



## CERTIFICATE OF CONFORMANCE

Date: 06/07/2013 Customer: KEYSTONE PIPELINE LIMITED  
Sales Order No: PJ03050 Customer PO: 25472101POAPV14W0001.  
Line #: 4 Address: PARTNERSHIP  
ATTN: KEYSTONE KXL PAYABLES  
450-1ST STREET S.W.  
CALGARY, ALBERTA T2P-5H1

Crane Energy Flow Solutions certifies that the valve manufactured, all materials used in the manufacturing of the valve, and the inspection and testing process are all in compliance with applicable Crane Co. codes and standards.

PO# 25472-101-POA-PV14-W0001 ITEM# 44 123-MTRSP-B5-WCHK-1051 BODY SERIAL:205 LEFT PLATE SERIAL:367  
RIGHT PLATE SERIAL:369

A handwritten signature in black ink that reads "Brad Toler".

Brad Toler  
Crane Energy Representative

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## CERTIFIED MATERIAL TEST REPORT

Date: 06/07/2013

Sales Order No: PJ03050

Line #: 4

Customer: KEYSTONE PIPELINE LIMITED

Customer PO: 25472101POAPV14W0001.

Address: PARTNERSHIP  
ATTN: KEYSTONE KXL PAYABLES  
450-1ST STREET S.W.  
CALGARY, ALBERTA T2P-5H1

Heat Numbers								
Part Number	Part Description	Serial Number	Optional Tag Number	Body	Shaft	Plate-R	Plate-L	N/A
30H60SMF3	H60SMF3 30	E025999		S0138	—	D1161	D1195	—

### Material Test Results

Material Spec: A216-WCB																	
Heat #	C	MN	S	P	SI	CR	MO	NI	V	Cu	TNSL. KSI	YLD KSI	ELONG %	Reduction of Area%	BHN	CE	AI
Ranges	0.3 MAX	1.0 MAX	0.045 MAX	0.04 MAX	0.6 MAX	0.5 MAX	0.2 MAX	0.5 MAX	0.03 MAX	0.3 MAX	95.0/70.0	36.0 MIN	22.0 MIN	35 Min	237 Max	.45 MAX	0.08 MAX
D1195	0.2	0.86	0.012	0.014	0.52	0.24	0.03	0.13	0.005	0.02	76.897	45.962	32.4	58.38	—	—	—
D1161	0.22	0.89	0.011	0.023	0.413	0.12	0.008	0.089	0.02	0.015	80.29	47.68	33.54	62.68	154	0.405	0.04
S0138	0.217	0.858	0.011	0.02	0.383	0.131	0.008	0.034	0.007	0.018	73.27	48.86	33	61.82	152	0.393	0.04

### Hydrostatic/Pneumatic Test Report

Serial #	Test	Test Type	P.S.I.	SEC	Leak Allow	Leak Actual	Medium	Date	Oper Inits	Comments
E025999	API 598 shell	SHELL	2225	300	0	0	WATER	06/07/2013	BT	
E025999	API 598 seat	SEAT	1630	120	0	0	WATER	06/07/2013	BT	

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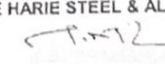


**CERTIFIED MATERIAL TEST REPORT**

*Brad Toler*

Brad Toler  
Crane Energy Representative

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	<b>SHREE HARIE STEEL &amp; ALLOYS</b> ISO 9001 : 2008 & AD 2000-Merkblatt W6 CERTIFIED SF NO.461/1A, MASANDIPALAYAM, KAREKAVUNDANPALAYAM (PO), ANNUR, COIMBATORE (DT) - 641 697, India Phone : 04254 265480 , 04254 292245 Fax : 04254-265480 Mail : hariesteels@yahoo.co.in													
	<b>MATERIAL TEST CERTIFICATE AS PER EN-10204-3.1</b>													
Customer : KARMEN INTERNATIONAL PVT.LTD CHENNAI 600 058		T.C. No. : A6528/13 T.C. Date : 07/01/2013												
P.Order No. : PO1-2012001182/BECH02973 Dt. 03/12/2012		Heat No. : S0138 Pouring Date : 25/12/2012												
Specification : ASTM A 216 Gr. WCB		CASTING PROCESSED BY INDUCTION MELTING FOUNDRY IDENTIFICATION : HSA												
<b>CHEMICAL COMPOSITION - %</b>														
Element	C	Si	Mn	S	P	Cr	Ni	Mo	Cu	V	CE	Al		
Min	---	---	---	---	---	---	---	---	---	---	---	---		
Req. Max	0.220	0.600	1.000	0.045	0.040	0.500	0.500	0.200	0.300	0.030	0.430	0.080		
Actual	0.217	0.383	0.858	0.011	0.020	0.131	0.034	0.008	0.018	0.007	0.393	0.040		
HEAT TREATMENT : NORMALISED : HEATED TO 920°C, SOAKED FOR 11 Hrs AND OPEN AIR COOLED. TEMPERED : HEATED TO 680°C, SOAKED FOR 8 Hrs AND OPEN AIR COOLED.														
<b>MECHANICAL PROPERTIES</b>														
Requirements	Yield Strength		Tensile Strength		% Elong	% of Reduction Area	Hardness	Bend Test	Impact Test in (Joules)					
	Mpa	ksi	Mpa	ksi	GL=50 mm		BHN	D = 2T at 90°	(10mm X 10mm X 55mm) CVN 2mm 45°					
Minimum	250	36.26	485	70.34	22.00	35.00	---							
Maximum	---	---	655	95.00	---	---	---	-	1	2	3	Avg		
Actual	336.87	48.86	505.21	73.27	33.00	61.82	152		--	--	--	--		
<b>ITEM DESCRIPTION</b>														
SL.No.	Description				Drawing No.		Part No.		Quantity					
1	XT1230 30"600 DOUBLE FLANGE BODY				27103-000-43 - S1 No: 2.05				1					
<div style="text-align: right;"> <b>INSPECTED</b>           MAK 08 2013           BY <u>DN</u> </div>														
Remarks : CONFIRMS TO ASTM A 216 Gr. WCB Visual inspection carried as per MSS-SP-55 II - XII a Satisfactory. MPI No.:M18464														
We hereby Certify that the items mentioned above have been tested, inspected and are found to be in accordance with the specification.														
for SHREE HARIE STEEL & ALLOYS <div style="text-align: right;">           M. NAGARAJAN          HOD - QA       </div>														



**Karmen International Pvt. Ltd.**Engineering Division  
CHENNAI - 600 095, INDIA.

Report No.: KIP/XT-C/MT/12-13/096

Date: 28.01.2013

**MAGNETIC PARTICLE TESTING REPORT**

Customer : CRANE VALVES, U.S.A

Equipment : Electro Magnetic Yoke

P.O.No. : BECH03050

Sensitivity : Field Indicator


Specification : ASTM A216 Gr.WCB

Powder : Black (Make: Electro Magfield Controls and Services)

Sl No	Item Description	Drg.No	Ident No.	Sl.No	Qty	MT No.
1	30"600 DOUBLE FLANGE BODY	27103-000-43MM	S0138	205	1	MA5559


Stage of Test : After Machining  
Area Coverage : All accessible Areas 100%  
Method : Visible Wet Continuous Water Based Yoke Magnetization.  
Type of Magnetisation : Longitudinal Yoke Method  
Prod Spacing : 4" to 6"  
Acceptance Standard : ASME B 16.34-2004 Mandatory App II.  
Procedure : ASME SE709 Sec V  
Result : No Relevant Indication observed.  
Remarks : Acceptable to ASME B 16.34 App II.

Witnessed By

  
GANESAN KUPPURAJ  
CRANE ENERGY  
K.SUBRAMANIAN  
ASNT - LEVEL III

QP-QA:18/July/2002

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**067**

K A R M E N Karmen International Pvt. Ltd.	<b>KARMEN INTERNATIONAL PVT. LTD.,</b> CASTMETALS DIVISION A-12, SIPCO INDUSTRIAL GROWTH CENTER, ORACADAM, PIN - 602105, INDIA.		ISO 9001 : 2008 CERTIFIED BY TUV NORD										
	<b>MATERIAL TEST CERTIFICATE</b> (As per EN 10204-3.1)												
Customer : Karmen International Pvt. Ltd. - UNIT I Chennai. 600 058		T.C. No. : KC2697 T.C. Date : 17/11/2012											
P. Order No. : P01-2012000576/BECH02973A Dt. 02/08/2012		Heat No. : D1195 Pouring Date : 18/10/2012											
Specification : ASTM A 216/ Gr. WCB - 2008.		CASTING PROCESSED BY INDUCTION MFLTING FOUNDRY IDENTIFICATION : KC											
<b>CHEMICAL COMPOSITION - %</b>													
Element	C	Mn	Si	P	S	Cr	Ni	Mo	Cu	V	Al	TRE	CE
Req. Min	---	---	---	---	---	---	---	---	---	---	---	---	---
Max	0.220	1.000	0.600	0.040	0.045	0.500	0.500	0.200	0.300	0.030	0.080	1.000	0.430
Actual	0.198	0.890	0.384	0.020	0.011	0.121	0.089	0.011	0.021	0.004	0.047	0.246	0.381
HEAT TREATMENT : NORMALIZING: Heated to 920°C soaked for 4 Hrs and then air cooled. TEMPERING: Heated to 650°C soaked for 5 Hrs and then Air cooled.													
<b>MECHANICAL PROPERTIES</b>													
Requirements	Yield Strength	Tensile Strength	% Elongation	% Reduction	Hardness	Bend Test	Impact Test in (Joules)						
	Mpa	MPa	in 2" GL: 50 mm	of Area	BHN		(10mm X 10mm X 55mm) CVN 2mm 45 ° at						
	0.2% Proof Stress	-	-	-	-								
Minimum	250	485	22.00	35.00	---								
Maximum	---	655	---	---	---		1	2	3 Avg				
Actual	334	592	30.64	59.43	158		--	--	--				
<b>ITEM DESCRIPTION</b>													
SL. No.	Product	Description	Drawing No.	Part No.	Poured Qty								
1	010064	XT115 30" 600 PLATE	22600 R/O - S1 No. 349, 347		4								
INSPECTED FEB 21 2013 BY: <i>[Signature]</i>													
Remarks : TRE=Total Residual Elements : (%Cr+%Ni+%Mo+%Cu+%V) Visual Inspection carried out as per MSS-SP 55-Accepted. We Certify that the material is free of contamination from Radioactive Elements.													
We hereby certify that the items mentioned above have been tested, inspected and found to be in accordance with customer's drawing, specification, purchase order and satisfy the requirements of ASTM A 216/ Gr. WCB - 2008.													
for KARMEN INTERNATIONAL PVT. LTD., <div style="text-align: right;">   <b>P. KUMARESAN</b>          QUALITY ASSURANCE          (Works Expert)       </div>													



K A R M E N	KARMEN INTERNATIONAL PVT. LTD., CASTMETALS DIVISION A-12, SIPCOT INDUSTRIAL GROWTH CENTER, ORAGADAM, PIN : 602105, INDIA.		ISO 9001 : 2008 CERTIFIED BY TUV NORD										
	MATERIAL TEST CERTIFICATE (As per EN 10204-3.1)												
Customer : Karmen International Pvt. Ltd.- UNIT I Chennai. 600 058		T.C. No. : KC2697 T.C. Date : 17/11/2012											
P. Order No. : P01-2012000576/BECH02973A DL 02/08/2012		Heat No. : D1195 Pouring Date : 18/10/2012											
Specification : ASTM A 216/ Gr. WCB - 2008.		CASTING PROCESSED BY INDUCTION MELTING FOUNDRY IDENTIFICATION : KC											
CHEMICAL COMPOSITION - %													
Element	C	Mn	Si	P	S	Cr	Ni	Mo	Cu	V	Al	TRE	CE
Req. Min	---	---	---	---	---	---	---	---	---	---	---	---	---
Max	0.220	1.000	0.600	0.040	0.045	0.500	0.500	0.200	0.300	0.030	0.080	1.000	0.430
Actual	0.198	0.890	0.384	0.020	0.011	0.121	0.089	0.011	0.021	0.004	0.047	0.246	0.381
HEAT TREATMENT : NORMALIZING: Heated to 920°C soaked for 4 Hrs and then air cooled. TEMPERING: Heated to 650°C soaked for 5 Hrs and then Air cooled.													
MECHANICAL PROPERTIES													
Requirments	Yield Strength Mpa 0.2% Proof Stress	Tensile Strength MPa	% Elongation in 2" GL : 50 mm	% Reduction of Area	Hardness BHN	Bend Test	Impact Test in (Joules) (10mm X 10mm X 55mm) CVN 2mm 45 ° at						
Minimum	250	485	22.00	35.00	---		1 2 3 Avg						
Maximum	---	655	---	---	---		-- -- -- --						
Actual	334	592	30.64	59.43	158		-- -- -- --						
ITEM DESCRIPTION													
SL.No.	Product	Description	Drawing No.	Part No.	Poured Qty								
1	010064	XT115 30" 600 PLATE	22600 R/O	~ S1. no: 349, 366, 367 4395  INSPECTED MAR 25 2013	4								
Remarks : TRE=Total Residual Elements : ( %Cr+%Ni+% Mo+%Cu+%V) Visual Inspection carried out as per MSS-SP 55-Accepted. We Certify that the material is free of contamination from Radioactive Elements.													
We here by certify that the items mentioned above have been tested, inspected and found to be in accordance with customer's drawing, specification, purchase order and satisfy the requirements of ASTM A 216/ Gr. WCB - 2008.,													
for KARMEN INTERNATIONAL PVT. LTD.,  P. KUMARESAN QUALITY ASSURANCE (Works Expert)													

S.S.P.I.

SUPERIOR SHOT PEENING, INC.

16880 LUTHE ROAD

HOUSTON, TEXAS 77089

(281) 449-6559 • (800) 554-4903

MFG. FAX (281) 449-6559 • CORP. FAX (281) 449-3151

email: info@superiorshotpeening.com



CERTIFICATION  
OF  
COMPLIANCE

CUSTOMER ORDER NO.

CUSTOMER

C0595  
CRANE ENERGY FLOW SOLUTIONS  
4526 RESEARCH FOREST DR. STE 400  
THE WOODLANDS TX 77381

Date : 08/14/13 No. : 164344  
Req. Date: 08/21/13 Page: 1

Ship to/Remark  
13 - 30" VALVES\*REWORK\*  
PAINT  
8-21

Zone		FOB	Terms	Your#		Re
REWOK		08-21		DOPJ03050R		
Item	Number	Description		Ordered	Ship	BIN
C059530H60SMF3		PO# DOPJ03050RC 30" VALVE #30H60SMF3 WO DPJ03050-1; WO DPJ03050-2; WO DPJ03050-3; WO DPJ03050-4 WO DPJ03050-5; WP DPJ03050-6 WO DPJ03050-7; WO DPJ03050-8 WO DPJ03050-9; WP DPJ03050-10 WO DPJ03050-11; WP DPJ03050-12 WO DPJ03050-13 VALVES TO BE PAINTED SAFTEY WHITE COLOR CODE 27925 TABLE 1 PER BECHTEL DOC NO 25472-100-3PS-NXSO-W001 REV 1 PAINT SYSTEM PS-00-14 FROM TABLE 5 APPLIED PER MANUFACTURERS INSTRUCTIONS SSPC PA-1		13.0		13.0

SUPERIOR SHOT PEENING, INC. CERTIFIES That The Job(s) Listed Above Are In  
Accordance With Military Specification MIL-S-13165C And or As Customer Specification  
Noted Above.

Certified This 20 Day of AUGUST, 2013

Quality Assurance Signature

BECHTEL  
067

F.A.A. CERT No.



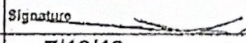
## SUPPLIER DEVIATION DISPOSITION REQUEST (SDDR) FORM

## NOTES:

This form is not to be used for clarification or resolution to conflicting requirements. Please contact the Buyer when clarifications are needed.

1. COMPLETE INSTRUCTIONS FOLLOW THIS SHEET
2. Items 1 thru 18 and 19 below to be completed by Supplier
3. (\*) Items, KXL entries only (others by Supplier)
4. Non-applicable items to be marked "N/A"

5. Attach additional information whenever necessary
6. KXL shall be notified within 5 days after detection of deviation
7. A copy of the completed SDDR form shall be included by the Supplier in the quality verification data package for each item to which this SDDR applies.

FOR SUPPLIER USE		FOR KEYSTONE XL USE	
SUPPLIER SDDR NO.	DATE SUBMITTED	PROJECT: KXL Oil Pipeline Project	KEYSTONE XL SDDR NO.
N/A	7/19/2013	JOB NO: 25472	DATE RECEIVED
1. Supplier Name Address City & State Zip			
Crane Energy 9860 Johnson Road Montgomery, TX 77316			
2. Supplier's Order No. PJ03050		3. Supplier's Tag No. See attached list	
5. Keystone XL P.O. & Rev. No. 25472-101-POA-PV14-W0001, Rev 4		7. Keystone XL Tag Name See attached list	
8. Deviation Description (Attach extra sheets, photographs, sketches, etc. as necessary and identify quantity and serial numbers, as applicable): Paint specification 25472-100-3PS-NXSO-W0001 Rev 01 calls out the following Mill thicknesses for system number PS-O-14: DFT for primer is 3 Mills min and 4 Mills max, DFT for top coat is 6 Mills min and 7 Mills max. Crane is requesting that coating is per manufacture product data sheet. Attached are copies of coating manufacture product data sheets.			
9. Affected Specification, Drawing, or Document No: 25472-100-3PS-NXSO-W0001 Rev 01			
10. Supplier Proposed Disposition: <input checked="" type="checkbox"/> Use As-Is <input type="checkbox"/> Repair <input type="checkbox"/> Replace			
11. Cost Impact: \$0.00		12. Schedule Impact: None	
13. Proposed Disposition and Technical (plus Cost/Schedule if applicable) Justifications: Attach extra sheets, sketches, etc., as necessary. USE AS IS			
14. Associated Supplier Document Change(s). USE AS IS			
15. Supplier's Authorized Representative Name John Wiles		Signature 	
Title Quality Supervisor		Date 7/19/13	
*16. Keystone Engineering Action <input checked="" type="checkbox"/> Accepted <input type="checkbox"/> Rejected Engineering <input type="checkbox"/> Drawing Change ( <input type="checkbox"/> KXL <input type="checkbox"/> Supplier) <input type="checkbox"/> Licensing Document Change Follow-up <input type="checkbox"/> Spec/Req. Change ( <input type="checkbox"/> KXL <input type="checkbox"/> Supplier) <input type="checkbox"/> Price Adjustment <input type="checkbox"/> Other Supplier Affected <input type="checkbox"/> Other			
*17. Keystone Disposition Statement including Justification (Attach extra sheets, sketches, etc. as necessary). Acceptable to use manufactures PPS provided paint is applied well, cured and visually acceptable Construction Action Required <input type="checkbox"/> Yes <input type="checkbox"/> No			
*18. Keystone Disposition Approval/Signature		19. Supplier	
EC RE: Name Signature Date EC ADJ/REG: Bob Bauer Bob Bauer Aug 02/13 EC APE/PEM: Name Signature TCPL PEM: Rick Warren Rick Warren Aug 9/11		Date 8/20/13	
		*20. Bechtel Supplier Quality Rep Date Name Signature Date 8-26-13	
		21. Bechtel Project Procurement Manager Date	

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Sales Order	Line	Bechtel PO #	Bechtel Item #	Bechtel Tag # in ASI
PJ03050	1	101	41	122-LKSDE-B4-WCHK-1041
PJ03050	2	101	42	122-LKSDE-B5-WCHK-1051
PJ03050	3	101	43	123-MTRSP-B4-WCHK-1041
PJ03050	4	101	44	123-MTRSP-B5-WCHK-1051
PJ03050	5	101	45	124-OYENS-B4-WCHK-1041
PJ03050	6	101	46	125-BDLSS-B4-WCHK-1041
PJ03050	7	101	47	125-BDLSS-B5-WCHK-1051
PJ03050	8	101	48	126-FXLVY-B4-WCHK-1041
PJ03050	9	101	49	126-FXLVY-B5-WCHK-1051
PJ03050	10	101	50	127-PIAPT-B4-WCHK-1041
PJ03050	11	101	51	127-PIAPT-B5-WCHK-1051
PJ03050	12	101	52	128-GRSSY-B4-WCHK-1041
PJ03050	13	101	53	128-GRSSY-B5-WCHK-1051

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## Selection &amp; Specification Data

Generic Type	Solvent Based Inorganic Zinc
Description	Time-tested corrosion resistant primer that protects steel galvanically in the harshest environments. For over five decades, Carbozinc 11 (CZ 11) has been the industry standard for high-performance inorganic zinc protection on steel structures worldwide.
Features	<ul style="list-style-type: none"> <li>• Carbozinc 11 meets Class B slip co-efficient and creep testing criteria for use on faying surfaces.</li> <li>• Rapid cure. Dry to handle in 45 minutes at 60°F (16°C) and 50% relative humidity.</li> <li>• Low temperature cure down to 0°F (-18°C).</li> <li>• High zinc loading.</li> <li>• Meets FDA requirements in gray color.</li> <li>• Very good resistance to salting.</li> <li>• May be applied with standard airless or conventional spray equipment.</li> <li>• VOC compliant in certain areas</li> </ul>
Color	Green (0300), Gray (0700)
Finish	Flat
Primers	Self Priming
Topcoats	May be coated with Acrylics, Epoxies, or Polyurethanes depending on exposure and need.  Not required for certain exposures. Under certain conditions, a mist coat is required to minimize topcoat bubbling.
Service Temperature	<u>Untopcoated</u> Continuous: 750°F (400°C) Non-Continuous: 800°F (427°C) <u>With recommended high heat topcoats:</u> Continuous: 1000°F (538°C) Non-Continuous: 1200°F (649°C)
Dry Film Thickness	2.0 - 3.0 mils (51 - 76 microns) per coat  Dry film thickness up to 6.0 mils (150 microns) is acceptable
Solids Content	By Weight 79%
Zinc Content in Dry Film	By Weight 85%
Theoretical Coverage Rates	1000 square feet at 1 mil (24.5 square meters/liter at 25 microns) DFT; 333 square feet at 3 mils (8.2 square meters/liter at 75 microns) DFT.
VOC Values	As Supplied EPA Method 24: 4.0 lbs./gal (479 g/l)  Thinned: 7 oz/gal w/ #21: 4.1 lbs./gal (492 g/l) 5 oz/gal w/ #20: 4.1 lbs./gal (492 g/l) 5 oz/gal w/ #33: 4.1 lbs./gal (492 g/l) 8 oz/gal w/ #254: 4.0 lbs./gal (507 g/l) These are nominal values.

## Substrates &amp; Surface Preparation

General	Surfaces must be clean and dry. Employ adequate methods to remove dirt, dust, oil and all other contaminants that could interfere with adhesion of the coating.
Steel	<u>Non-Immersion</u> : SSPC-SP6 and obtain a 1.0-3.0 mil (25-75 micron) angular blast profile (Reference ASTM D4417)

## Performance Data

Test Method	System	Results
AASHTO M300 Bullet Hole Immersion Paragraph 4.6.9	1 ct. CZ11 over Abrasive blasted steel	No blistering or rusting of coating or rusting of bare steel area after 650 hrs. Immersion in 5% sod
ASTM A-325 Slip Co-efficient	Blasted Steel 1 ct. CZ 11 @6 mils (150 microns)	0.68; meets requirement for Class B rating
ASTM B117 Salt Spray	1 ct CZ11 at 2 mils dry film thickness over blasted steel.	No rusting blistering cracking delamination after 43000 hrs. Moderate salting of the surface only.
ASTM D3363 Pencil Hardness	1 ct. CZ11	Pencil Hardness "2H"

Test reports and additional data available upon written request.

## Mixing &amp; Thinning

Mixing	Power mix base, then combine and power mix as follows. Pour zinc filler very slowly into premixed base with continuous agitation. Mix until free of lumps. Pour mixture through a 30 mesh screen. <b>DO NOT MIX PARTIAL KITS.</b> Tip: Sifting zinc through a window screen will aid in the mixing process by breaking up or catching dry zinc lumps.
Thinning	May be thinned up to 5 oz/gal (4%) with #26 or #33 for ambient and warm surfaces. For extremely warm or windy conditions (above 85°F/29°C) may be thinned up to 8 oz/gal (6%) with #254. In cool weather (below 40°F (4°C)), thin up to 7 oz/gal (6%) with #21. Use of thinners other than those supplied or recommended by Carboline may adversely affect product performance and void product warranty, whether expressed or implied.
Ratio	1 Gal. Kit - Part A - .75 gal 1 Gal Kit - Zinc Filler - 14.6lbs 5 Gal Kit - Part A - 3.75 gal 5 Gal Kit - Zinc Filler - 73 lbs.
Pot Life	8 Hours at 75°F (24°C) and less at higher temperatures. Pot life ends when coating becomes too viscous to use.

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March 2013

To the best of our knowledge the technical data contained herein is true and accurate on the date of publication and is subject to change without prior notice. User must contact Carboline Company to verify correctness before specifying or ordering. No guarantee of accuracy is given or implied. We guarantee our products to conform to Carboline quality control. We assume no responsibility for coverage, performance or injuries resulting from use. Liability, if any, is limited to replacement of products. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY CARBOLINE, EXPRESS OR IMPLIED, STATUTORY, BY OPERATION OF LAW, OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Carboline® and CarboGuard® are registered trademarks of Carboline Company.

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# Carbozinc® 11

## Application Equipment Guidelines

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

<b>Spray Application (General)</b>	The following spray equipment has been found suitable and is available from equipment manufacturers. Keep material under mild agitation during application. If spraying stops for more than 10 minutes, recirculate the material remaining in the spray line. Do not leave mixed primer in the hoses during work stoppages.
<b>Conventional Spray</b>	Agitated pressure pot equipped with dual regulators, 3/8" I.D. minimum material hose, with a maximum length of 50 feet; 0.070" I.D. fluid tip and appropriate air cap.
<b>Airless Spray</b>	Pump Ratio: 30:1 (min.) GPM Output: 3.0 (min.) Material Hose: 3/8" I.D. (min.) Tip Size: 0.019-0.023" Output PSI: 1500-2000 Filter Size: 60 mesh PTFE packings are recommended and available from the pump manufacturer.
<b>Brush</b>	For touch-up of areas less than one square foot only. Use medium bristle brush and avoid rebrushing.
<b>Roller</b>	Not recommended.

## Application Conditions

Condition	Material	Surface	Ambient	Humidity
Minimum	0 °F (-18 °C)	0 °F (-18 °C)	0 °F (-18 °C)	30%
Maximum	130 °F (54 °C)	200 °F (93 °C)	130 °F (54 °C)	95%

This product simply requires the substrate temperature to be above the dew point. Condensation due to substrate temperatures below the dew point can cause flash rusting on prepared steel and interfere with proper adhesion to the substrate. Special application techniques may be required above or below normal application conditions.

## Curing Schedule

Surface Temp. & 50% Relative Humidity	Dry to Handle	Dry to Recoat & Topcoat w/ other finishes
0 °F (-18 °C)	4 Hours	7 Days
40 °F (4 °C)	1 Hours	48 Hours
60 °F (16 °C)	45.0 Minutes	24 Hours
80 °F (27 °C)	45.0 Minutes	18 Hours
100 °F (38 °C)	15.0 Minutes	16 Hours

These times are based on a 3.0-4.0 mil (75-100 micron) dry film thickness. Higher film thickness, insufficient ventilation or cooler temperatures will require longer cure times and could result in solvent entrapment and premature failure. Humidity levels below 50% will require longer cure times. Notes: Any salt that appears on the zinc surface as a result of prolonged weathering exposure must be removed prior to the application of additional coatings. Also, loose zinc must be removed from the cured film by rubbing with fiberglass screen wire (if 1) The Carbozinc 11 is to be used without a topcoat in immersion service and "zinc pick up" could be detrimental, or 2) When "dry spray/overspray" is evident on the cured film and a topcoat will be applied. For accelerated curing or where the relative humidity is below 40%, allow an initial 2-hour ambient cure. Follow 2 hour cure with water misting or steam to keep the coated surface wet for a minimum of 8 hours and until the coated surface achieves a "2H" pencil hardness per ASTM D3363.

## Cleanup & Safety

<b>Cleanup</b>	Use Thinner #21 or Isopropyl Alcohol. In case of spillage, absorb and dispose of in accordance with local applicable regulations.
<b>Safety</b>	Read and follow all caution statements on this product data sheet and on the MSDS for this product. Employ normal workmanlike safety precautions.
<b>Ventilation</b>	When used as a tank lining or in enclosed areas, thorough air circulation must be used during and after application until the coating is cured. The ventilation system should be capable of preventing the solvent vapor concentration from reaching the lower explosion limit for the solvents used. In addition to ensuring proper ventilation, appropriate respirators must be used by all application personnel.

## Packaging, Handling & Storage

<b>Shelf Life</b>	Part A: 12 months at 75°F (24°C) Part B: 24 months at 75°F (24°C)  *Shelf Life: (actual stated shelf life) when kept at recommended storage conditions and in original unopened containers.
<b>Shipping Weight (Approximate)</b>	1 Gallon Kit - 23 lbs (10 kg) 5 Gallon Kit - 113 lbs (51 kg)
<b>Storage Temperature &amp; Humidity</b>	40° - 100°F (4-38°C). 0-90% Relative Humidity
<b>Flash Point (Setaflash)</b>	Part A: 55°F (13°C) Zinc Filler: NA
<b>Storage</b>	Store Indoors.



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March 2013

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## Selection &amp; Specification Data

Generic Type	Modified Siloxane Hybrid
Description	Carboxane 2000 is a premium, ultra-durable coating that provides outstanding gloss and color retention for exterior exposures. When used over a suitable primer (as a two coat system) Carboxane 2000 provides the barrier properties normally seen using a three-coat system (primer, epoxy intermediate with an acrylic-polyurethane finish) for most environments. This tightly cross-linked film utilizes a UV-resistant siloxane binder resulting in a finish with outstanding barrier properties and weathering performance that far exceeds polyurethanes.
Features	<ul style="list-style-type: none"> <li>• Exceptional weatherability</li> <li>• Long life performance</li> <li>• Outstanding gloss/color retention</li> <li>• VOC compliant</li> <li>• Excellent abrasion resistance</li> <li>• Isocyanate free</li> <li>• Flexible Film</li> </ul>
Color	Refer to Carboline Color Guide
Finish	Gloss
Primers	Compatible with inorganic and organic zinc rich primers, epoxies and others as recommended by Carboline Technical Service
Dry Film Thickness	3.0 - 7.0 mils (76 - 178 microns) per coat  As the finish of a two coat system (over a primer) a minimum of 5 mils (125 microns) is recommended. As the finish of a three coat system (primer and intermediate coat), a minimum of 3 mils (75 microns) is recommended. See Severe Exposures below.
Solids Content	By Volume 75% +/- 2%
Surface Burning Characteristics	Flame Spread Index: 0 Smoke Developed Index: 10
Theoretical Coverage Rate	1203 ft <sup>2</sup> at 1 mil (30 m <sup>2</sup> /l at 25 microns) 401 ft <sup>2</sup> at 3 mils (10 m <sup>2</sup> /l at 75 microns) 172 ft <sup>2</sup> at 7 mils (4 m <sup>2</sup> /l at 175 microns)  Allow for loss in mixing and application.
Severe Exposures	For severe marine environments (offshore structures) a three coat system is recommended. For other severe exposures, a two coat system may be used provided the minimum film thickness of 5 mils (25 microns) is achieved.
VOC Values	Thinner 10 13 oz/gal; 2.29 lbs/gal (275 g/l) As Supplied 1.8 lbs/gal (216 g/l) mixed  These are nominal values and may vary with color
Dry Temp. Resistance	Continuous: 200 °F (93 °C) Non-Continuous: 250 °F (121 °C)

## Substrates &amp; Surface Preparation

General	Surfaces must be clean and dry. Employ adequate methods to remove dirt, dust, oil and all other contaminants that could interfere with adhesion of the coating. Refer to specific primer's Product Data Sheet for detailed requirements of the specified primer
Steel	SSPC-SP6 with a 1.5-2.5 mil (37.5-62.5 micron) surface profile for maximum protection. SSPC-SP2 or SP3 as minimum requirement. Prime with recommended primer.
Galvanized Steel	SSPC-SP1 and prime with specific Carboline primers as recommended by your Carboline sales representative.

## Performance Data

Test Method	System	Results
Adhesion: ASTM D4541	859/2000	1362 psi
EMMAQUA Weathering	2000	Exposure 12 mos. Gloss Retention 90% Exposure 24 mos. Gloss Retention 73% Exposure 32 mos. Gloss Retention 61%
Flexibility: Conical Mandrel	2000	>3/8 inch
Pencil Hardness	2000	F
QUV-A Weathering	2000	Exposure 4000 hours Gloss Retention 99% Exposure 8000 hours 80% gloss retention Exposure 12000 hours Gloss Retention 53%
South Florida Weathering	2000	Exposure 4 years Gloss Retention 90% dE: 0.45 color change
Wet Adhesion: "X-Cut", Knife Adhesion	859/2000	No failure after 7 days

## Mixing &amp; Thinning

Mixing	Power mix Part A separately. Part B requires no mixing. Then combine power mix. DO NOT MIX PARTIAL KITS.
Thinning	Not normally required. May be thinned up to 10% (13 oz/gal) with Thinner #10 for spray, and Thinner 214, 215, or 238 for brush and roll.
Ratio	Part A: 2.2:1 Part B: by volume.
Pot Life	8 hours at 75°F (23°C) and less at higher temperatures. Material is moisture sensitive. If left uncovered for extended periods or under very high humidity conditions, check for and remove any skinning that may occur.

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2000

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# Carboxane<sup>®</sup> 2000

## Application Equipment Guidelines

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

**Spray Application (General)** This is a high solids coating and may require adjustments in spray techniques. Wet film thickness is easily and quickly achieved. The following spray equipment has been found suitable and is available from manufacturers.

**Airless Spray** Pump Ratio: 30:1 (min.)  
Volume Output: 2.5 gpm min. (11.5 l/min min.)  
Material Hose: 1/2" I.D. min. (12.5mm min.)  
Tip Size: 0.017-0.021" (0.43-0.53mm)  
Output Pressure: 1500-2000 psi (105-140kg/cm<sup>2</sup>)

**Brush & Roller (General)** Multiple coats may be required to obtain desired appearance, recommended dry film thickness and adequate hiding. Avoid excessive re-brushing or re-rolling.

**Brush** Use a medium natural bristle brush.

**Roller** Use a short to medium-nap mohair roller cover with solvent resistant core.

## Application Conditions

Condition	Material	Surface	Ambient	Humidity
Minimum	50 °F (10 °C)	35 °F (2 °C)	35 °F (2 °C)	20%
Maximum	90 °F (32 °C)	110 °F (43 °C)	110 °F (43 °C)	90%

Industry standards are for substrate temperatures to be 5°F (3°C) above the dew point. Protect from high humidity, dew and direct moisture contact until fully cured. Application and/or curing in humidities above maximum, or exposure to moisture from rain or dew may result in a loss of gloss and/or staining of the product.

## Curing Schedule

Surface Temp. & 50% Relative Humidity	Dry to Recoat	Dry to Touch	Hard Cure
35 °F (2 °C)	24 Hours	8 Hours	30 Hours
60 °F (16 °C)	12 Hours	3 Hours	24 Hours
75 °F (24 °C)	6 Hours	2 Hours	18 Hours

These times are based on recommended coverage rates. Curing under low humidity conditions will extend times. Maximum recoat for this product is 30 days. After this period, it is best to degloss the surface by abrasive blasting or sanding prior to recoating. \*Fingernail hard

## Cleanup & Safety

**Cleanup** Use Thinner #2 or Acetone. In case of spillage, absorb and dispose of in accordance with local applicable regulations.

**Safety** Read and follow all caution statements on this product data sheet and on the MSDS for this product. Employ normal workmanlike safety precautions.

**Ventilation** When used in enclosed areas, thorough air circulation must be used during and after application until the coating is cured. The ventilation system should be capable of preventing the solvent vapor concentration from reaching the lower explosion limit for the solvents used. User should test and monitor exposure levels to insure all personnel are below guidelines. If not sure or if not able to monitor levels, use MSHA/NIOSH approved supplied air respirator.

## Packaging, Handling & Storage

### Shelf Life

Part A: 24 months at 76°F (24°C)

Part B: 24 months at 76°F (24°C)

\*Shelf Life: (actual stated shelf life) when kept at recommended storage conditions and in original unopened containers.

### Shipping Weight (Approximate)

1 Gallon Kit - 13 lbs (6 kg)

5 Gallon Kit - 67 lbs (30 kg)

### Storage

40 -110°F (4°C-43°C)

### Temperature & Humidity

0-90% Relative Humidity

### Flash Point (Setflash)

Part A: 98°F (36°C)

Part B: 75°F (24°C)

Thinner 10: 83°F (28°C)

Thinner 214: 102°F (38°C)

Thinner 215: 128°F (53°C)

Thinner 238: 102°F (38°C)

Thinner 2: 23°F (-5°C)

### Storage

Store Indoors, KEEP DRY.

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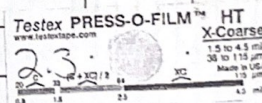


# SUPERIOR SHOT PEENING INSPECTION REPORT

JOB#: 164344  
WO# DPJ03050-4

INSPECTOR: JOSE AMEZCUA

PART NUMBER/DESCRIPTION		PAINT SPECIFICATION				QUANTITY		
30H60SMF3 - 30" VALVES		BECHTEL DOC# 25472-100-3PS-NXSO-W001 REV 1				13		
SURFACE PREP		INSPECTION ACTION						
		1ST COAT		2ND COAT		3RD COAT		NOTES
AIR TEMP	86	AIR TEMP		AIR TEMP		AIR TEMP		PAINTING DONE
HUMIDITY	50%	BRAND	CARBOLINE	BRAND	CARBOLINE	BRAND	CARBOLINE	INSIDE BUILDING
DEW POINT	25	TYPE	CARBOZAK11	TYPE	CARBOXANE2000	TYPE	CARBOXANE2000	
METAL TEMP.		BATCH#	13FD8473L	BATCH#	11ED5420L	BATCH#	11ED5420L	
BLAST TYPE	SP10	WET MILS	6	WET MILS	8	WET MILS	8	
		THINNER	#26	THINNER	#10	THINNER	#10	
ABRASIVE SIZE	GREEN DIAMOND	COLOR	GREY A700	COLOR	WHITE 1864	COLOR	WHITE 1864	
		DRY MILS	3	DRY MILS	4	DRY MILS	2	
A.P. DEPTH		THINNER		THINNER		THINNER		
2.3		DRY MILS		DRY MILS		DRY MILS		
SAVE TAPE:	1	COLOR		COLOR		COLOR		
		DRY MILS	TO	DRY MILS	TO	DRY MILS	9 TO 11	
NOTES:								



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WorleyParsons

Valve Datasheet - Pipeline Facilities  
Dual Plate Check Valve

10/18/2011

Project: Keystone XL Oil Pipeline Project		Project No.: 08E4490		Sheet: 1 Of 2	
Client: TransCanada Keystone Pipeline Limited Partnership		Datasheet No.: 25472-101-PVD-PV14-W0001		Rev: 03	
<b>General:</b>					
Note: Indicates Information Completed By <input type="radio"/> Purchaser <input type="checkbox"/> Manufacturer					
1	● Size:	NPS 30	Pressure Rating:	PN 100	
2	■ Manufacturer:	Crane $\Delta_1$	Impact Test Required:	<input type="radio"/> Yes <input checked="" type="radio"/> No	
3	● Quantity:	41 $\Delta_3$	Location	<input type="radio"/> U.S. <input checked="" type="radio"/> Canada	
4	■ Weight	1735 $\Delta_1$ kg	Design Code:	<input type="radio"/> API 6D <input checked="" type="radio"/> API 594 <input type="radio"/> CSA Z245.15	
5	<input type="checkbox"/> Flow Coefficient	Cv	Grade:	<input checked="" type="radio"/> Above Grade <input type="radio"/> Below Grade	
6				Application: Pump Station Header - Unit and Discharge	
7	<b>Mechanical Design Conditions:</b>			<b>Materials:</b> $\Delta_1$	
8	● MDMT:	-29 °C	■ Body:	ASTM A216 WCB	
9	● Min Design Temp for Elastomers:	-40 °C	■ Plates:	ASTM A216 WCB	
10	● Ambient Temp.:	-40 to 40 °C	■ Seat Seal - Body:	Buna N	
11	● Product Temp.:	0 to 70 °C	■ Seat Seal - Disc:	N/A	
12	● Max Design Temp.:	70 °C	■ Hinge Pin:	316 SS	
13	● Design Pressure:	9930 kPag	<input type="checkbox"/> Gasket:		
14	● Max Operating Pressure:	9930 kPag	<input type="checkbox"/> Bolting:		
15	<input type="radio"/> Fire Safety Std:		■ Pins:	316 SS	
16	● Fluids Handled	Crude Oil	■ Spring:	316 SS	
17					
18	Fluid Name	S.G.	Viscosity cSt		
19	Diluted Bitumen (Dilbit)	0.94	350	<b>Additional Requirements:</b>	
20	Synthetic Crude Oil (SCO)	0.86	3.6		
21		(Note 2)	(Note 3)		
22	End Configuration:	<input checked="" type="radio"/> Flanged (Raised Face)			
23	(Note 1)	<input type="radio"/> Welded			
24		<input type="radio"/> Wafer			
25	Welded End Info (if Required):				
26	<input type="radio"/> Pipe Material & Grade:	N/A			
27	<input type="radio"/> Pipe Outer Diameter:	N/A			
28	<input type="radio"/> Pipe Wall Thickness:	N/A			
29	<input type="radio"/> Piping Specification:	N/A			
30	<b>Painting:</b>				
31	● External Paint Spec or Standard:				
32	Painting System for Above Ground Facilities				
33	25472-100-3PS-NXSO-W0001				
34					
35	<b>Notes:</b>				
36	1) End connections shall be flanged and dimensions in accordance with ASME B16.47 Series A Flanges.				
37	2) Dilbit and Synthetic Crude specific gravity at standard temperature 15°C.				
38	3) Maximum viscosity of Dilbit at 18.5°C and minimum viscosity of synthetic crude at 45°C.				
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Rev	Description	Originator	Reviewer	WP Approval	Date
01	Issued For Purchase	Brad Kooy	Troy Smereka		3-Dec-09
02	Re-Issued for Purchase	Brad Kooy	Troy Smereka		29-Jan-10
03	New valves added to K2 scope. Re-Issued for Purchase	Nick Ivankiv	Chunlin Du		12-Oct-11

25472-101-PVD-PV14-W0001 Rev.03