email: [crown@gcpuae.ae](mailto:crown@gcpuae.ae)

# SURTREAT

## PROJECTS IN UAE

<b>Contractor</b>	<b>Consultant</b>	<b>Client</b>
Pivot Engineering & General Contracting Co. (W.L.L.)	Dorsch	ADNOC Ruwais Housing Complex Construction of Bachelor Flats
Target	ECG	Takreer
DODSAL	ADCO	BU HASA Facility Development BU849
DUBCO	Dimensions	Marina Tower Dubai
Archirodon	Associated Consolidated Engineers (ACE) Consultants	Al Nakheel Palm Island Dubai
Hyundai Engineering & Construction Co.	Scott Wilson Kirkpatrick & Co. Ltd.	Dubai Port Authority Jebel Ali Port Extension
Al Ahmadiah Contracting & Trading Company	Dewan Al Emera	Jumeirah Beachfront Villa's and Development
Seidco Contracting	White Young and Associates	Abu Dhabi Water and Electricity Department Abu Dhabi Project
Seidco Contracting	White Young and Associates	Abu Dhabi Water and Electricity Department Al Ain Project
Belhsa Six Construct LLC	Halcrow	Sohar Industrial Port, Oman
Al Laytani	Al Salam	Abu Dhabi Municipality
Bin Awedha	Future	Al Mazroui
Park Arab	Al Makhta Bridge Consultant	Noura Khalifa Villas Complex

# SURTREAT

## PROJECTS IN UAE

Contractor	Consultant	Client
HYUNDAI	Moffat x Nichol / Bectal	Khalifa Port Abu Dhabi
CCC	EWAN	Presidential Palace Abu Dhabi
SIXCO	White Young	Sohar Port Oman
Emirates Precast	DEWA	DEWA Substation


**Ready Mix Beton**
*"A Commitment to Quality"*

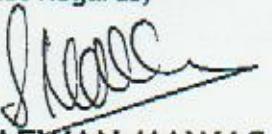
<b>By Fax</b>	<b>Reference : RA/RS/sk/F11/0163</b>		<b>Date : 08/02/2011</b>
M/s.	: Gulf Concreting Prod.	From	: SAFWAN MAWAS
Attention	: Mr. Tarik Dannoura	CC	: RS
Phone	: 02 - 627 3998	Pages	: 1 + 3
Fax	: 02 - 627 3994 / 050-6228512	email	: rmb.auh@readymixbeton.com
Your Ref.	:	http	: <a href="http://www.readymixbeton.com">www.readymixbeton.com</a>
Subject	: SURTREAT TPSV for Presidential Palace project		

Dear Mr. Tarik,

Please find attached herewith the letter received from CCEP regarding the approval of Surtreat Corrossion Inhibitor.

Kindly asking you to confirm regarding Point 2 & Point 3 of RWA Armstrong comments.

Best Regards,

  
**SAFWAN MAWAS**  
 Technical Manager


**CONSOLIDATED CONTRACTING ENGINEERING &  
PROCUREMENT S.A.L. - OFFSHORE**

Tel.: +9712-6276500 / 6147660 Telefax: +9712-6276400 / 6271039 Website: www.ccep.gr P.O. Box: 224 Abu Dhabi - UAE

Reference : PPP/3940/03.01/L-0238

Date : February 07, 2011

**M/s Ready Mix Beton**  
**P.O. Box: 3610**  
**Abu Dhabi - UAE**

 Tel.: 02-6337580  
 Fax: 02-6333715

For the Attention of Mr. Saifan Mawas - Technical Manager

Dear Sir,

**Contract : Presidential Palace Main Building Package (Contract No. CCP210)**  
**Subject : Re: Surfreat Corrosion Inhibitor Rev.01: Reply on RWA Comment - Reference:**  
**CCEP-TRANSMIT-000870**

Please find the attached reply of M/s RW Armstrong to your submittal.

Item .	Reference	Description
1	RWA-TRANSMIT-004324	Re: Surfreat Corrosion Inhibitor Rev.01: Reply on RWA Comment - Reference: CCEP-TRANSMIT-000870 (Comments : Approved )

This is for your information, records and necessary action.

Yours faithfully,

  
 Hazem Kayyali  
 Project Director  
 CCEP

  
 WBM/AHH

Encls: as stated above


 Gabbagh & Khourey Brig. - Nicosia Sarsok street • Ramlet Al Baida, Br Hassan • Beirut, Lebanon  
 Tel: +(961) 1 850409 / 847777 • Fax: +(961) 1 466657

Special C.R. Beirut 1600363 - Capital US\$ 1,000,000 Fully Paid



Thread - Reference No: RWA-TRANSMIT-004324

## Presidential Palace

Abu Dhabi, UAE



Reference No: CCEP-TRANSMIT-000870

RWA-TRANSMIT-004324

## Transmittal

To Mr Hazem Kayall - CCEP  
Mr Alan Sheepwash - Ewan Architectural and Engineering Consultancy  
Mr Cc (3) Mr Imad Hammoud - Ministry of Presidential Affairs-UAE  
Mr Mohammed Hamoudah - Ministry of Presidential Affairs-UAE  
  
From Mr Souheil Chafel - RW Armstrong  
Sent Thursday, 3 February 2011 11:30:33 AM GST (GMT +04:00)  
Reason ISSUED FOR ACTION  
  
Attribute 1 03 Construction  
Attribute 2 MMB - Main Building  
Attribute 4 18 Main Building Package works  
  
Status N/A  
Subject Re: Surtreat Corrosion Inhibitor Rev.01: Reply on RWA Comment - Reference  
000870



Dear Sir,

With reference to above mentioned subject and further to your submittal ref.:CCEP-TRANSMIT-000870, please note that the subject submittal has been reviewed by the consultant and commented as Approved.

Furthermore, CCEP should consider the following during the execution:

- Contractor shall submit material delivery notes with the name of Presidential Palace Project.
  - Contractor to raise RFIA to check on going testing to ASTM G109 for information immediately.
  - Test reports for PH, specific gravity and solid contents for each delivery shall be undertaken by third party and witnessed by Consultant, submit RFIA.
  - Corrosion Inhibitor will be dispensed as per manufacturers instructions and recorded on delivery ticket.

This is for your information and further action.

Regards,

Souheil Chafei  
Project Manager  
RW Armstrong

Pls. ensure strict compliance with those comments.

WH/JK

---

From: Hazem Kayyali  
Sent: 02/02/2011 1:55:30 PM GST (GMT +04:00)  
To: Souheil Chafei  
Mail Number: CCEP TRANSMIT-000870  
Subject: Surmat Corrosion inhibitor Rev.01: Reply on RWA Comment

Dear Sir,

Please find attached File Surmat Corrosion inhibitor Rev.01: Reply on RWA Comment.  
this Transmittal supersedes the letter No. CCEP-LETTER-000049

Regards,

Hazem Kayyali  
Project Director  
CCEP

WBM/AHH/mms

Refer To .....	Mail No	From	From Organization	Subject
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FAILED  
4/2/10 11:06



Abu Dhabi Company for Onshore Oil Operations (ADCO)

شركة أبوظبي للعمليات البترولية البرية (أدكو)

## FACSIMILE

P.O. BOX 270

ABU DHABI, U.A.E.

Ref : AFC-ED-AS-7193.01-0079 Date : 6th February 2010

To : Mr. S.I. Lee Company : SK ENGINEERING & CONSTRUCTION  
Position : Site Manager Fax No : 028842606

Copy : Mr. Tareq Danoura, Executive and Sales Director, Gulf Concreting Products FZC  
(Fax No. 02-6273994)  
AEM (Gas), PM , CS (AR), CE (SP), File

Page : 1 + 1

Subject : 7193.01

### SK - EPC PACKAGE FOR BAB GAS COMPRESSION PROJECT MATERIAL CERTIFICATION APPROVAL

This is in reference to Gulf Concreting Products FZC letter GCP / ADCO/100204 dated 4<sup>th</sup> February 2010 on the above subject.

Please be informed that the migrating corrosion Inhibitor Surtreat TPS-V USA is being used for the Bab Gas Compression Project, Trial mix of the concrete was conducted base on the Trial mix design for the Reinforce Concrete Structure submitted by SK Engineering, all quality check as per procedure was carried out by the approved Third Party inspection company (lonestar) witnessed by ADCO. The 7 days and 28 days crushing of the cubes was witnessed in Lonestar Technical & Industrial Services LLC laboratory and the result were found acceptable. For reference please see the crushing report for the respective trial mix concrete.

This is for your records and future reference.

Regards,

Manaf Ahmad Daoud  
Head of Construction (Oil/Gas)

SP/Damo

File Plan No:

The information in this facsimile and any attachments transmitted with it are intended only for the addressee and may contain confidential and/or privileged material. Access to this facsimile by anyone other than the intended recipients is unauthorized. If you receive this facsimile in error, please contact the sender immediately and destroy the facsimile and any related attachments. If you are not the intended recipient, any disclosure, copying, distribution or any action taken or omitted to be taken in reliance on it is strictly prohibited and the Abu Dhabi Company for Onshore Oil Operations (ADCO) is not responsible for any consequences from such unauthorized usage.

PETROFAC INTERNATIONAL LTD.



DOCUMENT TRANSMITTAL

TO: AL JABER ENERGY SERVICES P.O BOX : 47467 ABU DHABI U.A.E TEL : 02-5546550 d@ajes.ae		DATE: 17-Mar-2011	JOB: JI-193
		PROJECT: EPC FOR ASAB FFD PROJECT Contract No.7118.01/EC 10714 PROJECT No.P14333	
ATTN: Mr. HUSSAIN MUHAMMAD ABDULLA Sr. PROJECT MANAGER		TRANSMITTAL NO: JI-193-PSB-AJE-0459-T	PAGE 1 OF 1

TRANSMITTING OF: ADCO APPROVED DOCUMENTS

SL.	DRAWING/DOCUMENT NO.	REV.	TITLE	STATUS
1	MAR-0057	2	MAR FOR MCI FOR CONCRETE MIX DESIGN (ALTERNATIVE SOURCE SURTREAT TPS-V)	1
2	MAR-0088	0	MAR FOR FIXED TYPE FENCING & GATES FOR WELL HEAD AREA	1
TOTAL NO. OF RECORDS: 2				

STATUS CODE

- |                           |                         |
|---------------------------|-------------------------|
| 1 - APPROVED              | 4 - FOR ACTION          |
| 2 - APPROVED WITH COMMENT | 5 - FOR INFORMATION     |
| 3 - REJECTED WITH COMMENT | 6 - REVIEW NOT REQUIRED |

REMARKS

COPIES TO DV/FILE (W/Encl.) PIL ASAB (W/o Encl.)	TRANSMITTED BY:  
DIEGO VEDDA CONSTRUCTION DIRECTOR	

Please acknowledge receipt by signing and returning  
a copy of this transmittal to

Document Controller ( JI-193 )

RECEIVED BY:

DATE:

ASAB Full Field Development Project  
EPC  
ADCO Contract No. 7118.01/EC10714



459

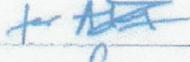
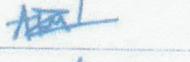
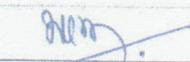
ADCO Project Document Review No: APDRC-CD-SB-7118.01-1768

ADCO PDR No.	APDRC-CD-SB-7118.01-1768		Date	16-Mar-2011
PIL Transmittal No.	CTA-CD-SB-7118.01-2010		Date	15-Mar-2011
Addressed To:	CM - PIL.			
Copy To:	PM / EM / TCM / PMC TL / PMT-Sec			
Discipline	CONSTRUCTION			
1. Docum. for ADCO approval	<input checked="" type="checkbox"/>	1 a) Doc. Approved: Work to proceed.		
	<input type="checkbox"/>	1 b) Doc. With Comments: Work not to proceed, to be resubmitted.		
2. Docum. for ADCO comments	<input type="checkbox"/>	2 a) No comments.		
	<input type="checkbox"/>	2 b) With Comments, work to proceed subject to incorporation of comments.		
	<input type="checkbox"/>	2 c) With Major Comments, work NOT to proceed.		
3. Docum. for ADCO Information	<input type="checkbox"/>	3 a) Exceptional comment to be incorporated by Contractor.		

Sub: CTA-CD-SB-7118.01-2010 MAR FOR MCI FOR CONCRETE MIX DESIGN (ALTERNATIVE SOURCE-SURTREAT TPS-V) - AJES

APPROVED – Comply with material specs.

<p>Review By </p> <p>Name : Islam Kasrawi / Ibrahim Negm Position : SCE / CSI Date : 16-Mar-2011</p>	<p>Approved by </p> <p>Name : Michael Rautenbach / Serag Bebars Position : Gen. Supt. / CM Date : 16-Mar-2011</p>
<p>Please acknowledge receipt by signing and returning a copy of this PDR to Document Controller -- ADCO (P14333)</p> <p>Received By: Signature: Date:</p>	

 الشركة الوطنية للنفط أبوظبي - أبوظبي للعمليات البترولية - أبوظبي للتنمية Abu Dhabi Company for Onshore Oil Operations (ADCO)	<b>ADCO / ASAB FULL FIELD DEVELOPMENT PROJECT</b> <b>ADCO PROJECT NO. P14333</b>		 <b>PETROFAC</b> INTERNATIONAL LTD.	
<b>MATERIAL APPROVAL REQUEST (MAR) : MAR-8038-0057</b>				
CLIENT	ADCO	Rev. 2	DATE : 12-FEB-2011	
CONTRACTOR	PETROFAC INTERNATIONAL LIMITED (PIL)			
SUBCONTRACTOR	AL JABER ENERGY SERVICES LLC			
SUBCONTRACT	JI-193/27-002			
APPROVAL REQUESTED FOR	MCI for Concrete Mix Design (Alternative Source) - SURTREAT - TPS-V			
MANUFACTURER / SUPPLIER	M/s. Gulf Concreting Products, UAE			
CATALOGUE REF	NIL			
SAMPLE	NIL			
<u>MATERIAL DESCRIPTION:</u>				
Surtreat TPS -V is water based concrete admixture that protects steel reinforcing in concrete from corrosion designed for use as an admixture to the concrete mix as supplier by M/s. Gulf Concreting Products, Abu Dhabi. P.O Box 43010				
<u>ATTACHMENT:</u>				
1 - Technical Data sheet as presented by Gulf Concreting product				
2- Materials Certification approved by ADCO				
<u>LOCATION WHERE USED:</u>				
To replace the previous MCI Materials submitted in previous Mix Design				
<u>REFERENCE DRAWINGS AND SPECIFICATIONS:</u>				
NIL				
<u>MATERIAL CONFORMS TO SPECIFICATION : YES / NO (COMPARISON SHEET ATTACHED)</u>				
<u>FOR AJES:</u>				
Prepared by: Simon - Sr. Procurement Engr	Date: 12-Feb-11	Sign: 		
Checked by: Petronio Escalona - Field Eng. Manager	Date: 12-Feb-11	Sign: 		
Reviewed by: Avijit Dey - QC Manager	Date: 12-Feb-11	Sign: 		
Approved by: Hussain Muhammad Abdulla - Sr. PM	Date: 12-Feb-11	Sign: 		
For Petrofac:	<input type="checkbox"/> Accepted	<input checked="" type="checkbox"/> Accepted subject to	<input type="checkbox"/> Not accepted	
Comments:	1) ADCO Approval. 2) Satisfactory test results of trial cubes tested.			
Name:	George Lyte	Date: 15-03-2011	Sign: 	
Name:		Date:	Sign:	



شركة أبوظبي لل操業 المحدودة  
Abu Dhabi Company for Onshore Oil Operations (ADCO)



ADCO / ASAB FULL FIELD DEVELOPMENT PROJECT  
ADCO PROJECT NO. P14333

SPECIFICATION COMPARISON TABLE

CLIENT: ADCO

CONTRACTOR: PETROFAC INTERNATIONAL LIMITED (PIL)

SUBCONTRACTOR : AL JABER ENERGY SERVICES LLC

SUBCONTRACT NO.: JL-193/27-002

Rev: 2

AJES NO : MAR-8038-0057

MATERIAL DESCRIPTION: MCI for Concrete Mix Design – SURTREAT TPS-V

PROJECT SPECIFICATION REQUIREMENT

SUBCONTRACTOR PROPOSAL  
REMARKS (SPECIFICATION DEVIATION, IF ANY)

ADCO Doc. No. 14.99.75.1613

7.2.1 Admixtures  
\* Corrosion Inhibitor

Surtreat TPS V is a water-based concrete admixture that protects steel reinforcing in concrete from corrosion. The organic amine salt vapor phase penetrating corrosion inhibitor will protect steel from carbonation and chloride ion attack. Surtreat TPS V complies to the test method of ASTM G109.

Comply

The corrosion inhibitor shall be used in accordance with manufacturer's recommendation and shall comply with the relevant sections of BS 1881, ASTM C1202-91, ASTM G109.

\*\*\*\*\* Nothing Follows\*\*\*\*\*



Sahil/Shah Full Field Development Project  
EPC  
ADCO Contract No. 7354.01/EC10744

ADCO Project Document Review No: APDRC-ED-SA-7354.01-3586

ADCO PDR No.	APDRC-ED-SA-7354.01-3586		
TR/CCC Transmittal No.	Date 14-05-2010		
Addressed To:	CONSORTIUM TR / CCC		
Copy To:	EM/TCM/IM – ADCO PM – PMC T/L		
Discipline / Subject	CIVIL		
1. Docum for ADCO approval	<input type="checkbox"/>	1 a) Doc Approved: Work to proceed.	
	<input type="checkbox"/>	1 b) Doc. With Comments: Work not to proceed, to be resubmitted.	
2. Docum. for ADCO comments	<input checked="" type="checkbox"/>	2 a) No Comments.	
	<input type="checkbox"/>	2 b) With Comments, work to proceed subject to incorporation of comments.	
	<input type="checkbox"/>	2 c) With Major Comments, work NOT to proceed	
3. Docum. for ADCO information	<input type="checkbox"/>	3 a) Exceptional comment to be incorporated by Contractor	

Documents commented with this APDR:

Doc.Nr.	Rev.	Title of Document	Registered in Distribution Matrix to be for
MAR-0006	B	MAR- Super- Plasticizers for Concrete Works	R/C
MAR-0007	B	MAR- Corrsion Inhibitors for Concrete Works	R/C

Please find the reply for two missing MARs, which were not included in our previous APDR 2860, dated 05-04-2010: no further comments on the above documents for Material Approval.

Reviewed By :  Name : C. Laragan  Position: Sr. Construction Engineer  Date : 03-04-2010 (@ 11:41)	Approved by:  Name : G.Mandujano / A.Hsino  Position : TCM / EM  Date : 14-05-2010
--	--

Please acknowledge receipt by signing and returning a copy of this PDR to Document Controller – ADCO  
Sahil: P16062 & Shah: P29148

Received By:

Signature:

Date:



## SAHIL & SHAH FULL FIELDS DEVELOPMENT PROJECT

ADCO PROJECT No. P16062/ P29148

### Material Approval Request (MAR)

Form No.: FM-006-001  
 Owner : QMP-1001-006  
 Page No. 1 of 1  
 Rev. B  
 Attachments: 116 sheets

Serial No. MAR 0 0 0 7 Rev. No. B Date : 16-Mar-10

**Material Description:** Corrosion Inhibitors for Concrete works

**Trade Name:**

- a. Rheocrete 222+
- b. Surtreat TPS-V

**Manufacturer:**

- a. BASF Construction Chemicals.
- b. Surtreat International (Supplier:Gulf Concreting Products)

**Is Material Included in the Project Specifications:**  Yes  No  Not available

**Notes:** Refer to Cluse No. 7.2 of Doc. No. 30-99-90-1644 Rev.1 'Specification for Buildings Concrete works'

**Is Supplier or Manufacturer Known to ADCO:**  Yes  No

**Notes:** a. For Rheocrete 222+ Refer Page 18 of Clause 7.2.1 of Doc No. 30-99-90-1644 Rev 1  
 b. For Surtreat TPS-V Refer to attached ADCO Material Approval for BAB Gas Compression Project  
 (Supplier Pre Qualification Dossier is attached - Document Ref. No. PQ-043)

Location of Use For all Structural Concrete works in Sahil & Shah Full Fields Development Project.

Technical Details Refer attached Technical Data Sheets.

**Attachments:**

Sample	Yes	No
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Size

\_\_\_\_\_

Brochure

Yes	No
<input checked="" type="checkbox"/>	<input type="checkbox"/>

Composition / Others

- Reference Project Specs.
- Compliance Sheet.
- Technical Data Sheets.
- Surtreat TPS-V Previous Approval
- Gulf Concreting Products Pre Qualification

**Notes / Comments:** Kindly note that BASF Construction Chemicals previously conducted business as Degussa Admixtures Inc. and prior to that as Master Builders Inc.

**For CCC :**

Prepared by . Name: Thouqan Atawna Date: 16/03/2010 Sign:

Reviewed by . Name: Marlo Laycano Date: 16/03/2010 Sign:

Approved by . Name: Youssef Ghantous Date: 16/03/2010 Sign:

**For TR :**

Approved by . Name: \_\_\_\_\_ Date: \_\_\_\_\_ Sign: \_\_\_\_\_

**For ADCO**  Accepted  Accepted Subject to  Not Accepted

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Sign: \_\_\_\_\_



Ref : \_\_\_\_\_

Date : 11 March 2008

Ref : **12 Towers Environment Center  
Abu Dhabi Municipality  
Abu Dhabi, United Arab Emirates**

**Subject : Surtreat TPS-V Migrating Corrosion Inhibitor Approval**

Dear Sirs,

We thank you for the additional information provided on the proposed material, Surtreat TPS-V Migrating Corrosion Inhibitor which now meets our requirement.

We hereby confirm approval of Surtreat TPS-V Migrating Corrosion Inhibitor for all reinforced concrete on our project **12 Towers, Environment Center Abu Dhabi Municipality** where a corrosion inhibitor is specified.

With best regards,

**Eng. Imad Ali Adeeb**  
General Manager





8 May 2008

S.S. Lootah General Contracting  
Abu Dhabi, UAE

**Project : Commercial Tower for Mr. Obeid Salem Al Khaily**  
**Abu Dhabi – Plot No. C71 Sector E4/02**

**Subject : Approval for Surtreat TPS-V Migrating Corrosion Inhibitor**

Dear Sir,

In reference to your letter SSL05-2008 on the proposed use of the above mentioned material for ready mix concrete, please be informed that after a thorough evaluation of its technical specification we approve the use of Surtreat TPS-V Migrating Corrosion Inhibitor to protect the steel rebar from corrosion for the Commercial Tower for Mr. Obeid Salem Al Khaily Abu Dhabi – Plot No. C71 Sector E4/02 project.

With best regards,

**Eng. Ahmad Dhafer Essa**  
General Manager



14 June 2006

# **Qumra Transport General Contracting Establishment**

## **Abu Dhabi, UAE**

## **Project : Villa Complex**

**Subject : Approval for Surtreat TPS-V Migrating Corrosion Inhibitor**

Dear Sir,

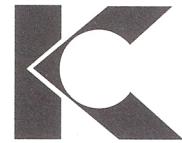
In reference to your letter QU3267-2006 on the proposed use of the above mentioned material for ready mix concrete, please be informed that after a thorough evaluation of its technical specification we approve the use of Surtreat TPS-V Migrating Corrosion Inhibitor to protect the steel rebar from corrosion for the following projects:

1. Villa Complex for His Highness Sheikh Mohammed Bin Zayed Saqer Al Nahyan  
Khalifa City A, SE 42, Plot No. 17
  2. Villa Complex for Sheikh Khaled Faisal Al Qasimi  
Khalifa City A, SE 42, Plot No. 21
  3. Villa Complex for Saeed Rashid Ali Al Mazroui  
Khalifa City A, SE 15, Plot No. 4

With best regards,

**Eng. Ahmad Dhafer Essa**  
General Manager





23 September 2008

To whom it may concern

**CONSULTANCY FOR ARCHITECTURAL  
DESIGN AND ENGINEERING  
INSTITUTE FOR GEOTECHNICAL ENG.**

**AREA & MASTER PLANNING  
ARCHITECTURAL DESIGN  
STRUCTURAL ENGINEERING  
CIVIL & MEP ENGINEERING  
INFRASTRUCTURE ENG.  
SOIL & ROCK ENGINEERING  
PROJECT MANAGEMENT  
EXPERTISES & VALUE ENG.**

**Approval Surtreat TPS – V Migrating Corrosion Inhibitor**

Dear Sir,

We would like to certify that we (Kling Consult) hereby approve the use of **Surtreat TPS – V Migrating Corrosion Inhibitor** for use in any of our Projects where the use of a Migrating Corrosion Inhibitor is specified.

Best Regards,

23/09/2008

Dr. Zaid Abdulla  
Senior Structural Engineer



15 Aug 04 12:22

A  
JAP 006/

## Contractor's Submission Form

Client:	NAKHEEL	N.C.E.
Consultant:	Associated Consulting Engineers (ACE) International	D.E.
Title of Submission:	Surtreat - Corrosion Inhibitor Admixture	M.E.
	Manufacturer : Surtreat International Chicago, Illinois U.S.A.	T.O.E.
	Supplier : Gulf Concreting Products FZC, Abu Dhabi U.A.E.	P.E.
Date of Submission/Time:	22.01.04 - 16:00PM	C.E.
Submission Ref. No.:	M-03300-002-A	C.I.
ARCO Submission Ref. No.:	0315-MAT-030-A/NK	S.M.
Specification Reference:	General Spec. Vol. II-0, Section 03300, Clause 2.02/B.1	G.C.F.
Drawing Reference	-	Reserved for ARCO Storage File 1 File 2

## Description of Contents:

Surtreat - Corrosion Inhibitor Admixture

Manufacturer : Surtreat International Chicago, Illinois U.S.A.

Supplier : Gulf Concreting Products FZC, Abu Dhabi U.A.E.



B.O.Q Item: \*Please refer to attached sheet

Originator: Kostas Daniilidis Section or Dept. Head: Kostas Daniilidis

Signature: Signature:

Please CIRCLE required actions

Reply expected by: Immediate 1 Day 3 Days 7 Days ..... Days

Purpose of submission: For Review/Approval For Information For Record Purposes

To: Employer's Rep. From Project Manager - Kimon Schoinas

Title: Project Manager - Mr. Tawfiq Ghazi

Signed:

Date: 20.01.04

Employer's Rep. Response Ref. No.

- Approved  Approved as Noted  Revise and resubmit  
 Rejected. Please resubmit

Ref:

ARCH: ODON CONSTRUCTION (O) CO. SA  
Eminent Infrastructure/Bridges

DATE:	FILE:
SECTION	A C SECTION
PROJECT MANAGER	<input checked="" type="checkbox"/> E.M DEPT.
DEPM - INFRA	<input checked="" type="checkbox"/> SURVEY
DEPM - BRIDGES	<input checked="" type="checkbox"/> TRANSPORTATION
DATA/OC MANAGE	<input checked="" type="checkbox"/> W/S MANAGER
HS	
ENGENEERING	<input checked="" type="checkbox"/> COMM. MANAGER
TECHNICAL OFFICE	<input checked="" type="checkbox"/> ACCOUNTS
BRIDGES DEPT.	<input checked="" type="checkbox"/> PROCUREMENT
PLANNING	<input checked="" type="checkbox"/> PERS/ADMIN.
SERVICES DEPT.	<input checked="" type="checkbox"/> STORE
STRUCTURES DEPT.	<input checked="" type="checkbox"/> SECRETARY
EAFT, ROADWORKS	

To: Project Manager - Mr. Kimon Schoinas

From: Employer:

Signed:

Date: 20.01.04



**THE PALM JUMEIRAH  
SHORELINE APARTMENTS**

**NAKHEEL**

				Transmittal No.: C02-000-0123-03300-01		
				Date: 7/Oct/04		
				1. SUBMITTED FOR		CODE
				APPROVAL		1
				YOUR INFORMATION		2
				2. ACTION		
				APPROVED		A
				APPROVED WITH COMMENTS		B
				INCORPORATE COMMENTS		C
				RESUBMIT BEFORE PROCEEDING		
				REJECTED		D
						E
QTY	DRWS., SPEC. OR BOQ. REF.	ITEM SEQ NUMBER	DESCRIPTION	TYPE	CODE	
					Submittal	Action
2	Section 03300 - Concrete	1	Surtreat TPS XV Corrosion Inhibitor Admixture from GULF Concreteing Products, Abu Dhabi, UAE	OT	1	
COPIES						
EEL						
PM (TCI)						
A/E (ACE)			For: CONTRACTOR			

^ -- CI to enter Action Codes and Remarks, and return to CONTRACTOR

REMARKS:

Corrections or comments made relative to submittals during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for confirming and correlating all quantities and dimensions selecting fabrication processes and techniques of construction; coordinating his work with that of other trades, and performing his work in a safe and satisfactory manner.

COPIES TO			
NAKHEEL			
PM (TCI)			
A/E (ACE)		For: ACE	
DATE:			

11 Code to be entered by CONTRACTOR

+ TYPE: SD - Shop drawings MD - Manufacturer's Data

12 Code to be entered by A/E (ACE)

SM - Sample CT - Certificates

GT - Guarantee OT - Other

FROM : SE 1 DCO ADWEA RD

WY

**SUBMITTAL**

**Contract No. : G1823**  
**Client : Abu Dhabi Water & Electricity**  
**Project : Distribution Management & Control Centre**

Comments or responses made relative to this section during this review do not relieve this Contractor from compliance with the requirements of the contract documents. The Contractor is responsible for reviewing the design drawings of the project and general compliance with the information given in the contract documents. The Contractor is responsible for compliance and coordination with all other trades and subcontractors in the work, as well as the architect, engineer, and supervisor.

**COPIES:**  **1000**

DATE:

**ROUTING**

#### **STATUTORY CODE: ACTION**

- STATUS CODE: ACTION**

Approved. Work may proceed.

Approved with requirements. Work may proceed subject to interpretation of changes.

Approved with conditions. Work may proceed only after approval of revised proposal.

Rejected. Work must not proceed.

Code to be entered by Connector



Date : 03-07-2004

TO : M/s. Seidco Gen. Contg. Co. Ltd  
Abu Dhabi

Ref : 300304004A3R4/3-4/972

## M I X D A T A

Site : ADWEA G- 1823 Distribution Management and Control Centre - AUH

Specification : BS

Mix (a)	40 N/mm <sup>2</sup> 20mm. Agg. 75mm ± 25mm Slump, SRC+MS	
Mix (b)		
Mix (c)		

BATCH WEIGHTS/M <sup>3</sup>	Mix (a)		Mix (b)		Mix (c)		S O U R C E
	Weights	B.Down%	Weights	B.Down%	Weights	B.Down%	
Cement ( SRC ) Kg	360						Al Ain / R.A.K.
Cement ( ) Kg							
Cement ( ) Kg							
Microsilica Kg	20						Municipality
Water (free) L	150						
40mm Kg							
20mm Kg	720	37.50					RAK
10mm Kg	340	17.71					RAK
5mm Kg	605	31.51					RAK
Sand ( Coarse ) Kg							Al Ain
Sand ( Fine ) Kg	255	13.28					Grace
Admix 1. ( MIRA30 ) L	2.5						Grace
Admix 2. ( 19CF ) L	2.5 - 4.0						Gulf Conc. Products
Surteat MCI-TPS XV.) L	1.0 *						
Free Water/Cern. Ratio	0.39						
Aggregate /Cern. Ratio	5.05 :1						
Density	2450						

Stated weights for Aggregates are in Saturated Surface Dry conditions.

## Remarks :

\* Surteat MCI-TPS XV. to be added at Site by the Contractor

TGRMCC reserve the right to adjust these mixes any time with the approval from consulting engineer , justified changes in accordance with TGRMCC Quality Control &amp; Assurance Programme.

## **SPECIFICATION FOR CONCRETE INCORPORATING MIGRATING CORROSION INHIBITOR**

A migrating corrosion inhibitor shall be added to the concrete mix for all piling substructure and superstructure for the project at the rate of 0.60 litres per m<sup>3</sup> of concrete.

The migrating corrosion inhibitor shall be added with the water to the mixer during the mixing cycle at the batching plant or directly into the transit mixer at site at the rate of 0.60 litre per m<sup>3</sup> of concrete. Please adjust the concrete mix design by reducing the addition of water by 80% of the volume of migrating corrosion inhibitor added to the mix of concrete. The migrating corrosion inhibitor shall comply with ASTM G109 or approved equivalent.

The Migrating Corrosion Inhibitor product, when used in accordance with manufacturer's recommendations, should impart changes to three important properties of concrete compared to similar concretes without the product. The changes are: increased corrosion resistance (Durability), no adverse effects on physical properties of concrete and effectiveness even when corrosion is active.

The Migrating Corrosion Inhibitor shall be Surtreat TPS-V as supplied in the Gulf Region by Crown Concreting Products (CCP) • P.O. Box 43010 Abu Dhabi, UAE • Tel. No. 02 6273998 • Fax No. 02 6273994.

## **SPECIFICATION FOR CONCRETE INCORPORATING MIGRATING CORROSION INHIBITOR**

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The Migrating Corrosion Inhibitor product, when used in accordance with manufacturer's recommendations, should impart changes to three important properties of concrete compared to similar concretes without the product. The changes are: increased corrosion resistance (Durability), no adverse effects on physical properties of concrete and effectiveness even when corrosion is active.

### REPORT OF TESTS

Description	One Sample of Surtreat TPS - V Migrating Corrosion Inhibitor	
Tested for	Gulf Concreting Product FZE, Post Box No.43010, Fujairah, U.A.E.	
Lab Ref. No.	WR05-06920 (Page 1 of 4)	Request No. WQ04-07191
Date Received	18.10.2004	Date Reported 02.04.2006

Client's ref. Req. dtd 18.10.2004

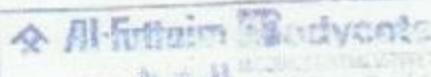
#### 1.0 Introduction

Further to the test work instructions received via a test requisition dated 18.10.2004 from M/s. Gulf Concreting Product Fujairah, Al Futtaim Bodycote Materials Testing Services started a long term test on Surtreat TPS - V Migrating Corrosion Inhibitor as per ASTM G109 to determine the effect of chemical admixture on the corrosion of steel reinforcement in concrete exposed to chloride environment.

#### 2.0 Mix Design for Concrete

To make the test specimen following materials were used:-

Cement	Type I Cement ex Sharjah Cement Co. Dubai, UAE
Aggregate	1½" Aggregate ex STEVIN ROCK
Sand	0 - 5mm Sand ex Bartawi
Admixture (Air Entraining)	Source - MBT
Water	Dubai Main Supply
Additives	Surtreat TPS - V
Steel Reinforcement Bar	14mm ex Qatar



This report shall only be reproduced in full. Approval of the testing laboratory is required for partial reproduction.  
Samples will be retained for a period of one month only, unless otherwise requested.  
The test results relate only to the samples tested.

WR05-06920

(Page 2 of 4)

02.04.2006

### 3.0 Sample Preparation

Concrete was made in accordance with ASTM G109, Section 6.1 using the above materials with a minimum slump of 50mm.

The test specimens were casted with 14mm rebars placed horizontally in the concrete as per standard. The outer portion of the steel was coated with an epoxy. The specimens were demoulded and kept in a thermostatically controlled room for 28 days at a room temperature of  $20\pm 2^\circ\text{C}$  with a relative humidity of  $50\pm 5\%$ .

### Test Method

The surfaces of the specimens were wire brushed and a pond was made using plastic with a measurement of 75mm x 150mm. The pond was filled with 3% sodium chloride solution (approximately 400ml) and the specimens were kept at a room temperature of  $22\pm 2^\circ\text{C}$  with a relative humidity of  $50\pm 5\%$ . After two weeks, the solution was drained and the specimens were dried for 2 weeks. This cycle was continued until the final stage. The sample's current was monitored every 4<sup>th</sup> week during the second week of ponding.

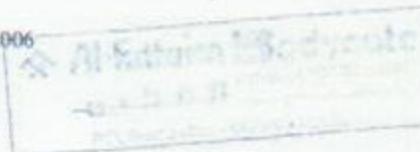
### 4.0 Result

Results are given on the attached sheets.

### 5.0 Conclusion

Based on the above results the supplied Surtreat TPS - V Migrating Corrosion Inhibitor material can be used in concrete as a corrosion resistance additive.

For and on behalf of Al-Futtaim Bodycote  
Materials Testing Services (L.L.C)  
Tested By : SKS , Date tested: 20.01.2005-30.03.2006



WR05- 06920

(Page 3 of 4)

02.04.2006

Evaluation of corrosion Inhibitor- Surtreat TPS - V

Date of Cast	20.01.2005
--------------	------------

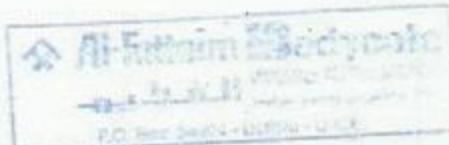
Reading ( $\mu\text{A}$ )		Test	Control
03.03.2005	A	<1	<1
	B	<1	<1
	C	<1	<1
31.03.2005	A	<1	<1
	B	<1	<1
	C	<1	<1
28.04.2005	A	<1	<1
	B	<1	<1
	C	<1	<1
26.05.2005	A	<1	<1
	B	<1	<1
	C	<1	<1
30.06.2005	A	<1	<1
	B	<1	<1
	C	<1	<1
28.07.2005	A	<1	<1
	B	<1	<1
	C	<1	<1
25.08.2005	A	<1	<1
	B	<1	<1
	C	<1	<1

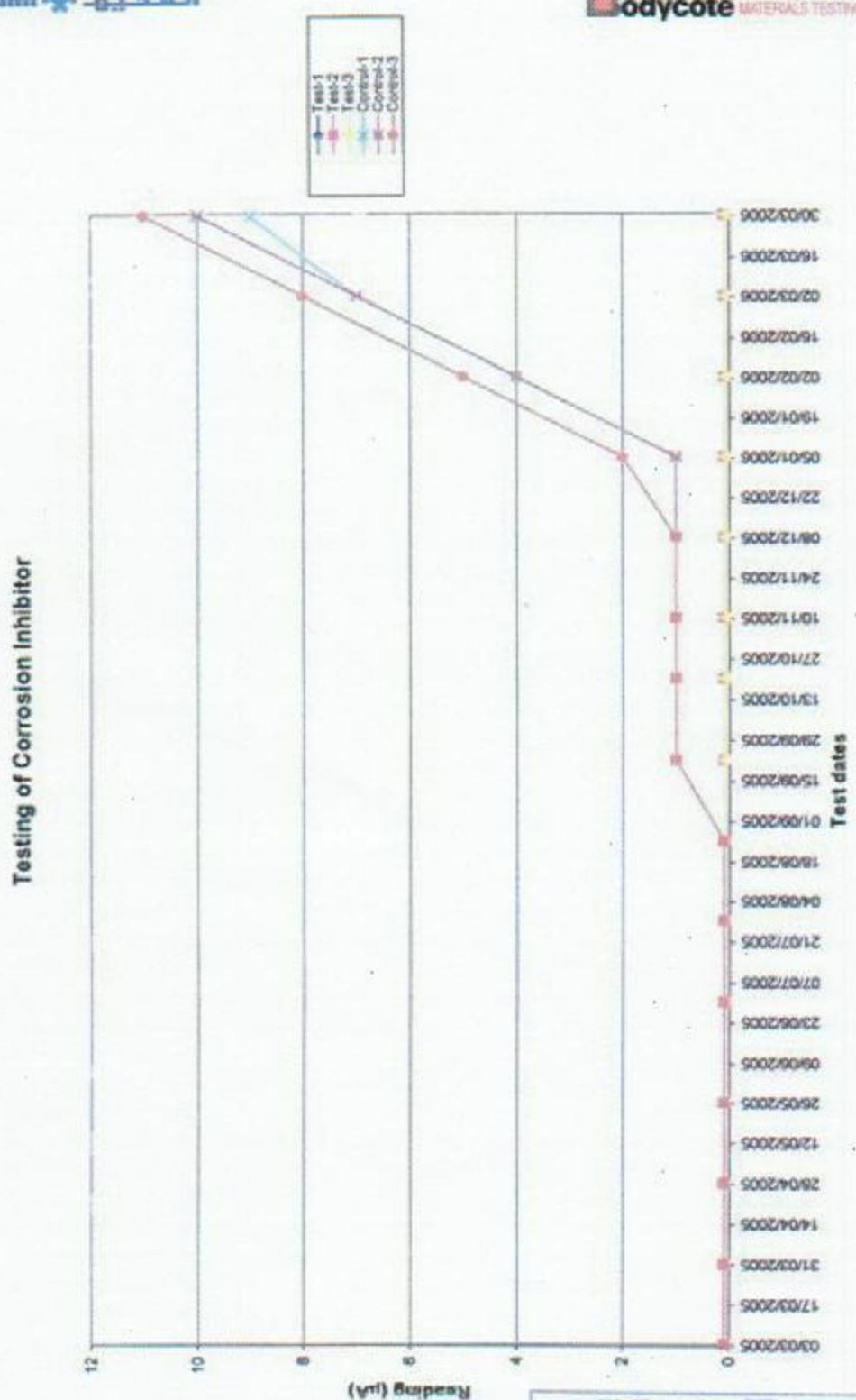
WR05-06920

(Page 4 of 4)

02.04.2006

Reading ( $\mu\text{A}$ )		Test	Control
		A	B
22.09.2005	A	<1	1
	B	<1	1
	C	<1	1
20.10.2005	A	<1	1
	B	<1	1
	C	<1	1
10.11.2005	A	<1	1
	B	<1	1
	C	<1	1
08.12.2005	A	<1	1
	B	<1	1
	C	<1	1
05.01.2006	A	<1	1
	B	<1	1
	C	<1	2
02.02.2006	A	<1	4
	B	<1	4
	C	<1	5
02.03.2006	A	<1	7
	B	<1	7
	C	<1	8
30.03.2006	A	<1	9
	B	<1	10
	C	<1	11





## COMPARISON BETWEEN SURTREAT TPS-V AND CORTEC MCI 2005 CORROSION INHIBITORS

PROPERTIES	SURTREAT TPS XV	CORTEC 2005
Liquid and vapour phase migrating corrosion inhibitors	Yes	Yes
Basic active compound is an amine salt	Yes	
Protects both anodic and cathodic areas	Yes	Yes
Complies to ASTM G 109	Yes	Yes
Has 10 years history	Yes	Yes
Compatible with all known concrete additives	Yes	Yes
Does not affect the strength of the concrete mix	Yes	Yes
Water based and non-flammable	Yes	Yes
Organic, safe and environmentally friendly	Yes	Yes
Does not retard the setting time	Yes	No
Protects against the harmful effects of corrosion even in the densest concrete	Yes	Yes
Does not affect the air entrainment of the concrete mix	Yes	Yes
Required dosage is not affected by chloride concentration	Yes	Yes
Lab and field tested worldwide	Yes	Yes
Concentrated for cost effectiveness on all projects	Yes	Yes
Elevates and controls pH	Yes	Yes
Establishes a protective film on the rebar surface	Yes	Yes
Converts rust into a hard inert shell	Yes	Yes
Purges and stabilizes contaminants	Yes	
Reduces water penetration	Yes	
Reduces porosity	Yes	
Increases surface adhesion (for surface applied materials)	Yes	
Offers engineers, owners, contractors, DOT's and government agencies a time-proven corrosion inhibiting technology that will extend the life of all reinforced concrete structures.	Yes	Yes

## REPORT OF TESTS

Description : Laboratory Trial Mix  
 Tested for : Gulf Concreting Products, P.O. Box 43010, Abu Dhabi, UAE  
 Contact Person : Mr. Frank Casey  
 Tel No. : 02-6273998  
 Fax No. : 02-6273994  
 Exova Ref. No. : ADC 000319 Rev. 0  
 Date Received : 13/01/10  
 Date Reported : 22/02/10  
 Order No. : 2112

### **1.0 Introduction**

Further to the test works instructions received from M/s Gulf Concreting Products – Abu Dhabi, Exova Testing Limited have conducted two (Test and Control) number laboratory concrete trial mixes.

The purpose of the trial mix was to test the following fresh and hardened properties of the concrete.

1.1	Workability (Slump)	:	BS 1881: Part 102:1983
1.2	Temperature	:	ASTM 1064:2007
1.3	Setting Time	:	ASTM C403/403M-06
1.4	Compressive Strength	:	BS 1881: Part 116:1983
1.5	Water Absorption	:	BS 1881: Part 122:1983
1.6	Water Penetration	:	DIN 1048 : Part 5 : 7.6 : 1991
1.7	Rapid Chloride Permeability	:	ASTM C 1202 - 08

### **2.0 Material**

The following individual materials were used for the trial mix. The mixing process was conducted in accordance with UK Department of the Environment Design of Normal Concrete mixes

Materials	Source	Batch Weight	
		Control	Test
20mm Aggregates	RAK	720 Kg/m <sup>3</sup>	720 Kg/m <sup>3</sup>
10mm Aggregates	RAK	350 Kg/m <sup>3</sup>	350 Kg/m <sup>3</sup>
0-5mmCrushed & Washed Sand	RAK	650 Kg/m <sup>3</sup>	650 Kg/m <sup>3</sup>
Dune Sand	Al Ain	300 Kg/m <sup>3</sup>	300 Kg/m <sup>3</sup>
Cement, OPC	RAK	450 Kg/m <sup>3</sup>	450 Kg/m <sup>3</sup>
Water	ADWEA	135 Kg/m <sup>3</sup>	135 Kg/m <sup>3</sup>
Admixture SP 495	FOSROC	7 Kg/m <sup>3</sup>	7 Kg/m <sup>3</sup>
Surtreat TPS V	GCP	--	0.6 L/m <sup>3</sup>

### **3.0 Preparation & Analysis of Fresh Concrete**

The concrete was prepared using a "Crettangle" laboratory mixer. Concrete temperature, workability, initial and final setting time were determined on the fresh concrete.

### **4.0 Testing of Hardened Concrete**

150x150x150mm cubes were prepared from the mix (Test and Control) for compressive strength, Water Absorption, Water Penetration and Rapid Chloride Permeability test.

Client : Gulf Concreting Products

Exova Ref No : ADC 000319 Rev. 0

## 5.0 Results

### 5.1 Fresh Concrete tests

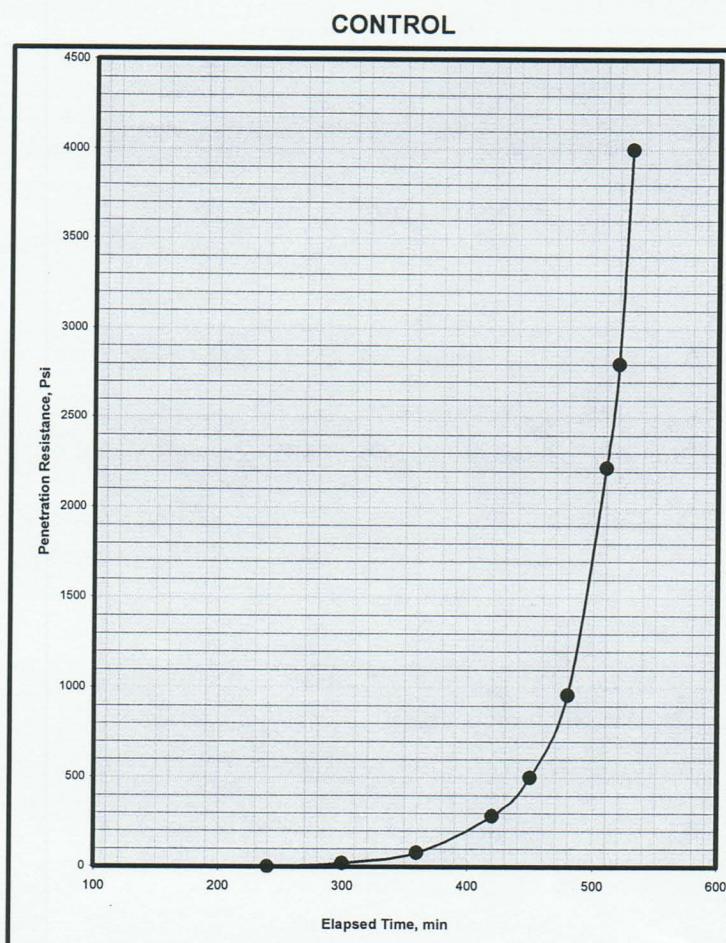
#### 5.1.1 Workability (Slump) & Temperature

Test Method: Slump : BS 1881 Part 102  
 Temperature : ASTM C 1064

Tests		Control		Test	
		Initial	30min	Initial	30 min
Workability(Slump)	mm	120	100	160	100
Concrete Temperature	°C	23.0	23.0	24.0	24.0

#### 5.1.2 Setting Time

Test Method: ASTM C 403/403M-06



**Initial Setting Time**

440 minutes - 7 Hours. 20 minutes



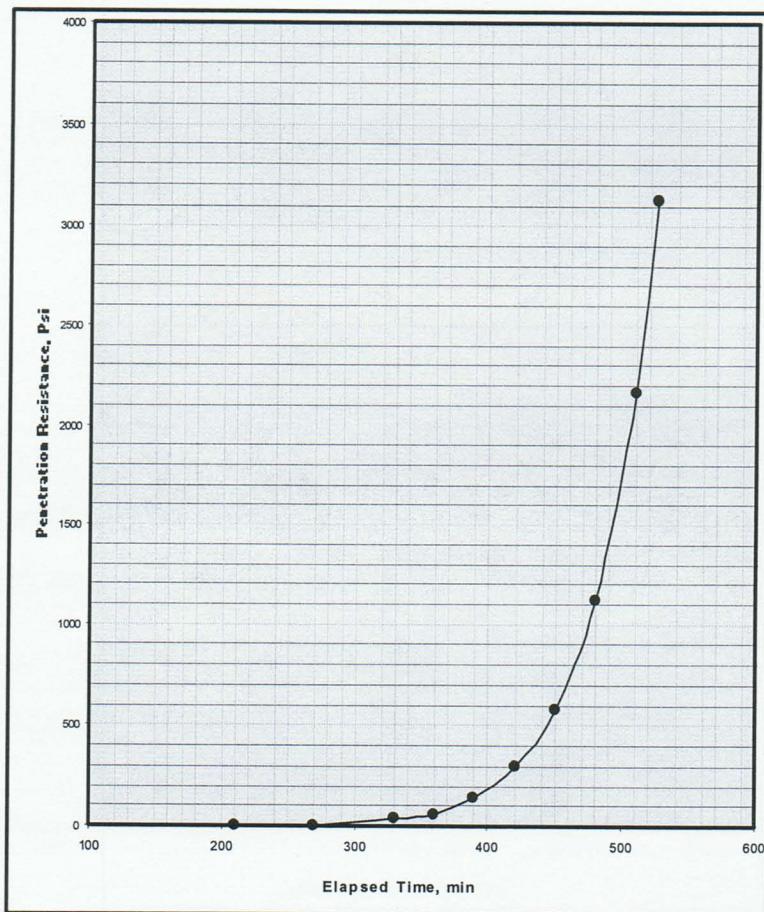
Client

: Gulf Concreting Products

Exova Ref No

: ADC 000319 Rev. 0

### TEST



#### Initial Setting Time

435 minutes - 7 Hours 15 minutes

## 5.2 Testing of Hardened Concrete

### 5.2.1 Compressive Strength

Test Method: 150mm nominal cubes were casted for compressive strength in accordance with BS 1811 Part 116:1983. The specimens were water cured at laboratory conditions.

Sample Identification		Control	Test
Test Ref.	Test Age	Compressive Strength (N/mm <sup>2</sup> )	
1	3	63.0	65.5
2		61.0	63.5
3		63.5	62.0
Average		62.5	63.5
4	7	73.5	71.0
5		72.0	71.5
6		72.0	74.0
Average		72.5	72.0
7	28	84.5	83.5
8		83.0	83.5
9		85.0	78.5
Average		84.0	82.0

Client : Gulf Concreting Products

Exova Ref No : ADC 000319 Rev. 0

### **5.2.2 Water Absorption**

**Test Method :** The test was carried out in accordance with BS 1881: Part 122:1983. The specimens were water cured in the laboratory condition for 28 days.

Test	Test Ref.	Water Absorption %	
		Control	Test
Water Absorption	10	1.5	1.4
	11	1.5	1.4
	12	1.5	1.4

### **5.2.3 Water Penetration**

**Test Method :** The test was carried out in accordance with DIN 1048 : Part 5 : 7.6 : 1991. The specimens were water cured in the laboratory condition for 28 days.

Test	Test Ref.	SSD Density, Kg/m <sup>3</sup>		Max Water Penetration , mm	
		Control	Test	Control	Test
Water Penetration	17	2490	2500	Nil	Nil
	18	2480	2490	Nil	Nil
	19	2490	2480	Nil	Nil

### **5.2.4 Rapid Chloride Permeability**

**Test Method :** The test was carried out in accordance with ASTM C 1202 -08. The specimens were water cured in the laboratory condition for 28 days.

Test	Test Ref.	Control		Test	
		Coulombs	Chloride Penetration	Coulombs	Chloride Penetration
Rapid Chloride Permeability	13	2625	Moderate	2608	Moderate
	14	2930	Moderate	2518	Moderate
	15	2714	Moderate	2477	Moderate
	16	2710	Moderate	2608	Moderate

Date Tested: 20/01/10 – 19/02/10

Tested By : Randy/Anandha/Ajay/Assainar

For and on behalf of Exova Limited (Abu Dhabi) –Umm Al Naar Laboratory

