PIPEWORX LTD.
A PLH GROUP COMPANY

MRR #28

MATERIAL RECEIVING INSPECTION REPORT

SALES ORDER NUMBER:	490153
PIPEWORX JOB#:	162-113
OWNER:	PEMBINA PIPELINE CORPERATION
PO NUMBER:	4500084343 R1
DATE:	Tuesday, May 31, 2016
Ordered By:	PEMBINA PIPELINE CORPERATION

* NOTE:

1. **MATERIAL TEST REPORTS** (MTR'S) AND **CRN NUMBERS** ARE REQUIRED TO BE RECEIVED WITH EACH ORDER AND REVIEWED FOR COMPLIANCE TO MATERIAL SPECIFICATIONS AS ORDERED IF SPECIFIED IN THE CONTRACT DOCUMENTS. CONSULT THE PIPEWORX QUALITY MANUAL.
2. COMPLETE OVER / SHORT / DAMAGE REPORT IF REQUIRED AND MAKE NOTE IN REMARKS.
3. ATTACH OR REFERENCE ALL SUPPORTING DOCUMENTATION FOR TRACEABILITY (i.e. PO, PACKING SLIPS etc.)
4. ALL FITTING DESIGNS MUST BE REGISTERED WITH ALBERTA BOILERS SAFEY ASSOCIATION.

ITEM #	PO ITEM#	Quantity	Size	Sch	Rating	Grade	DESCRIPTION	HEAT NUMBER	REC.	INITIAL	INSPECT FOR DAMAGE		MTR RECEIVED
1		2	8"	Sch 80	600#	A-350-LF2	FLANGE, ANCHOR, 600 CL, SCH 80, ASME B16.5, ASTM A-350-LF2 CL1	7310AF4	YES	WW	Accept		YES

REMARKS (IF NCR IS ISSUED, NOTE NCR NUMBER):	

PIPEWORX QUALITY REPRESENTATIVE	DATE RECEIVED	SIGNATURE
NAME: Keith Noble	May 31th, 2016	
TITLE: QC Inspector		

Bill of Lading
Police de chargement

COMCO PIPE & SUPPLY COMPANY
A Division of Russel Metals

Certified System ISO 9001

- 5910 - 17TH STREET NW, P.O. BOX 457, EDMONTON, AB, T6J 2K1, TEL. (780) 440-2000, FAX (780) 440-4275
- 2165 - 70TH AVENUE, EDMONTON, AB, T6P 0B4, TEL. (780) 468-1115, FAX (780) 440-3091
- 14 Kerr Crescent, Pusinch, ON, N0B 2J0, TEL. (519) 763-1114, FAX. (519) 763-3722
- 116 - 4 STREET EAST, STONEWALL, MB, R0C 2Z0, TEL. (204) 467-8797, FAX. (204) 467-5588
- 300 MACDONALD CRESENT, FORT MCMURRAY AB, T9H 4B6, TEL. (780) 743-3404, FAX. (780) 790-3456
- 4203-63 AVE, EDMONTON AB, T6B 3P4

NAME OF CARRIER/ NOM DU TRANSPORTEUR	POINT OF ORIGIN/ POINT D'ORIGINE	SHIPPING DATE/ DATE D'EXPÉDITION
TBD Transtech		31-May-2016
CONSIGNEE/ DESTINATAIRE	**CARRIER'S NUMBER/ NOM DU TRANSPORTEUR**	**from** Comco Pipe & Supply Co Comco Tuyaux et fourniture
PEMBINA PIPELINE		
TBD	PROVINCE/ STATE/ PROVINCE/ ÉTAT	COUNTRY OF/ COMTÉ DE
	TRAILER NUMBER/ NUMÉRO DE LA REMOR	UNIT NUMBER/ NUMÉRO DE L'UNITÉ
COMCO SALES ORDER NUMBER/ NUMÉRO DE COMMANDE DE VENTE COMCO		ROUTE/ ROUTE
490153		
CUSTOMER PURCHASER ORDER/ COMMANDE D'ACHETEUR DU CLIENT		INSIDE SALESPERSON NUMBER/ NUMERO DU VENDEUR INTERNE
4500084343 R1		Ward
PO RELEASE NUMBER/ NUMÉRO DE RELÂCHE DU BC	CUSTOMER CONTACT/ CONTACT DU CLIENT	CUSTOMER ACCOUNT NUMBER/ NUMERO DE COMPTE DU CLIENT
M/15228	Erin Fraser	PEMBIN PIP

PIECES/PACKAGES ÉLÉMENTS/ COLIS	DESCRIPTION OF ARTICLES AND SPECIAL MARKS DESCRIPTION DES ARTICLES ET MARQUES SPÉCIALES	WEIGHT/ POIDS SUBJECT TO CORRECTION/ SUJET À CORRECTION	RATE/ TAUX
0	Loose Pcs/lens of steel pipe Elements/longueurs de tuyau d'acier en vrac	0	
0	Bundles of steel pipe Paquets de tuyaux d'acier	0	
0	Pallets of steel pipe Palettes de tuyau d'acier	0	
0	Sacks of steel pipe/steel pipe fittings Sacs de raccords de tuyaux d'acier	0	
0	Loose steel pipe fittings Raccords de tuyaux d'acier en vrac	0	
0	Boxes of steel pipe/steel pipe fittings Cartons de raccords de tuyaux d'acier	0	
0	Crates of steel pipe/steel pipe fittings Caisses de raccords de tuyaux d'acier	0	
1	Pallets of steel pipe fittings Palettes de raccords de tuyaux d'acier	300	
0	Bundles of steel pipe fittings Paquets de raccords de tuyaux d'acier	0	
1	Set of Documents		

If charges are to be prepaid write or stamp here: "To Be Prepaid"
Si les frais sont payables d'advance, noter ici a la main ou au tampon: "À payer d'advance"

ALLOW/ COMPTER | CHARGE/ FACTURER

RECEIVED $ / REÇU $
TO APPLY IN PREPAYMENT OF THE CHARGES ON THE PROPERTY DESCRIBED HEREON.
EN VUE DU PRÉ-PAIEMENT DES FRAIS SUR LES BIENS DÉCRITS ICI.

AGENT OR CASHIER/ AGENT DU CAISSIER

FOR CARRIER USE CHARGES/ FRAIS A L'USAGE DU TRANSPORTEUR

ADVANCE AND OR BEYOND/ ADVANCE ET OU EN $US	$
MISCELLANEOUS/ DIVERS	$
BASIC/ BASE	$
PIÈCE/ ÉLÉMENT	$
VALUE/ VALEUR	$
G S T	$
TOTAL	$

SHIPPER SHOW AMOUNT OF COD/ EXPÉDITEUR PAYABLE A LIVRAISON

AMOUNT/ MONTANT	$
FEE/ REDEVANCE	$
G S T	$
TOTAL	$

TOTAL NUMBER OF PIECES/PACKAGES NOMBRE TOTAL DE COLIS/ÉLÉMENTS	WHERE REQUIRED BY THE TARIFF SHIPPER MUST COMPLETE THE FOLLOWING/ A REMPLIR PAR L'EXPÉDITEUR LA OU LES TARIFS L'EXIGENT				
2	DIMENSIONS OF SHIPMENT/ DIMENSIONS DU CHARGEMENT	TOTAL CUBIC FEET/ TOTAL PDS CUBE	DIMENSIONAL WEIGHT/ POIDS DIMENSIONNEL	300 LBS TOTAL WEIGHT/ POIDS TOTAL	NUMBER X.L. PCS/ PKGS NBRE DE COLIS ÉLÉMENTS X.L.

Maximum liability of $4.41/kg. ($2.00/lb.) computed on the total weight of the shipment unless declared valuation states otherwise.
Responsabilité maxima de $4.41/kg. ($2.00/lb.) calculée sur poids total du chargement sauf évaluation déclarée à effet contraire.

DECLARED VALUE OF SHIPMENT/ CHARGEMENT VALEUR DECLAREE $

SHIPPER/ EXPÉDITEUR	CARRIER/ TRANSPORTEUR	CONSIGNEE: RECEIVED IN APPARENT GOOD ORDER/ DESTINATAIRE: REÇU EN BON ÉTAT APPARENT
uschwandt		
SIGNATURE/ SIGNATURE	SIGNATURE/ SIGNATURE	SIGNATURE/ SIGNATURE

SHIPPER'S NUMBER/ NUMÉRO DE L'EXPÉDITEUR

315356

COMBINATION SHORT FORM OF STRAIGHT BILL OF LADING EXPRESS SHIPPING CONTRACT ADOPTED BY RAIL FREIGHT AND EXPRESS CARRIERS SUBJECT TO THE JURISDICTION OF THE CANADIAN TRANSPORT COMMISSION ISSUED AT SHIPPER'S REQUEST.
COMBINAISON FORMAT SIMPLIFIÉ DE LA POLICE DE CHARGEMENT/CONTRAT D'EXPÉDITION EXPRESS ADOPTÉE PAR FRET FERROVIAIRE ET TRANSPORTEURS EXPRESS SUJET A LA JURISDICTION DE LA COMMISSION DES TRANSPORTS CAN EMISE SUR DEMANDE DE L'ACHETEUR.

Received, subject to the classifications and tariffs in effect on the date of issue of this Original Bill of Lading, as Received, subject to the Rules for the Carriage of Express and Non-Carload Freight Tariffs and tariffs in effect on the date of issue of this original Shipping Contract/Bill of lading) goods described above, in apparent good order, except as noted/contents and conditions of contents of packages unknown, marked, consigned and destined as indicated above, which said Company agrees to carry to its usual place of delivery at said destination if on its route, otherwise to deliver to another carrier on the route to said destination.

It is agreed, as to each carrier of all or any of said goods over all or portion of said route to destination, and as to each party at any time interested in all or any of said goods, that every service to be performed hereunder shall be subject to all the terms and conditions/which are, hereby incorporated by reference and have the same force and effect as if the same were severally, fully and specifically stated herein.

1 Governed by the Board of Transport Commissioners for Canada by General Order No. T-6, dated February 1, 1955 set forth in the Canadian Freight Classification and also available at all Railway agency stations and freight offices upon request, when said goods are carried by a rail carrier, or

2 This Bill of lading set forth to be prescribed by the relevant tariffs, classification, statutes and regulations pertaining to motor carrier's services when said goods are carried by a motor carrier, or

3 Bill of lading from R.T. 200, approved by the Quebec Transportation Board on August 6, 1980, when the said goods originating in Quebec are to be carried by a motor carrier;

4 As approved by the Board of Transport Commissioners for Canada by General Order No. T-43, set forth in the Rules for the carriage of Express and Non-Carload Freight Tariffs, and also available at all express and railway agency stations and express and freight offices upon request, when said goods are carried by a rail carrier and which are agreed to by the shipper and accepted for himself and his assigns.

Reçus, sujet aux classifications et tarifs en vigueur à la date d'émission de cette Police de chargement originale, au Reçu, sujet aux Règles pour le transport au tarifs et de fret express et non par wagon et aux tarifs à la date d'émission de ce contrat d'expédition original (police de chargement), les marchandises décrites plus haut, en bon état apparent, sauf quand indiqué autrement et sauf du contenu des colis inconnu, marqués, consignés et destinées comme indiqué plus haut, la dite compagnie s'engageant à transporter à son point de livraison habituelle à dite destination si c'est sur son chemin, et sinon à livrer à un autre transporteur sur la route vers la dite destination. Il est convenu mutuellement, en ce qui concerne chaque portage de tout ou partie des dites marchandises sur tout ou partie quelconque de la dite route vers la destination, et en ce qui concerne chaque partie intéressée à tout moment par tout ou partie des dites marchandises, que chaque service à effectuer du fait de la présente sera sujet à tous les termes et conditions qui sont, ici incorporés par référence et ont le même effet que si les mêmes étaient insérés à plusieurs reprises, en entier et spécifiquement dans la présente.

1 approuvée par la commissaires au transport pour le Canada par Ordre No. général d'ordre T-6, date de fev février 1955 inscrit dans la classification de fret canadienne et dispositionsdisponibles aux agences de gare et bureaux de fret ferroviaires sur demande, quand lesdits effets sont transportés par un transporteur ferroviaire, ou

2 du police de chargement de transporter par eau telle que insérée dans nos tarifs et Règles et réglementations quand les dites marchandises sont transportées par un transporteur par eau, ou

3 de la police de chargement inscrite dans ou présent par les tarifs, classifications, statuts et réglementations pertinent ayant trait aux services des transporteurs routiers quand les dites marchandises sont transportées par un transporteur routier; ou

4 du formulaire de police de chargement R.T. 200, approuvé par la commission des transports du Québec le 5 août 1980, quand les dites marchandises originaires du Québec doivent être transportées par un transporteur routier

5 ou approuvée par la commission des commissaires au transport pour le Canada par Ordre général No. T-43, inscrit dans les Règles pour le transport de tarifs de fret express et non par wagon et dispositionsdisponibles dans toutes les agences de gare express et ferroviaires et dans les bureaux d'express et de fret sur demande, quand les dites marchandises sont transportées par un transporteur ferroviaire et à quel l'expéditeur souscrit qu'il accepte pour lui-même et ses ayants cause.

ORIGINAL - NOT NEGOTIABLE THIS BILL OF LADING- EXPRESS SHIPPING CONTRACT IS TO BE SIGNED BY THE SHIPPER, CARRIER AND CONSIGNEE.
ORIGINAL - NON NÉGOCIABLE POLICE DE CHARGEMENT - CONTRAT D'EXPEDITION EXPRESS A SIGNER PAR EXPÉDITEUR, TRANSPORTEUR, DESTINATAIRE

COMCO
PIPE & SUPPLY COMPANY
A Division of Russel Metals

Certified System ISO 9001

Alberta (780) 440-2000
Prairies (204) 467-8797
Eastern (519) 763-1114

Packing Slip Version C 1 0 2015 0129

PACKING SLIP / BORDEREAU DE VENTE

CUSTOMER ACCOUNT NO./No. DE COMPTE DU CLIENT	DATE ORDERED / DATE DE COMMANDE	DATE REQ'D / DATE EXIGEE	DATE SHIPPED / DATE D'EXPEDITION
PEMBIN PIP	5-Apr-2016	1-Jun-2016	31-May-2016

PLEASE REFER TO THIS NUMBER ON ALL ENQUIRIES
PRIERE DE MENTIONNER CE NUMERO SUR TOUTE DEMANDE DE

DE NO./No 490153

FACTURER A BILL TO
PEMBINA PIPELINE
4000, 525 - 8 AVENUE SW
CALGARY, AB, T2P 1G1
Contact: Erin Fraser

EXPEDIER A SHIP TO
PEMBINA PIPELINE
TBD

P/L MESSAGE:

PO RELEASE NUMBER / NUMÉRO DE RELÂCHE DU BC:	CUSTOMER CONTACT / CLIENT CONTACT	INSIDE SALESPERSON / REPRESENTANT(E) DES VENTES
M/15228	Erin Fraser	Ward Nathan

SHIPPED FROM / EXPEDIE DE	SHIPPED VIA / EXPEDIE PAR	FREIGHT / PORT	SHIPPING INSTRUCTIONS / INSTRUCTIONS D'EXPEDITION	CUSTOMER P.O. NO. / No BC DU CLIENT
	TBD			4500084343 R1

LINE / LIGNE	DESCRIPTION / DESCRIPTION	UNIT PRICE / PRIX UNITAIRE	QUANTITY / QUANTITE	PACKAGE / PAQUET	CUSTOMER SECTION / SECTION CLIENT
1	**Flanges 8 (219.1mm O.D.) 600# ANCHOR XS A/SA350-LF2 CL1** Part # F 8 6 ANCHOR XS LF Heat Number: 7310AF4 Manufacturer: WFI Tagging: AS PER DWG: A220-ME-BOM-0002 Line Comment : AS PER DWG: A220-ME-BOM-0002 Design code: ASME B31.3 Material: A350 LF2 Cl. 1 Design pressure: 10,204 kPag Design Temp: 38 C Installation Temp: -20 C Allowable concrete bearing stress: Not aplicable Corrosion allowance: 1.5 mm Run pipe diameter: 219.1 mm Run pipe schedule thickness: Sch. 80 (12.7 mm) Load: 15 kN in the axial direction Bolt circle: 349 mm		**SHIPPING: 2.00** UOM: EA *Ordered:* 2.00 *Prev. Shipped:* 0.00 *Backordered :* 0.00	PALLET1	MTR APPROVED R.B.

TALLY SHEET NO. / NO DE FEUILLE DE CONTROLE	BILL OF LADING NO. / NO DE CONNAISSEMENT	PICKED BY / PREPARE PAR	TOTAL WEIGHT / POIDS TOTAL	PAGE
	315356	jbecker	300 lbs.	1/1

ITEM # 1

Order#: 490153 Seq: 1 PO#: 4500084343 R1 Heat#: 7310AF4 Mill: WFI
Part#: F 8 6 ANCHOR XS LF Part Desc: Flanges 8 (219.1mm O.D.) 600# ANCHOR XS A/SA350-LF2 CL1

CE=0.43

INTERNATIONAL WFI NUCLEAR PRODUCTS
Manufacturer of Piping and Pressure Vessel Components
4404 Haygood St - Houston, TX 77022
Phone: 713-695-3633 Fax: 713-695-3528
A Bonney Forge Company

Sold To: COMCO PIPE & SUPPLY
(EDMONTON)
4203 - 53RD AVENUE
EDMONTON AB T6B 3P4

MTR #: 313,291

PO #: E1-490153-1

Sales Order #: C001603865 Date: 05/16/2016

This product has not come in direct contact with mercury or any of its compounds, nor with any mercury-containing device employing a single boundary of containment. No welding performed.

We certify that the contents of this report are correct and accurate, and that all test results and operations performed by WFI or its subcontractors are in compliance with the material specification and requirements of the referenced code or standard, and that the material conforms to the dimensional requirements of the order. This document is in accordance with EN10204 3.1.

Certified Material Test Report

Heat Code: 7310AF4

Material: A/SA350 12 LF2 CL1

Item	Quantity	Description
1	2	8 600 S80 ANCHR FLG A/SA350LF2 CL1 PER DWG: A220-ME-BOM-0002

Chemical Composition

	C	CR	CU	MN	MO	NB	NI	P
Ladle	0.1800	0.07	0.21	1.220	0.016	0.003	0.070	0.011
	S	SI	V					
	<0.001	0.240	0.02					

Carbon Equivalency: Ladle 0.42

	C	CR	CU	MN	MO	NB	NI	P
Product	0.1860	0.07	0.20	1.200	0.020	0.003	0.076	0.008
	S	SI	V					
	0.003	0.246	0.02					

Carbon Equivalency: Product 0.43

	Tensile PSI	Yield PSI	Elong %	RA %	Hardness	
Product	72,900	49,300	34.70	69.70	144 BHN	144 BHN

Charpy V-Notch Properties: Test Temperature: -50 F

FT LBS: 51/81/76 % Shear: 40/60/50 MLE: 36/58/51

MELTING MILL: ARCELORMITTAL STEELTON (USA) - HEAT #207W989

NORMALIZED @ 1650 DEG F & AIR COOLED

1.
IN ACCORDANCE WITH NACE SPEC MR0175-2009 & MR0103-2010

Marie Dehmer
Quality Assurance Representative

MTR #236

PIPEWORX LTD.
A PLH GROUP COMPANY

MRR #29

MATERIAL RECEIVING INSPECTION REPORT

SALES ORDER NUMBER:	4497453-001
PIPEWORX JOB#:	162-113
OWNER:	PEMBINA PIPELINE CORPERATION
PO NUMBER:	162-113-543
DATE:	Wednesday, September 28, 2016
Ordered By:	BRENT CALVERT

* NOTE:

1. **MATERIAL TEST REPORTS** (MTR'S) AND **CRN NUMBERS** ARE REQUIRED TO BE RECEIVED WITH EACH ORDER AND REVIEWED FOR COMPLIANCE TO MATERIAL SPECIFICATIONS AS ORDERED IF SPECIFIED IN THE CONTRACT DOCUMENTS. CONSULT THE PIPEWORX QUALITY MANUAL.
2. COMPLETE OVER / SHORT / DAMAGE REPORT IF REQUIRED AND MAKE NOTE IN REMARKS.
3. ATTACH OR REFERENCE ALL SUPPORTING DOCUMENTATION FOR TRACEABILITY (i.e. PO, PACKING SLIPS etc.).
4. ALL FITTING DESIGNS MUST BE REGISTERED WITH ALBERTA BOILERS SAFEY ASSOCIATION.

ITEM #	PO ITEM#	Quantity	Size	Sch	Rating	Grade	DESCRIPTION	HEAT NUMBER	REC.	NITIAL	DAMAGE ACCEPT		MTR RECEIVED
87		2	2"		600#	A516 GR. 70N	SPECTACLE BLIND, RF, 600 CL, ASME B16.48, ASTM A516 GR. 70N, 9.7mm THK (23.7 mm OAT)	MEE, MED	YES	KN	Accept		YES
57		2	1"	SCH 160		A-333	NIPPLE, SCH 160, PBE, ASME B16.10M, ASTM A-333-GR6 SMLS, 100 MM LONG	84JD, 867J	YES	KN	Accept		YES

REMARKS (IF NCR IS ISSUED, NOTE NCR NUMBER):	

PIPEWORX QUALITY REPRESENTATIVE	DATE RECEIVED	SIGNATURE
NAME: Keith Noble	September 30th, 2016	
TITLE: QC Inspector		

MRC Global PACKING LIST

4497453001

Sales Order Number 4497453-001 Page 1
Printed 09/30/16 10:36

Deliver To:	From: 73-755	Customer Purchase Order
PIPEWORX LTD LOT 215C 26229 TOWN SHIP 531A ZONE 2 ACHESON AB T7X 5A4	GRANDE PRAIRIE 12102 - 101 AVE GRANDE PRAIRIE AB T8V 8A9	162-113-543 Customer Release/Requisition No. Ordered by:

Promised - 09/28/16 Salesman - KATLIN MCKELVEY Ship VIA - WILL CALL Terms - NET 30 DAYS
Shipped - 09/30/16 Phone - (780) 532-9542 Freight Terms - PREPAID & ALLOW A Customer Ship No. - 83599-0002

ATTN BRENT @ 403-844-5751
PO# 162-113-543

CPO Line	Customer Part/Item ID	Quantity Ordered	Backorder	Shipped	U/M	Description	Line No.
	17C11716	2		2	EA	2 600# BLK CS SPEC BLIND RF A516 GR 70N IMP MFG: HLS: MBE MFG: HLS: MBD SHIPPED 2 UNITS AT $48.3100 TOTAL $96.62	001
	21C10297	2		2	EA	1 X 4 S160 BLK CS SMLS PIPE NIPPLE PBE ASTM A333 GR.6 MFG: . 84JD HLS: H01573 86 7J SHIPPED 2 UNITS AT $10.1100 TOTAL $20.22	002

RECEIVING INFO: Company: Date: 9/30/16 Signed By: Keith Noble Signature:

Tubes-	Box/Bag- 2	Crates-	Pallets-	Pieces-	Bundles-	Picked by-	Checked by-	TDF	Staged-			
Order Weight-	6.30	Material Tot-	$116.84	Freight- S	.00	Other- S	.00	Tax- S	5.84	Total- S	122.68	

CMPACK (Rev 09/15)

ITEM # 87

CE: .40

Material Test Report

Report Number: 30905
Description: 2" 600# SPECS PADDLES SPACERS
Specification: ASME B16.48
Year of Revision:
Comment: NACE MR0103-12 MR0175/ISO 15156-2-09
Additional Comment:

Date: 22/02/2016
Heat Treatment: NORM
Material: A/SA 516-70N
CRN: 0B7771.5CR1

Chemical Analysis

Heat Code: MBD
Heat Number: 3144A3-AN7995

C	0.18	Cu	0.02	Al	0.022
Mn	1.26	Ni	0.01	Ti	0.002
P	0.01	Cr	0.02	B	0.0001
S	0.002	Mo	0		
Si	0.34	V	0.015		
N		Cb/Nb			

Carbon Equivalency Formula Used:
C+(Mn/6)+(Cr+Mo+V)/5+(Ni+Cu)/15
CE= 0.399

Mechanical Tests

Yield PSI: 54000
Elongation: 26 % @ 8" "
Size: 1/2" THK

Tensile PSI: 78000
Reduction of Area %
Brinell Hardness: 156

Charpy Impact Test

Individual Values: -50 F

(V1) 110 ft/lbs (V2) 118 ft/lbs (V3) 109 ft/lbs

This Material Test Report meets DIN 50 049/EN 10 204 3.1.B Standard 1995

We hereby Certify that the material described has been tested in accordance with the specifications, and the results are correct as contained in the records of the Company

Lisa Bidines
Q.A. Manager L. Bidines

Sarnia, Ontario
645 Keddco St., Sarnia, ON, N7T 8G3
Toll Free: 1-866-511-1381

Edmonton, Alberta
3911 - 76th Ave., Edmonton, AB, T6B 2S8
Toll Free: 1 877-465-0303

Houston, Texas
12107-2 Old Huffmeister Rd., Cypress, TX, 77429
Toll Free: 1-855-539-7013

MTR #28

ITEM # 8 7

CE = .37

List MTR Sheets | Print MTR Sheet

Material Test Report

Report Number: 30906
Description: 2" 600# SPECS PADDLES SPACERS
Specification: ASME B16.48
Year of Revision:
Comment: NACE MR0103-12 MR0175/ISO 15156-2-09
Additional Comment:

Date: 22/02/2016
Heat Treatment: NORM
Material: A/SA 516-70N
CRN: 0B7771.5CR1

Chemical Analysis

Heat Code: MEE
Heat Number: 411109-308023-1

C	0.138	Cu	0.021	Al	
Mn	1.46	Ni	0.045	Ti	0.003
P	0.007	Cr	0.029	B	0.0002
S	0.0006	Mo	0.012		
Si	0.374	V	0.001		
N		Cb/Nb	0.001		

Carbon Equivalency Formula Used:
C+(Mn/6)+(Cr+Mo+V)/5+(Ni+Cu)/15
CE= .3967

Mechanical Tests

Yield PSI: 54800
Elongation: 25 % @ 2" "
Size: 1/2" THK

Tensile PSI: 75700
Reduction of Area %
Brinell Hardness: 151

Charpy Impact Test

Individual Values: -51 F

(V1) 294 ft/lbs (V2) 289 ft/lbs (V3) 295 ft/lbs

This Material Test Report meets DIN 50 049/EN 10 204 3.1.B Standard 1995

We hereby Certify that the material described has been tested in accordance with the specifications, and the results are correct as contained in the records of the Company.

Lisa Bidtnes
Q.A. Manager L. Bidtnes

Sarnia, Ontario
645 Keddco St., Sarnia, ON, N7T 8G3
Toll Free: 1-866-511-1381

Edmonton, Alberta
3911 - 76th Ave., Edmonton, AB, T6B 2N8
Toll Free: 1-877 465-0303

Houston, Texas
12107-2 Old Huffmeister Rd., Cypress, TX, 77429
Toll Free: 1-855-539-7015

MTR # 237

CapProducts, Ltd.
25 Winnipeg St
Vanastra, ON N0M 1L0

Phoenix * Capitol * Camco
CapProducts ITEM # 65

Commanding a Higher Standard℠

Certified Mill Test Report

Printed: 7/19/2016
Customer
MRC GLOBAL (CANADA) ULC
7072 - 112 AVE SE
CALGARY, AB T2C 4Z1

Certified: 06/01/2015
P.O. S 759 308446
Tag
Material ASTM A333 GR6 2015/ASME SA333 GR6 2015 Edition

Heat No A2947
Heat Code 84JD
Phoenix Order # 1216900

CE: .295

Part Number
15131008PBECSA

Description
1X4 SCH 160 SMLS NIPL A333-GR6 PBE CSA

Chemical Properties

C	Mn	P	S	Si	Cu	Ni	Cr
0.1470	0.8300	0.0180	0.0040	0.2500	0.0490	0.0170	0.0660

C Eq. Long
0.3047

Mo	V	Co	Al	Cb	N	Pb	Sn	Ta	Ti
0.0050	0.0040		0.0250	0.0000					0.0010

Additional Chemical Properties

Cr + Cu + Ni
0.1320

Mechanical Properties

Tensile (PSI)	Yield (PSI)	Elong. % in 2 in. or 4D	R of A	HBW	HBW2
66,765	44,748	40.0%	0.0%	139	0

Charpy Minimum Impact - ft/lbs

Test 1	Test 2	Test 3	Average	Test Temp.
76	69	62	69.00	51

* Hydro test passed. at 2500 psi.

We hereby certify that these parts were manufactured, sampled, tested, and inspected in accordance with the product specifications stated and were found to meet the requirements.
We further certify that this material was inspected using independent inspectors conforming to the requirements of EN 10204 3.1. These products meet the requirements of the latest editions of NACE MR0175, NACE MR0103, and ISO 15156. No weld repair has been performed on these products. This material was not exposed to mercury or any other metal alloy that is liquid at ambient temperatures during processing or while in our possession.

Comments:

Flattening test passed.
Charpy V Impact Tested at -51° C. Specimen size - 10 x 5 mm.

MTR # 239

ITEM # 65

57

CE=.38

Phoenix * Capitol * Camco
CapProducts

Certified Mill Test Report

Heat Code: 867J
Heat Number: A4354
Item: 15131008PBECSA: 1X4 SCH 160 SMLS NIPL A333-GR6 PBE CSA

Material: ASTM A333 GR6 2015/ASME SA333 GR6 2015 Edition

Chemistry Properties

C	Mn	P	S	Si	Cu	Cr
0.1630	1.3000	0.0140	0.0070	0.3020	0.0090	0.0390
Ni	**Mo**	**V**	**Co**	**Al**	**Cb**	**N**
0.0260	0.0050	0.0030		0.0300	0.0000	
Pb	**Sn**	**Ta**	**Ti**	**C Eq. Long**		
			0.0020	0.3914		

Additional Chemical Properties

Mechanical Properties

Tensile(PSI)	Yield(PSI)	Elong. % in 2 in. or 4D	Reduction	HBW	HBW 2
67445	46575	38%		139	

Charpy Minimum Impact - ft/lbs

Test 1	Test 2	Test 3	Avg.	Test Temp.
114	118	116	116.00	52

Hydro Test Passed at 2500 psi

We hereby certify that these parts were manufactured, sampled, tested, and inspected in accordance with the product specifications stated and were found to meet the requirements. We further certify that this material was inspected using independent inspectors conforming to the requirements of EN 10204 3.1. These products meet the requirements of the latest editions of NACE MR0175, NACE MR0103, and ISO 15156. No weld repair has been performed on these products. This material was not exposed to mercury or any other metal alloy that is liquid at ambient temperatures during processing or while in our possession.

Heat Code Remarks: Flattening test passed. Charpy V Impact Tested at -52° C. Specimen size - 10 x 5 mm.

MTR # 240

PIPEWORX LTD.
A PLH GROUP COMPANY

MRR #30

MATERIAL RECEIVING INSPECTION REPORT

SALES ORDER NUMBER:	4482471-008
PIPEWORX JOB#:	162-113
OWNER:	PEMBINA PIPELINE CORPERATION
PO NUMBER:	4500094219
DATE:	Wednesday, October 05, 2016
Ordered By:	BRENT CALVERT

* NOTE:

1. **MATERIAL TEST REPORTS** (MTR'S) AND **CRN NUMBERS** ARE REQUIRED TO BE RECEIVED WITH EACH ORDER AND REVIEWED FOR COMPLIANCE TO MATERIAL SPECIFICATIONS AS ORDERED IF SPECIFIED IN THE CONTRACT DOCUMENTS. CONSULT THE PIPEWORX QUALITY MANUAL.
2. COMPLETE OVER / SHORT / DAMAGE REPORT IF REQUIRED AND MAKE NOTE IN REMARKS.
3. ATTACH OR REFERENCE ALL SUPPORTING DOCUMENTATION FOR TRACEABILITY (i.e. PO, PACKING SLIPS etc.).
4. ALL FITTING DESIGNS MUST BE REGISTERED WITH ALBERTA BOILERS SAFEY ASSOCIATION.

ITEM #	PO ITEM#	Quantity	Size	Sch	Rating	Grade	DESCRIPTION	HEAT NUMBER	REC.	NITIAL	DAMAGE ACCEPT		MTR RECEIVED
		2	1"	SCH 160		T316/316L	NIPPLE, SCH 160, TBE, ASME B16.10M, T316/316L SMLS, 100 MM LONG	866F	YES	KN	Accept		YES
17		2	2"		600 CL	A-350-LF2	FLANGE, BLIND RF, 600 CL, ASME B16.5, ASTM A-350-LF2 CL1 (C/W 3/4 NPT TAP)	13/39243	YES	KN	Accept		YES

REMARKS (IF NCR IS ISSUED, NOTE NCR NUMBER):	

PIPEWORX QUALITY REPRESENTATIVE	DATE RECEIVED	SIGNATURE
NAME: Keith Noble	10/5/2016	
TITLE: QC Inspector		

MRC Global PACKING LIST

If this order is placed under an existing written contract, the terms of such existing contract shall apply. Otherwise, this order is subject to and governed by MRC Global's General Terms and Conditions of Sale (found at www.mrcglobal.com/tc by following the instructions on this site and also available by request), which Terms and Conditions are hereby incorporated by reference.

4482471008

Sales Order Number 4482471-008 **Page** 1
Printed 10/05/16 15:32

Deliver To:	From: 73-755	Customer Purchase Order
PEMBINA PIPELINE 2000 700 - 9TH AVENUE S W PO 4500094219 ATTN BRENT @ 403-844-5751 CALGARY AB T2P 3V4	GRANDE PRAIRIE 12102 - 101 AVE GRANDE PRAIRIE AB T8V 8A9	4500094219 **Customer Release/Requisition No.** **Ordered by:**

Promised - 09/14/16 **Salesman** - KATLIN MCKELVEY **Ship VIA** - WILL CALL **Terms** - NET 30 DAYS
Shipped - 10/05/16 **Phone** - (780) 532-9542 **Freight Terms** - PREPAID & ALLOW A **Customer Ship No.** - 61723-0000

4500094219
ATTN BRENT W/ PIPEWORX
403-844-5751
ORDERED BY:
BRENT W/ PIPEWORX 403-844-5751

CPO Line	Customer Part/Item ID	Quantity Ordered	Backorder	Shipped	U/M	Description	Line No.
	76C30048	2		2	EA	1 X 4 S160 T316/316L SS SMLS PIPE NIPPLE TBE SA733 MFG: CAP HLS: 866F SHIPPED 2 UNITS AT $16.1600 TOTAL $32.32	026
	62C00099	8		8	EA	10 CANUSA K-60 280-450 YE WW SLEEVE SHIPPED 8 UNITS AT $31.2500 TOTAL $250.00	027
	64C2XXXX	1		1	EA	6" X 50FT YJ REPAIR ROLL SHIPPED 1 UNITS AT $212.2600 TOTAL $212.26	028
	24C20849	16		16	EA	2 STL TWO BOLT PIPE CLAMP FIG 212 20 SHIPPED 16 UNITS AT $2.6500 TOTAL $42.40	029
	17C1XXXX	2		2	EA	2" 600# HUB BLIND C/W 3/4" CENTER TAP, NO COUNTERBORE, A350-LF2N Ht # 13/39243 SHIPPED 2 UNITS AT $97.6200 TOTAL $195.24	030
	24C2XXXX	5		5	EA	6" SS GRINNEL FIG 212 SHIPPED 5 UNITS AT $53.5500 TOTAL $267.75	031
	24C2XXXX	2		2	EA	8" SS GRINNEL FIG 212 SHIPPED 2 UNITS AT $72.0300 TOTAL $144.06	032

RECEIVING INFO: Company: Date: Signed By: Katie Noble Signature:

OCT 05 2016

Tubes-	Box/Bag-	3	Crates-	Pallets-	Pieces-	Bundles-	Picked by-	Checked by- KMM	Staged-		
Order Weight-	34.54	Material Tot-	$1144.03	Freight- $	.00	Other- $	.00	Tax- $	57.20	Total- $	1201.23

CMPACK (Rev 09/15)

MRC Global PACKING LIST

4502516001

Sales Order
Number 4502516-001 Page 1
Printed 10/05/16 15:31

Deliver To:	From: 73-755	Customer Purchase Order
PIPEWORX LTD LOT 215C 26229 TOWN SHIP 531A ZONE 2 ATTN BRENT @ 403-844-5751 ACHESON AB T7X 5A4	GRANDE PRAIRIE 12102 - 101 AVE GRANDE PRAIRIE AB T8V 8A9	162-113-558 **Customer Release/Requisition No.** **Ordered by:**

Promised - 10/03/16 Salesman - KATLIN MCKELVEY Ship VIA - WILL CALL Terms - NET 30 DAYS
Shipped - 10/05/16 Phone - (780) 532-9542 Freight Terms - PREPAID & ALLOW A Customer Ship No. - 83599-0002

ATTN BRENT @ 403-844-5751
162-113-558

CPO Line	Customer Part/Item ID	Quantity Ordered	Backorder	Shipped	U/M	Description	Line No.
	64C41443	1		1	EA	4 LITRES ACE ACE-4 LIQUID ACE ACETONE ACETONE SHIPPED 1 UNITS AT $34.2300 TOTAL $34.23	001
	64C2XXXX	2		2	EA	1" X 10YARD 80GRIT EMERY CLOTH SHIPPED 2 UNITS AT $12.2900 TOTAL $24.58	002

RECEIVING INFO: Company: Date: Oct 6/16 Signed By: Kerta Noble Signature:

Tubes-	Box/Bag-	Crates-	Pallets-	Pieces-	Bundles-	Picked by-	Checked by- KMM	Staged-	
Order Weight-	5.00	Material Tot-	$58.81	Freight- $	.00	Other- $	.00	Tax- $	2.94	Total- $	61.75

CMPACK (Rev 09/15)

Phoenix * Capitol * Camco
CapProducts

CE=

Certified Mill Test Report

Heat Code: 866F
Heat Number: 140806T06
Item: 15341008 1 X 4" SCH160 SMLS NIP 316/316L

Material: ASTM A312-2015 316/316L / ASME SA312-2015 Edition

Chemistry Properties

C	Mn	P	S	Si	Cu	Cr
0.0170	1.0500	0.0360	0.0040	0.3700		16.4900
Ni	**Mo**	**V**	**Co**	**Al**	**Cb**	**N**
10.0300	2.0500					
Pb	**Sn**	**Ta**	**Ti**	**C Eq. Long**		
				4.5687		

Additional Chemical Properties

Mechanical Properties

Tensile(PSI)	Yield(PSI)	Elong. % in 2 in. or 4D	Reduction	HBW	HBW 2
83397	36259	35%		144	

Charpy Minimum Impact - ft/lbs

Test 1	Test 2	Test 3	Avg.	Test Temp.

Eddy Current Passed

We hereby certify that these parts were manufactured, sampled, tested, and inspected in accordance with the product specifications stated and were found to meet the requirements. We further certify that this material was inspected using independent inspectors conforming to the requirements of EN 10204 3.1. These products meet the requirements of the latest editions of NACE MR0175, NACE MR0103, and ISO 15156. No weld repair has been performed on these products. This material was not exposed to mercury or any other metal alloy that is liquid at ambient temperatures during processing or while in our possession.

This material conforms to the metallurgical and hardness requirements of ISO 15156. This material was solution annealed at 1900 F (Min) and was water quenched to below 500 F in less than 3 minutes.

Heat Code Remarks: Flattening test passed.

MTR # 241

HEAT# 13/39243 2 600 RF 'HUB' BLIND 'LF2' C/W 3/4 NPT
SO# 302883

METALFAR
PRODOTTI INDUSTRIALI S.P.A.
STAMPAGGIO A CALDO DI ACCIAI COMUNI - LEGATI E INOSSIDABILI

SEDE AMMINISTRATIVA E STABILIMENTO:
23861 CESANA BRIANZA (LC) - Italy
Via G. Parini, 28
Tel. +39 031.655441
Fax +39 031.655149
quality.mf@farmex.com

COMPANY WITH QUALITY SYSTEM
CERTIFIED BY DNV
= ISO 9001 =

SALA PROVE E ANALISI MATERIALI / MATERIAL TEST DEPARTMENT

CERTIFICATO DI COLLAUDO SECONDO EN 10204 - 3.1 INSPECTION CERTIFICATE

Certif. N. 1484	Del/Dated 17.03.2014	Fattura / Invoice N. 1072	Del/Dated 17.03.2014
DDT / Del Note N. 1190	Del/Dated 17.03.2014	Ns.Ord. / Our ref. N. 0	Del/Dated
		Dest.:	

COD. COL. HEAT CODE	COLATA HEAT	POS. ITEM	VS.ORDINE YOUR REFERENCE	Q.TA' Q.TY	DESCRIZIONE DESCRIPTION
	13/39243	040	3363747	50,00	BOSSED 600 RF 2" LF2CL1

DIM.IN ACC. A
DIM. ACCORDANCE TO
ASME/ANSI B16.5 -2013

VISIVO E DIMENS.
VIS. & DIMENS.
SATISFACTORY

MATERIALE / MATERIAL
ASTM A350 LF2 CL1/2 (LADLE)

C%	Si%	Mn%	S%	P%	Cr%	Ni%	Mo%	Ti%	Cu%	V%	Nb%	N%	Al%	C.E.%	B %
0,160	0,230	0,970	0,010	0,008	0,160	0,070	0,020	0,017	0,150	0,003	0,001	0,010	0,026	0,391	0,000

PROVETTA / TEST SPECIMEN DIEZ. mm2 / SECT. mm2	LUNG. mm / LENGHT mm	FORMA SHAPE	SNERVAMENTO YIELD POINT N/mm2 >=0,2%	ROTTURA TENSILE STRENGHT N/mm2 >=	ALLUNGAMENTO ELONGATION %>=	CONTRAZIONE REDUCTION OF AREA %>=	DUREZZA HARDNESS HBW
126,60	50,80	1	337,0	511,0	34,0	69,0	152,0 - 156,0

RESILIENZA / IMPACT TEST - JOULE/cm2

TIPO / TYPE 10x10mm	°C	1	2	3	SNERVAMENTO YIELD POINT N/mm2 >=1,0%
KV	-50	66	62	60	0,0

Ns.RIF. OUR REF.

MATERIALE IN ACCORDO A / MATERIAL IN ACC. TO
ASTM/ASME A 350/SA 350 M - 13 ASME CODE SECT. II, PART A, ED. 2013
NACE MR-0175/2009 ISO 15156 - SOUR SERVICE
NACE MR-0103/2012 - SOUR SERVICE
Q.A.S.IN ACCORD.WITH PRESS.EQUIPM.DIRECT.97/23/EC(PED) ANNEX I,PARAGRAPH 4.3 CERT.MLN 0531016/01
CSA CAN3 Z245.12-09 GRADE 290 CAT.II SOUR SERVICE

TRATTAMENTO TERMICO / HEAT TREATMENT
NORMALIZED AT 930 C - COOLED IN STILL AIR

FORNO / FURNACE
ELECTRIC FURNACE

ORIGINE / ORIGIN OF STEEL
EUROPEAN UNION

COD. COL. HEAT CODE	COLATA HEAT	POS. ITEM	VS.ORDINE YOUR REFERENCE	Q.TA' Q.TY	DESCRIZIONE DESCRIPTION
	13/38944	044	3363747	120,00	S/O 150 RF 6" A105N

DIM.IN ACC. A
DIM. ACCORDANCE TO
ASME/ANSI B16.5 -2013

VISIVO E DIMENS.
VIS. & DIMENS.
SATISFACTORY

MATERIALE / MATERIAL
ASTM A105 (LADLE)

C%	Si%	Mn%	S%	P%	Cr%	Ni%	Mo%	Ti%	Cu%	V%	Nb%	N%	Al%	C.E.%	B %
0,190	0,230	0,950	0,009	0,010	0,150	0,080	0,020	0,020	0,170	0,003	0,002	0,009	0,028	0,400	0,000

PROVETTA / TEST SPECIMEN DIEZ. mm2 / SECT. mm2	LUNG. mm / LENGHT mm	FORMA SHAPE	SNERVAMENTO YIELD POINT N/mm2 >=0,2%	ROTTURA TENSILE STRENGHT N/mm2 >=	ALLUNGAMENTO ELONGATION %>=	CONTRAZIONE REDUCTION OF AREA %>=	DUREZZA HARDNESS HBW
126,60	50,80	1	340,0	516,0	32,0	64,0	154,0 - 158,0

RESILIENZA / IMPACT TEST - JOULE/cm2

TIPO / TYPE 10x10mm	°C	1	2	3	SNERVAMENTO YIELD POINT N/mm2 >=1,0%
KV	20	87	81	83	0,0

Ns.RIF. OUR REF.

MATERIALE IN ACCORDO A / MATERIAL IN ACC. TO
ASTM/ASME A 105/SA 105 M - 13 ASME CODE SECT. II, PART A, ED. 2013
NACE MR-0175/2009 ISO 15156 - SOUR SERVICE
NACE MR-0103/2012 - SOUR SERVICE
Q.A.S.IN ACCORD.WITH PRESS.EQUIPM.DIRECT.97/23/EC(PED) ANNEX I,PARAGRAPH 4.3 CERT.MLN 0531016/01
CSA CAN3 Z245.12-09 GRADE 290 CAT.I SOUR SERVICE

TRATTAMENTO TERMICO / HEAT TREATMENT
NORMALIZED AT 920 C - COOLED IN STILL AIR

FORNO / FURNACE
ELECTRIC FURNACE

ORIGINE / ORIGIN OF STEEL
EUROPEAN UNION

NOTE / NOTES	UFFICIO CONTROLLO QUALITA' / QUALITY CONTROL DEPARTEMENT	ENTE UFFICIALE DI COLLAUDO / INSPECTION AUTHORITY	MARCHIO PRODUZIONE / MANUFACTURER'S SYMBOL
100% MANUFACTURED IN ITALY MANUFACTURING IN ACCORDANCE WITH ORDER AND SPECIFICATION MATERIAL FULLY KILLED STEEL AND FINE GRAIN PRACTICED	S. Erigolio		MFF

CE: .37

PIPEWORX LTD.
A PLH GROUP COMPANY

MRR #31

MATERIAL RECEIVING INSPECTION REPORT

SALES ORDER NUMBER:	4482471-014
PIPEWORX JOB#:	162-113
OWNER:	PEMBINA PIPELINE CORPERATION
PO NUMBER:	4500094219
DATE:	Thursday, October 13, 2016
Ordered By:	BRENT CALVERT

* NOTE:

1. **MATERIAL TEST REPORTS** (MTR'S) AND **CRN NUMBERS** ARE REQUIRED TO BE RECEIVED WITH EACH ORDER AND REVIEWED FOR COMPLIANCE TO MATERIAL SPECIFICATIONS AS ORDERED IF SPECIFIED IN THE CONTRACT DOCUMENTS. CONSULT THE PIPEWORX QUALITY MANUAL.
2. COMPLETE OVER / SHORT / DAMAGE REPORT IF REQUIRED AND MAKE NOTE IN REMARKS.
3. ATTACH OR REFERENCE ALL SUPPORTING DOCUMENTATION FOR TRACEABILITY (i.e. PO, PACKING SLIPS etc.)
4. ALL FITTING DESIGNS MUST BE REGISTERED WITH ALBERTA BOILERS SAFEY ASSOCIATION.

ITEM #	PO ITEM#	Quantity	Size	Sch	Rating	Grade	DESCRIPTION	HEAT NUMBER	REC.	INITIAL	DAMAGE ACCEPT		MTR RECEIVED
57		40	1"	SCH 160		A333	NIPPLE, SCH 160, PBE, ASME B16.10M, ASTM A-333-GR6 SMLS, 100 MM LONG	867J	YES	KN	Accept		YES
		1	2"		PN 100	GR 359 CAT II (M45C)	FLANGE, BLIND RF, PN 100, CSA Z245.12, GR 359 CAT II (M45C) (C/W 1 NPT TAP)	D1001389	YES	KN	Accept		YES
		16	2"				FOUR BOLT TWO CLAMP PIPE SHOE		YES	KN	Accept		N/A

REMARKS (IF NCR IS ISSUED, NOTE NCR NUMBER):	

PIPEWORX QUALITY REPRESENTATIVE	DATE RECEIVED	SIGNATURE
NAME: Keith Noble	10/13/2016	
TITLE: QC Inspector		

MRC Global PACKING LIST

4482471014

Sales Order Number 4482471-014 **Page** 1
Printed 10/12/16 11:30

Deliver To:	From: 73-755	Customer Purchase Order
PEMBINA PIPELINE 2000 700 - 9TH AVENUE S W PO 4500094219 ATTN BRENT @ 403-844-5751 CALGARY AB T2P 3V4	GRANDE PRAIRIE 12102 - 101 AVE GRANDE PRAIRIE AB T8V 8A9	4500094219 **Customer Release/Requisition No.** **Ordered by:**

Promised - 09/14/16 **Salesman** - KATLIN MCKELVEY **Ship VIA** - WILL CALL **Terms** - NET 30 DAYS
Shipped - 10/12/16 **Phone** - (780) 532-9542 **Freight Terms** - PREPAID & ALLOW A **Customer Ship No.** - 61723-0000

4500094219
ATTN BRENT W/ PIPEWORX
403-844-5751
ORDERED BY:
BRENT W/ PIPEWORX 403-844-5751

CPO Line	Customer Part/Item ID	Quantity Ordered	Backorder	Shipped	U/M	Description	Line No.
	24C20084	16		16	EA	2 CAN PIPE CLAMP 20PSP BLK STL FOUR BOLT TWO CLAMP PIPE SHOE SHIPPED 16 UNITS AT $23.4000 TOTAL $374.40	033
	24C2XXXX	5	5		EA	6" CLAMP ON PIPE SHOE 316SS SHIPPED UNITS AT $178.2300 TOTAL $.00	034
	24C2XXXX	2	2		EA	8" CLAMP-ON PIPE SHOE 316SS SHIPPED UNITS AT $299.1200 TOTAL $.00	035
	21C10297	40		40	EA	1 X 4 S160 BLK CS SMLS PIPE NIPPLE PBE ASTM A333 GR.6 MFG: CAP HLS: 967J MFG: CAP HLS: 867J SHIPPED 40 UNITS AT $9.2800 TOTAL $371.20	036
	17C1XXXX	1		1	EA	2" 600# HUB BLIND A350-LF2N/GR.359C2 C/W 1" SW TAP, S160 MFG: . HLS: D1001389 SHIPPED 1 UNITS AT $206.5000 TOTAL $206.50	037

RECEIVING INFO: Company: Date: Oct 13/16 Signed By: Keith Noble Signature:

Tubes-	Box/Bag-	Crates-	Pallets-	Pieces-	Bundles-	Picked by-	Checked by- KMM	Staged-	
Order Weight-	118.00	Material Tot-	$952.10	Freight- $	.00	Other- $	.00	Tax- $	47.61	Total- $	999.71

CMPACK (Rev 09/15)

Phoenix * Capitol * Camco
CapProducts

CE = .38

Certified Mill Test Report

Heat Code: 867J
Heat Number: A4354
Item: 15131008PBECSA: 1X4 SCH 160 SMLS NIPL A333-GR6 PBE CSA

Material: ASTM A333 GR6 2015/ASME SA333 GR6 2015 Edition

Chemistry Properties

C	Mn	P	S	Si	Cu	Cr
0.1630	1.3000	0.0140	0.0070	0.3020	0.0090	0.0390
Ni	**Mo**	**V**	**Co**	**Al**	**Cb**	**N**
0.0260	0.0050	0.0030		0.0300	0.0000	
Pb	**Sn**	**Ta**	**Ti**	**C Eq. Long**		
			0.0020	0.3914		

Additional Chemical Properties

Mechanical Properties

Tensile(PSI)	Yield(PSI)	Elong. % in 2 in. or 4D	Reduction	HBW	HBW 2
67445	46575	38%		139	

Charpy Minimum Impact - ft/lbs

Test 1	Test 2	Test 3	Avg.	Test Temp.
114	118	116	116.00	52

Hydro Test Passed at 2500 psi

We hereby certify that these parts were manufactured, sampled, tested, and inspected in accordance with the product specifications stated and were found to meet the requirements. We further certify that this material was inspected using independent inspectors conforming to the requirements of EN 10204 3.1. These products meet the requirements of the latest editions of NACE MR0175, NACE MR0103, and ISO 15156. No weld repair has been performed on these products. This material was not exposed to mercury or any other metal alloy that is liquid at ambient temperatures during processing or while in our possession.

Heat Code Remarks: Flattening test passed. Charpy V Impact Tested at -52° C. Specimen size - 10 x 5 mm.

MTR #243

Certificate No.:	TSK-2012-101
Date:	December 13, 2012
Customer:	
Material:	CSA Z245.12 CAT II M40C Gr.359
P.O. No.:	80712AFJ(116)

INSPECTION CERTIFICATE

Approved according to ISO9001

Certificate No. T120101005

EN 10204 3.1 Certificate

FUTAWA FLANGE WORKS CO.,LTD.

6-3-6 ISONOKAMI-CHO,
KISHIWADA-SHI,OSAKA,JAPAN

TEL 072-437-1001

Item No.	Description	Quantity	Heat No	Material	Heat Treatment Condition
1	600# HUB BL ZF 2"	150	D1001389	CSA Z245.12 CAT II M40C Gr.359	Normalized @ 900 °C/ 0.00h

Technical Requirements
Specifications / Reference Standards

1. CSA Z245.12-2009
2. ASTM A 961 - 2002
3. ASTM A 370 - 2003a
4. ASME B16.5-2003 Smooth Finish to MSS-SP6-2006
5. NACE MR-0175-2003
6. NACE MR-0103-2004
7. ISO 15156-2-2003

Chemical Composition :

Item No.	Heat No	Steel Mill Heat No.	Material	Elements Concentration	% C[1]	% Si	% Mn[1]	% P	% S	% Cr	% Ni	% Cu	% V	% Mo	% Nb	% B	CE[1]		Cr+Mn+Cu+Mo+V	Cr+Ni+Cu+Mo	Cr+Mo
			Gr359	Specification	0.30 Max	0.50 Max	1.60 Max	0.050 Max	0.060 Max	0.25 Max	1.00 Max	1.50 Max	0.13 Max	0.25 Max	0.10 Max	0.001 Max	0.45 Max	— —	— —	1.00 Max	0.32 Max
1	D1001389	D1001380	Heat Analysis		0.180	0.270	1.210	0.015	0.003	0.020	0.010	0.010	0.010	0.010	0.000	0.000	0.460	0.391	0.060	0.050	0.030
			Product Analysis		0.190	0.260	1.220	0.013	0.005	0.020	0.010	0.010	0.010	0.010	0.000	0.000	0.463	0.403	0.060	0.050	0.030

Mechanical Properties :

Item No.	Heat No	Material	Transverse -Tensile Test (d = 12.5 mm ; GL = 50 mm; Temp : 20 °C)				Hardness, HB			Transverse-Impact Test-Charpy V			
			Y. Strength (0.2%)	T. Strength	Elongation	Reduction of Area	Load: 3000 Kg A Ind: 10 mm Ball			Energy (J) (10 x 10 mm; Temp : -46°C)			
		Gr359	359 Min Mpa	455 Min Mpa	20 Min %	-	Min	Average	197 Max	J≥16			J/mm2
1	D1001389		374	601	30.5	62.1	169	165	169	99	81	80	87

Remarks

1. Hardness according to NACE MR-0175-2003.
2. RF / FF machined finish : Ra 125-250 µin
3. Heat treatment was in accordance with CSA Z245.12"Lot" definition "(a)"
4. Cooling method: water and air.
5. 100 % Visual inspection - Satisfactory
6. All material supplied is certified to be free of Mercury contamination and no mercury bearing equipment was used during manufacturing.

Note:

1) Gr359 CE = C + F= (Mn/6+Si/24+Cu/15+Ni/20+(Cr+Mo+V+Nb)/5+5B)

Certified that the material described herein has been inspected and tested, and conforms to the requirements of the order.

FUTAWA FLANGE WORKS CO.,LTD.

Y.Hashimoto

SURVEYOR

FUTAWA SINCE 1949 OSAKA JAPAN

2 600 RF 'HUB' BLIND GR 359 C/W I S160 SW
Heat#: D1001389

CE:40

PIPEWORX LTD.
A PLH GROUP COMPANY

MRR #32

MATERIAL RECEIVING INSPECTION REPORT

SALES ORDER NUMBER:	162-113-555
PIPEWORX JOB#:	162-113
OWNER:	PEMBINA PIPELINE CORPERATION
PO NUMBER:	
DATE:	Thursday, October 06, 2016
Ordered By:	BRENT CALVERT

* NOTE:

1. **MATERIAL TEST REPORTS** (MTR'S) AND **CRN NUMBERS** ARE REQUIRED TO BE RECEIVED WITH EACH ORDER AND REVIEWED FOR COMPLIANCE TO MATERIAL SPECIFICATIONS AS ORDERED IF SPECIFIED IN THE CONTRACT DOCUMENTS. CONSULT THE PIPEWORX QUALITY MANUAL.
2. COMPLETE OVER / SHORT / DAMAGE REPORT IF REQUIRED AND MAKE NOTE IN REMARKS.
3. ATTACH OR REFERENCE ALL SUPPORTING DOCUMENTATION FOR TRACEABILITY (i.e. PO, PACKING SLIPS etc.).
4. ALL FITTING DESIGNS MUST BE REGISTERED WITH ALBERTA BOILERS SAFEY ASSOCIATION.

ITEM #	PO ITEM#	Quantity	Size	Sch	Rating	Grade	DESCRIPTION	HEAT NUMBER	REC.	INITIAL	DAMAGE ACCEPT		MTR RECEIVED
		4	1/2"		3M	A350 LF2	BALL VALVE, THRD RP NLT, 3000	3K311L	YES	KN	Accept		YES
		4	1/2"	SCH 160		A333	NIPPLE, SCH 160, PBE, ASME B16.10M, ASTM A-333-GR6 SMLS, 100 MM LONG	H00160	YES	KN	Accept		YES
		4	1/2"		3M	A350 LF2	TEE, EQUAL, SW, 3000 CL, ASME B16.11, ASTM A-350-LF2 CL1	59794	YES	KN	Accept		YES
		4	1/2"		3M	A350 LF2	PLUG, HEAVY HEX HEAD, NPT, ASME B16.11, ASTM A-350-LF2 CL1	6972	YES	KN	Accept		YES

REMARKS (IF NCR IS ISSUED, NOTE NCR NUMBER):

PIPEWORX QUALITY REPRESENTATIVE	DATE RECEIVED	SIGNATURE
NAME: Keith Noble	10/6/2016	
TITLE: QC Inspector		

T-16 1100

APEX DISTRIBUTION INC.

CONTINUATION SHEE
DELIVERY TICKET

P.O.

PAGE_____ OF___

SOLD TO	ORDERED BY	LOCATION	UNIT / RIG NO.
Attention: P.P.E WORX	Brent		
1403 844-5751	CUSTOMER P.O. NO.	SHIP VIA	PREPARED BY
	CUSTOMER AFE NO.	DATE	CUSTOMER CODE
	167-113-555	OCT 6/16	

		QTY	U/M	PRODUCT CODE	DESCRIPTION	UNIT PRICE	AMOI
	✓	4			1/2 3M SLT BALL VALVE		
	✓	4		H00160	1/2 X 4 SCH160 nPPES A333		
	✓	4		59794	1/2 3M TEES LF2		
	✓	4		6972	1/2 3M HEX PLUGS LF2		

X Jordan Waldner DO NOT PAY - INVOICE TO FOLLOW

TOTAL

FORUM PRECISION TECHNOLOGIES — P.B.V.

Inspection Certificate and Material Test Report
(EN10204-1991 3.1.B / EN10204-2004 3.1)

Batch No :

P335-3-RH-SC-143C-1/2FB

PBV Valve
12735 Dairy Ashford Rd.
Stafford TX 77477
281-340-5400 - Fax 281-340-5499
www.pbvvalve.com

	Size (NPS)	Class	Product	Description	Type	SO#	Line	Sold to	Date
	0.5	3000	187083	P-335-3-RH-SC NACE	BALL				3/26/2014

Pressure Test:	✔ Satisfactory	Shell Pressure : 4500 psi	BackSeat : psi	Seat Pressure psi	Seat Air Pressure 100 psi

		Chemical Composition [%]												Mechanical Properties									
HEAT#	Specification	C	Si	Mn	P	S	Ni	Cr	Mo	Cu	V	W	Nb	Ceq	Tensile [ksi]	Yield [ksi]	Elong [%]	Redu [%]	Hard [HB]	Ch.1 [J]	Ch.2 [J]	Ch.3 [J]	Ch. 4 [J]	Temp. [F]	Heat
3A522L	ASTM A350 LF2	0.19	0.24	0.85	0.022	0.009	0.01	0.03	0	0.01	0.002			0.339	71.56	47.86	33.5	70.8	163/1	22	21	23	22	-50	NT.
3K311L	ASTM A350 LF2	0.2	0.2	0.82	0.022	0.014	0.08	0.1	0.01	0.24	0.002			0.380	71.63	45.38	35.6	73.5	165/1	25	21	23	23	-50	NT.

1/2" 3000 thrd RP Ball Valve NLT

HTR #2469

Heat Treatment Codes:

A : Annealing	AC : Air Cooling	DT : Double Aged	FT : Furnace Treatment	N : Normalizing	OQ : OilQuenched
PH : Precipitation Hardening	SA : Solution Annealed	SQ : Solution Quenched	ST : Solution Treatment	T : Tempering	WC : Water Cooling
WQ : Water Quenched				NT Normalized Tempered	

Part	Material
BALL	ASTM A351CF8M
BODY / ENDPIECE	LF2
SEAT	DELRIN
STEM	17-4PH

Made in Taiwan

All materials are in accordance with the pre-qualified materials identified in NACE MR0175/ISO 15156

This is to certify that above mentioned parts have not come into direct contact with mercury or any its components. Nor with any mercury contaminating devices during the manufacturing process, testing, inspection or storage.

We hereby certify, that the material described above complies with the order requirements.

UTE #2476

WESTBROOK Material Test Report

003000 WESTBROOK CANADA LTD

Description:
1/2 S160 A-333

****** Specifications - Heat Code H00160: ******
A333/A333M-11 GR.6, SA333 GR.6, A420-10A WPL6, SA420 WPL6,
A540, A733, ASME B1.20.1, MSS SP-25, SP-95
STARTING MATERIAL: PIPE & TUBE

Chemical Composition:

C:	Mn:	P:	S:	Si:	Cr:	Ni:	Mo:
0.170	0.820	0.007	0.004	0.210	0.082	0.081	0.030
Cu:	**V:**	**Cb:**	**Ti:**	**B:**	**C.E.:**		
0.250	0.002	<0.001	0.021	<.0001	.351		

Mechanical Properties:

Tensile(PSI):	Yield(PSI):	Elong(%):	Hardness:	Flattening:	Bend:
69789	47546	38.00	HRB 75	OK	OK
Hydro(PSI):					
2500					

Impact Results:

Test Temp:	Achieved Values:
-50F	24-23-22 J

Comments:
Normalized @ 890C/10 min.
Cold drawn. Charpy specimen size: .394 x .157"
Meets Nace MR-01-75/2009, MR-01-03/2010 and ISO 15156/2009.

We certify only the chemistry and physical results shown for the referenced Heat Code as furnished by the Producing Mill. The Description is the responsibility of the requesting party. This document was electronically transmitted and is in accordance with EN10204 3.1/DIN50049 3.1B.

H00160

½" x 4" S160 TBE A-333
Nipple.

MTR # 247

CERTIFIED MILL TEST REPORT

The Best Value - *Price, Quality, Service* All The Time.

LOG NO. F00000000078498 (2)

BONNEY FORGE CORPORATION
P.O. BOX 330 • 14496 CROGHAN PIKE • MOUNT UNION, PA 17066-0330
(814) 542-2545 • (800) 345-7546 • FAX (814) 542-4906
www.bonneyforge.com

CUSTOMER: CCTF CORPORATION

DATE 11/05/2015

CUSTOMER ORDER NO.: 4897873-00

BONNEY ORDER NO. B000196469

SHIP TO: CCTF CORPORATION (EDMONTON)
5407 - 53RD AVE.
EDMONTON AB T6B 3G2
Canada

ITEM	QUANTITY	LOT NO.	GRADE OR SPECIFICATION NO. CHEMICAL ANALYSIS, PHYSICAL PROPERTIES, REMARKS
3	250	59794	1/2 3000 LF2 TEE T — SA/A350 LF2 CL1
7680012			Al 0.022 C 0.200 Co 0.003 Cr 0.050 Cu 0.040 Mn 1.000 Mo 0.006 Nb 0.014 Ni 0.040 P 0.007 S 0.020 Si 0.220 V 0.003 CE(Long Formula) = 0.38 T/S(PSI) 73,185 Y/S(PSI) 50,423 EL(%) 37.90 RA(%) 75.00 Brinell 132 BHN 135 BHN Charpy -50 F 35/36/49 (Ft-Lbs) Average 40.00
4	20	59449	1 1/2 3000 LF2 TEE T — SA/A350 LF2 CL1
7680016			Al 0.029 C 0.200 Co 0.003 Cr 0.050 Cu 0.080 Mn 1.020 Mo 0.006 N 0.005 Nb 0.012 Ni 0.030 P 0.008 S 0.024 Si 0.210 V 0.004 CE(Long Formula) = 0.39 T/S(PSI) 71,530 Y/S(PSI) 49,291 EL(%) 36.80 RA(%) 63.38 Brinell 132 BHN 132 BHN Charpy -50 F 55/30/35 (Ft-Lbs) Average 40.00
5	48	6730	2 3000 LF2 COUP T — SA/A350 LF2 CL1
7680023			Al 0.020 C 0.200 Co 0.003 Cr 0.020 Cu 0.050 Mn 1.030 Mo 0.003 N 0.003 Nb 0.014 Ni 0.020 P 0.004 S 0.016 Si 0.240 V 0.003 CE(Long Formula) = 0.38 T/S(PSI) 73,691 Y/S(PSI) 49,441 EL(%) 33.80 RA(%) 63.47 Brinell 132 BHN 130 BHN Charpy -50 F 55/45/51 (Ft-Lbs) Average 50.30

We certify that the data on this sheet is a true copy taken from our records of material furnished us by the production mill, or as obtained by additional laboratory checks.

by Kylee Ruiz

Kylee Ruiz
QUALITY PROCESS MANAGER

CMTR: REV2

MTR # 248

CERTIFIED MILL TEST REPORT

The Best Value - *Price, Quality, Service* All The Time.

LOG NO. F00000000080022

BONNEY FORGE CORPORATION
P.O. BOX 330 • 14496 CROGHAN PIKE • MOUNT UNION, PA 17066-0330
(814) 542-2545 • (800) 345-7546 • FAX (814) 542-4906
www.bonneyforge.com

CUSTOMER: CCTF CORPORATION **DATE** 12/22/2015

CUSTOMER ORDER NO.: 4898069-00 **BONNEY ORDER NO.** B000198734

SHIP TO: CCTF CORPORATION (EDMONTON)
5407 - 53RD AVE.
EDMONTON AB T6B 3G2
Canada

ITEM	QUANTITY	LOT NO.	GRADE OR SPECIFICATION NO. CHEMICAL ANALYSIS, PHYSICAL PROPERTIES, REMARKS
10	100	59789	1 6000 LF2 90EL S SA/A350 LF2 CL1
7680166			Al 0.026 C 0.210 Co 0.003 Cr 0.030 Cu 0.040 Mn 1.030 Mo 0.004 Nb 0.013 Ni 0.020 P 0.006 S 0.018 Si 0.170 V 0.004 CE(Long Formula) = 0.39 T/S(PSI) 75,551 Y/S(PSI) 51,758 EL(%) 36.30 RA(%) 60.19 Brinell 132 BHN 132 BHN Charpy -50 F 91/36/36 (Ft-Lbs) Average 54.30
11	412	6972	1/2 3M/6M LF2 HXPL T SA/A350 LF2 CL1
7680055			Al 0.023 C 0.200 Co 0.004 Cr 0.060 Cu 0.060 Mn 1.040 Mo 0.005 N 0.003 Nb 0.013 Ni 0.020 P 0.005 S 0.018 Si 0.220 V 0.004 CE(Long Formula) = 0.39 T/S(PSI) 75,679 Y/S(PSI) 51,362 EL(%) 37.20 RA(%) 64.57 Brinell 135 BHN 135 BHN Charpy -50 F 86/103/59 (Ft-Lbs) Average 82.70
12	1,500	1105	1 3M/6M LF2 HXPL T SA/A350 LF2 CL1
7680057			Al 0.024 C 0.210 Co 0.004 Cr 0.050 Cu 0.050 Mn 1.010 Mo 0.007 Nb 0.014 Ni 0.030 P 0.008 S 0.022 Si 0.210 V 0.003 CE(Long Formula) = 0.40 T/S(PSI) 74,832 Y/S(PSI) 53,421 EL(%) 34.90 RA(%) 61.19 Brinell 137 BHN 135 BHN Charpy -50 F 51/49/58 (Ft-Lbs) Average 52.70

We certify that the data on this sheet is a true copy taken from our records of material furnished us by the production mill, or as obtained by additional laboratory checks.

by Kylee Ruiz
Kylee Ruiz
QUALITY PROCESS MANAGER

CMTR: REV2

MTR #249

PIPEWORX LTD.
A PLH GROUP COMPANY

MRR #33

MATERIAL RECEIVING INSPECTION REPORT

SALES ORDER NUMBER:	162-113-572
PIPEWORX JOB#:	162-113
OWNER:	PEMBINA PIPELINE CORPERATION
PO NUMBER:	
DATE:	Thursday, October 06, 2016
Ordered By:	BRENT CALVERT

* NOTE:

1. **MATERIAL TEST REPORTS** (MTR'S) AND **CRN NUMBERS** ARE REQUIRED TO BE RECEIVED WITH EACH ORDER AND REVIEWED FOR COMPLIANCE TO MATERIAL SPECIFICATIONS AS ORDERED IF SPECIFIED IN THE CONTRACT DOCUMENTS. CONSULT THE PIPEWORX QUALITY MANUAL.
2. COMPLETE OVER / SHORT / DAMAGE REPORT IF REQUIRED AND MAKE NOTE IN REMARKS.
3. ATTACH OR REFERENCE ALL SUPPORTING DOCUMENTATION FOR TRACEABILITY (i.e. PO, PACKING SLIPS etc.).
4. ALL FITTING DESIGNS MUST BE REGISTERED WITH ALBERTA BOILERS SAFEY ASSOCIATION.

ITEM #	PO ITEM#	Quantity	Size	Sch	Rating	Grade	DESCRIPTION	HEAT NUMBER	REC.	NITIAL	DAMAGE ACCEPT		MTR RECEIVED
137		5	1"		3M	A350 LF2	UNION, FULL, SW, 3000 CL, MSS SP-83, ASME B16.11, ASTM A-350-LF2 CL1	6804/6881/ M1AY	YES	KN	Accept		YES
137		3	1"		3M	A350 LF2	UNION, FULL, SW, 3000 CL, MSS SP-83, ASME B16.11, ASTM A-350-LF2 CL1	6747/6541/ M1AR	YES	KN	Accept		YES

REMARKS (IF NCR IS ISSUED, NOTE NCR NUMBER):	

PIPEWORX QUALITY REPRESENTATIVE	DATE RECEIVED	SIGNATURE
IE: Keith Noble	10/6/2016	
TITLE: QC Inspector		

490-15027335 4-TM

APEX DISTRIBUTION INC.

CONTINUATION SHEET
DELIVERY TICKET

P.O.

PAGE _____ OF _____

SOLD TO	ORDERED BY	LOCATION	UNIT / RIG NO.
Pioneerx			
Attention:	Brent		
	CUSTOMER P.O. NO.	SHIP VIA	PREPARED BY
403-844 5751	162-113-572-		TM
	CUSTOMER AFE NO.	DATE	CUSTOMER CODE
		Oct 6, 2016	

		QTY	U/M	PRODUCT CODE	DESCRIPTION	UNIT PRICE	☑	AMOUNT
Overnight		8		[redacted]	1 3M SWI UNION LF 7			
				[redacted]	6747 MDRT-SW , 6804/6881 MIAY			
					Thank			
		X			DO NOT PAY - INVOICE TO FOLLOW	TOTAL		

CERTIFIED MILL TEST REPORT

(2)

The Best Value - *Price, Quality, Service* All The Time.

LOG NO. F00000000064774 Page 1 of 2

BONNEY FORGE CORPORATION
P.O. BOX 330 • 14496 CROGHAN PIKE • MOUNT UNION, PA 17066-0330
(814) 542-2545 • (800) 345-7546 • FAX (814) 542-4906
www.bonneyforge.com

CUSTOMER: CCTF CORPORATION

DATE 10/17/2014

CUSTOMER ORDER NO.: 4895976-00

BONNEY ORDER NO. B000174529

SHIP TO: CCTF CORPORATION (EDMONTON)
5407 - 53RD AVE.
EDMONTON AB T6B 3G2
Canada

ITEM	QUANTITY	LOT NO.	GRADE OR SPECIFICATION NO. CHEMICAL ANALYSIS, PHYSICAL PROPERTIES, REMARKS:
25	5	6747	1 3M LF2 UNAR S SA/A350 LF2 CL1
7680052		MALE	Al 0.030 C 0.210 Co 0.003 Cr 0.040 Cu 0.060 Mn 0.970 Mo 0.004 N 0.004 Nb 0.014 Ni 0.030 P 0.011 S 0.024 Si 0.200 V 0.004
			CE(Long Formula) = 0.39
			T/S(PSI) 74,433 Y/S(PSI) 54,086 EL(%) 37.10 RA(%) 62.90
			Brinell 144 BHN 141 BHN
			Charpy -50 F 16/12/18 (Ft-Lbs)
			Average 15.30
		6541	1 3M LF2 UNAR S SA/A350 LF2 CL1
7680052		FEMALE	Al 0.025 C 0.220 Co 0.005 Cr 0.040 Cu 0.080 Mn 1.050 Mo 0.007 N 0.003 Nb 0.014 Ni 0.030 P 0.008 S 0.020 Si 0.200 V 0.004
			CE(Long Formula) = 0.41
			T/S(PSI) 76,781 Y/S(PSI) 53,303 EL(%) 39.55 RA(%) 65.70
			Brinell 147 BHN 150 BHN
			Charpy -50 F 13/18/21 (Ft-Lbs)
			Average 17.30
		M1AR	1 3M LF2 UNAR S SA/A350 LF2 CL1
7680052		NUT	Al 0.025 C 0.190 Co 0.000 Cr 0.100 Cu 0.190 Mn 1.020 Mo 0.030 Nb 0.002 Ni 0.090 P 0.012 S 0.019 Si 0.220 V 0.003
			CE(Long Formula) = 0.41
			T/S(PSI) 78,092 Y/S(PSI) 50,656 EL(%) 30.70 RA(%) 61.09
			Brinell 132 BHN 135 BHN
			Charpy -50 F 27/34/30 (Ft-Lbs)
			Average 30.30

We certify that the data on this sheet is a true copy taken from our records of material furnished us by the production mill, or as obtained by additional laboratory checks.

by Meloney Specht
Meloney Specht
QUALITY PROCESS MANAGER

CMTR: REV2

MTR #251

Invoice: 2215899-00 PO#: 490-1S0273384-TM Line# 2 Product: 7680052 Heat: 6804/6881/m1ay

CERTIFIED MILL TEST REPORT

(2)

The Best Value - Price, Quality, Service All The Time.

LOG NO. F00000000087198 Page 3 of 5

BONNEY FORGE CORPORATION
P.O. BOX 330 • 14496 CROGHAN PIKE • MOUNT UNION, PA 17066-0330
(814) 542-2545 • (800) 345-7546 • FAX (814) 542-4906
www.bonneyforge.com

CUSTOMER: CCTF CORPORATION

DATE 09/07/2016

CUSTOMER ORDER NO.: 4898829-00

BONNEY ORDER NO. B000210281

SHIP TO: CCTF CORPORATION (EDMONTON)
5407 - 53RD AVE.
EDMONTON AB T6B 3G2
Canada

ITEM	QUANTITY	LOT NO.	GRADE OR SPECIFICATION NO CHEMICAL ANALYSIS, PHYSICAL PROPERTIES, REMARKS
8	25	6804	I 3M LF2 UNAR S SA/A350 LF2 CL1
7680052		MALE	Al 0.027 C 0.210 Co 0.002 Cr 0.090 Cu 0.020 Mn 1.000 Mo 0.007 N 0.004 Nb 0.012 Ni 0.020 P 0.005 S 0.017 Si 0.210 V 0.003 CE(Long Formula) = 0.40 T/S(PSI) 73,591 Y/S(PSI) 51,620 EL(%) 36.15 RA(%) 58.93 Brinell 135 BHN 135 BHN Charpy -50 F 47/58/55 (Ft-Lbs) Average 53.30
		6881	I 3M LF2 UNAR S SA/A350 LF2 CL1
7680052		FEMALE	Al 0.033 C 0.200 Co 0.003 Cr 0.030 Cu 0.020 Mn 1.040 Mo 0.004 N 0.002 Nb 0.015 Ni 0.020 P 0.004 S 0.018 Si 0.220 V 0.003 CE(Long Formula) = 0.38 T/S(PSI) 70,941 Y/S(PSI) 47,309 EL(%) 36.95 RA(%) 60.38 Brinell 135 BHN 132 BHN Charpy -50 F 44/51/30 (Ft-Lbs) Average 41.70
		M1AY	I 3M LF2 UNAR S SA/A350 LF2 CL1
7680052		NUT	Al 0.020 C 0.190 Co 0.000 Cr 0.160 Cu 0.170 Mn 0.970 Mo 0.030 Nb 0.001 Ni 0.120 P 0.020 S 0.018 Si 0.200 V 0.000 CE(Long Formula) = 0.41 T/S(PSI) 72,293 Y/S(PSI) 47,735 EL(%) 33.30 RA(%) 67.48 Brinell 135 BHN 135 BHN Charpy -50 F 46/48/53 (Ft-Lbs) Average 49.00

We certify that the data on this sheet is a true copy taken from our records of material furnished us by the production mill, or as obtained by additional laboratory checks.

by Billie Jo Clemens

Billie Jo Clemens
QUALITY PROCESS MANAGER

CMTR: REV2

MTR # 250

6804/6881/M1AY. / 3M 3M UNION LF2

PIPEWORX LTD.
A PLH GROUP COMPANY

MRR #34

MATERIAL RECEIVING INSPECTION REPORT

SALES ORDER NUMBER:	4500094219
PIPEWORX JOB#:	162-113
OWNER:	PEMBINA PIPELINE CORPERATION
PO NUMBER:	
DATE:	Wednesday, October 19, 2016
Ordered By:	BRENT CALVERT

* NOTE:

1. **MATERIAL TEST REPORTS** (MTR'S) AND **CRN NUMBERS** ARE REQUIRED TO BE RECEIVED WITH EACH ORDER AND REVIEWED FOR COMPLIANCE TO MATERIAL SPECIFICATIONS AS ORDERED IF SPECIFIED IN THE CONTRACT DOCUMENTS. CONSULT THE PIPEWORX QUALITY MANUAL.
2. COMPLETE OVER / SHORT / DAMAGE REPORT IF REQUIRED AND MAKE NOTE IN REMARKS.
3. ATTACH OR REFERENCE ALL SUPPORTING DOCUMENTATION FOR TRACEABILITY (i.e. PO, PACKING SLIPS etc.)
4. ALL FITTING DESIGNS MUST BE REGISTERED WITH ALBERTA BOILERS SAFEY ASSOCIATION.

ITEM #	PO ITEM#	Quantity	Size	Sch	Rating	Grade	DESCRIPTION	HEAT NUMBER	REC.	INITIAL	INSPECT FOR DAMAGE		MTR RECEIVED
		3	2" X 1"		600	A350 LF2	FLANGE, BLIND RF, 600 CL, A350 LF2 (C/W 1 S/W SCH 160 TAP)	27069814	YES	KN	Accept		YES
		2	3/4"	160		A-333	NIPPLE, SCH 160, TOE X POE, ASME B16.10M, ASTM A-333-GR6 SMLS, 100 MM LONG	84Q8	YES	KN	Accept		YES
		2	3/4"		3M	A350 LF2	CAP, THD, 3000#, A350 LF2 CL1	Y025	YES	KN	Accept		YES

REMARKS (IF NCR IS ISSUED, NOTE NCR NUMBER):

PIPEWORX QUALITY REPRESENTATIVE	DATE RECEIVED	SIGNATURE
NAME: Keith Noble	10/19/2016	
TITLE: QC Inspector		

MRC Global PACKING LIST

4482471017

Sales Order
Number 4482471-017 Page 1
Printed 10/19/16 07:09

Deliver To:	From: 73-755	Customer Purchase Order
PEMBINA PIPELINE 2000 700 - 9TH AVENUE S W PO 4500094219 ATTN BRENT @ 403-844-5751 CALGARY AB T2P 3V4	GRANDE PRAIRIE 12102 - 101 AVE GRANDE PRAIRIE AB T8V 8A9	4500094219 Customer Release/Requisition No. Ordered by:

Promised - 09/14/16 Salesman - KATLIN MCKELVEY Ship VIA - WILL CALL Terms - NET 30 DAYS
Shipped - 10/19/16 Phone - (780) 532-9542 Freight Terms - PREPAID & ALLOW A Customer Ship No. - 61723-0000

4500094219
ATTN BRENT W/ PIPEWORX
403-844-5751
ORDERED BY:
BRENT W/ PIPEWORX 403-844-5751

CPO Line	Customer Part/Item ID	Quantity Ordered	Backorder	Shipped	U/M	Description	Line No.
	24C2XXXX	5	5		EA	6" CLAMP ON PIPE SHOE 316SS SHIPPED UNITS AT $178.2300 TOTAL $.00	034
	24C2XXXX	2	2		EA	8" CLAMP-ON PIPE SHOE 316SS SHIPPED UNITS AT $299.1200 TOTAL $.00	035
	21C10174	2		2	EA	3/4 X 4 S160 BLK CS SMLS PIPE NIPPLE TOE X POE ASTM A333 GR.6 MFG: CAP HLS: 84Q8 SHIPPED 2 UNITS AT $6.7300 TOTAL $13.46	038
	18C10588	2		2	EA	3/4 3000# BLK FS CAP THD SA350 LF2N IMP MFG: BW HLS: Y025 SHIPPED 2 UNITS AT $11.2700 TOTAL $22.54	039
	17C1XXXX	3		3	EA	2" 600# RF HUB BLIND C/W 1" S160 S/W TAP A350-LF2N MFG: SE HLS: 27069814 SHIPPED 3 UNITS AT $90.1100 TOTAL $270.33	040

RECEIVING INFO: Company: Date: Oct 19/16 Signed By: Kevin Noble Signature:

Tubes-	Box/Bag- 1	Crates-	Pallets-	Pieces-	Bundles-	Picked by-	Checked by- MW	Staged-			
Order Weight-	2.04	Material Tot-	$306.33	Freight- $	.00	Other- $	.00	Tax- $	15.32	Total- $	321.65

CMPACK (Rev 09/15)

SO# 303338 HEAT# 27069814 2 600 RF 'HUB' BLIND `LF2' C/W 1 S160 SW

SAN ENG STEEL FORGING CO LTD
311, Jen Hsin Road, Jen Wu District
Kaohsiung, Taiwan, R.O.C.
TEL:07-3724249 ; FAX:07-3712923
URL: www.saneng.com.tw
e-mail: saneng@ksts.seed.net.tw

MILL TEST CERTIFICATE

EN10204-3.1.B(DIN50049/3.1.B)
Customer: SEYBOLD INTERNATIONAL CORP.
Order No.: 7009491(6)-PVF

Certificate No.: SE9491F1
Date: 05/13/2015
Page: 2 OF 2

PRODUCT	MATERIAL SPECIFICATIONS	DIMENSIONAL SPECIFICATIONS
FORGED CARBON STEEL FLANGES	ASTM A-350 LF2-14 CL.1/ASME SA-350 LF2-14 CL.1	ASME B16.5-13 CSA Z245.12

Item No.	CODE NO	DESCRIPTION	QUANTITY	CHEMICAL COMPOSITION (%) C	Si	Mn	P	S	Cu	Cr	Ni	Mo	V	Nb	N			CE(*3)
Min				-	0.150	0.600	-	-	-	-	-	-	-	-	-			
Max				0.300	0.300	1.350	0.035	0.040	0.400	0.300	0.400	0.120	0.080	0.020	-			
11		600 HUB BLRF(3/4"SWXXS TAP)2" LF2	25 PCE	0.210	0.200	1.160	0.016	0.010	0.007	0.010	0.010	0.004	0.004	0.001	0.006			0.408
12		600 HUB BLRF(1"SWS160 TAP) 2" LF2	75 PCE	0.210	0.200	1.160	0.016	0.010	0.007	0.010	0.010	0.004	0.004	0.001	0.006			[illegible]
13		600 HUB BLRF(1"SWXXS TAP) 2" LF2	25 PCE	0.210	0.200	1.160	0.016	0.010	0.007	0.010	0.010	0.004	0.004	0.001	0.006			0.408
14		600 HUB BLRF(1 1/2"NPT TAP) 2" LF2	20 PCE	0.210	0.200	1.160	0.016	0.010	0.007	0.010	0.010	0.004	0.004	0.001	0.006			0.408
15		2500 BLRTJ (1"NPT TAP) 2" LF2	25 PCE	0.190	0.210	1.030	0.016	0.004	0.160	0.100	0.080	0.015	0.003	0.001	0.008			0.403
16		300 BLRF 6" LF2	25 PCE	0.200	0.210	1.140	0.022	0.004	0.010	0.030	0.010	0.001	0.004	0.001	0.008			0.398
17		600 BLRF 12" LF2	2 PCE	0.200	0.230	1.040	0.018	0.008	0.160	0.100	0.080	0.030	0.005	0.002	0.007			0.416
18		600 BLRF 12" LF2	8 PCE	0.190	0.210	1.050	0.020	0.009	0.130	0.110	0.040	0.020	0.002	0.001	0.006			0.403

Item No.	Heat No.	T.S.(*1) (MPA)	Y.S.(*1) (MPA)	E.L.(*1) (%)	Hardness (HB)	R.A.(*1) (%)	Impact Test Temp: -46°C Minimum: 20.0 Joule 1	2	3	Material Supplier
Min		485.0	250.0	22.0	-	30.0				
Max		655.0	-	-	197	-				
11	2706981403	518.0	364.0	36.4	153/150	71.3	135.0	87.0	84.0	ACOMINAS
12	[illegible]	518.0	364.0	36.4	153/150	71.3	135.0	87.0	84.0	ACOMINAS
13	2706981403	518.0	364.0	36.4	153/150	71.3	135.0	87.0	84.0	ACOMINAS
14	2706981403	518.0	364.0	36.4	153/150	71.3	135.0	87.0	84.0	ACOMINAS
15	102646	520.0	370.0	35.0	153/151	70.4	99.0	105.0	118.0	WEI CHIH STEEL
16	4723483	516.0	368.0	37.0	152/150	69.5	124.0	84.0	115.0	ACOMINAS
17	751674	512.0	341.0	34.2	152/150	69.5	79.0	109.0	122.0	GODO STEEL
18	Y302498	524.0	385.0	33.8	153/71	71.3	77.0	87.0	113.0	KOTOBUKI

HEAT TREATMENT(*2)
☒ N

REMARKS
890°C X4HRS
CONFORMS WITH NACE MR0103-12 AND NACE MR0175/ISO15156.2-09 CLAUSE 7.2.1.4 REGION 3 AND ANNEX A.
CONFORMS WITH Z245.12 CAT II GR248 SOUR SERVICE-09 (FOR USE AS WELDING NECK AND BLIND FLANGES ONLY)
TEST SPECIMEN SIZE: 10X10
TEST SPECIMEN ORIENTATION: TRANSVERSE
IMPACT TEST TEMP.: -46°C
MN TO C RATIO IS GREATER THAN 3.0"

*1: T.S. = Tensile Strength, Y.S.=Yield Strength, E.L.=Elongation, R.A.=Reduction of Area.

*2: N=Normalized, A=Annealed, Q=Quenched, T=Tempered, S.T=Solution Treated, S.R=Stress Relieved, A.C=Air Cooled, F.C=Furance Cooled, W.C=Water Cooled, O.C=Oil Cooled.

*3: C.E. Value = C + (Mn /6) + (Cr + Mo +V) / 5 + (NI + Cu) / 15

We hereby certify that the material has been tested in accordance with the above specification and also with the requirements called for by the above order.

SAN ENG STEEL FORGING CO., LTD.

Manager of Quality Assurance Dept

3/4" TOE SCH 160 A333 NIPPLE

CapProducts, Ltd.
25 Winnipeg St
Vanastra, ON N0M 1L0

Phoenix * Capitol * Camco
CapProducts CE = 0.29

Commanding a Higher Standard™

Certified Mill Test Report

Printed: 6/1/2016
Customer
MRC GLOBAL (CANADA) ULC
7072 - 112 AVE SE
CALGARY, AB T2C 4Z1

Certified: 12/17/2015
P.O. S 759 306223
Tag

Heat No A2416
Heat Code 84Q8
Phoenix Order # 1206501
Material ASTM A333 GR6 2013/ASME SA333 GR6 2015 Edition

Part Number
15130708PBECSA

Description
3/4X4 SCH160 SMLS NIPL A333 GR6 PBE CSA

Chemical Properties

C	Mn	P	S	Si	Cu	Ni	Cr
0.1500	0.8500	0.0120	0.0040	0.1600	0.0030	0.0300	0.0180

C Eq. Long
0.2985

Mo	V	Co	Al	Cb	N	Pb	Sn	Ta	Ti
0.0030	0.0020			0.0000					0.0010

Additional Chemical Properties

Cr + Cu + Ni
0.0510

Mechanical Properties

Tensile (PSI)	Yield (PSI)	Elong. % in 2 in. or 4D	R of A	HBW	HBW2
62,572	44,972	52.0%	0.0%	136	0

Charpy Minimum Impact - ft/lbs

Test 1	Test 2	Test 3	Average
39	44	42	41.67

* Hydro test passed. at 2500 psi.

We hereby certify that these parts were manufactured, sampled, tested, and inspected in accordance with the product specifications stated and were found to meet the requirements.
We further certify that this material was inspected using independent inspectors conforming to the requirements of EN 10204 3.1. These products meet the requirements of the latest editions of NACE MR0175, NACE MR0103, and ISO 15156. No weld repair has been performed on these products. This material was not exposed to mercury or any other metal alloy that is liquid at ambient temperatures during processing or while in our possession.

Comments:

Flattening test passed.
Charpy V Impact Tested at -56° C. Specimen size - 10 x 3.33 mm.

Heat Number: 4
MRC Global Part Number: 21C10168
MRC Global Part Description: 3/4 X 4 S160 BLK CS SMLS PIPE NIPPLE PBE ASTM A333 GR.6

MTR # 253

SO# 303338 HEAT# Y025 3/4 3000 SCRD CAP `LF2'

柏緯鐵工股份有限公司
高雄縣仁武鄉烏林村仁心路 303 號
BOTH-WELL STEEL FITTINGS CO., LTD.
NO.303, JEN-HSIN ROAD JEN-WU HSIANG
KAOHSIUNG HSIEN, TAIWAN R.O.C.(81460)
TEL: (07) 371-0497 , 371-1536 , 372-0260 FAX: (886-7) 371-3864 , 371-3882
WEB SITE:http://www.bothwell.com.tw E-MAIL:bothwell@www.bothwell.com.tw or box@mail.bothwell.com.tw

An ISO-9001 Registered Manufacturer

ISO 9001 ANSI-RAB ACCREDITED QMS

MILL TEST & INSPECTION CERTIFICATE

ACCORDING TO EN10204/DIN50049/3.1.B

CUSTOMER:SEYBOLD INTERNATIONAL CORP
CERT NO:51711-1 ORDER NO: 5033(SO602)
INVOICE NO: BW059406031
L/C NO:
DATE: 05/09/09
PAGE: 4

ITEM	RAW MATERIAL HEAT NO.	BOTH WELL HT.CD.	DESCRIPTION	QUANTITY	SPECIFICATION: A350/SA350 -02b LF2-Class1 DIMENSION: ASME B16.11 - 2001 SURFACE: BY VISUAL...GOOD
091	83523	Y025	45D ELBOW 1/4" 3000# NPT	25 PC	
094	83523	Y025	CAP 1/4" 3000# NPT	25 PC	
099	83523	Y025	90D ELBOW 3/8" 3000# NPT	25 PC	
100	83523	Y025	FULL CPLG 3/8" 3000# NPT	25 PC	
111	83523	Y025	FULL CPLG 3/4" 3000# NPT	25 PC	
112	83523	Y025	CAP 3/4" 3000# NPT	25 PC	
115	83523	Y025	HALF CPLG 3/4" 3000# NPT	25 PC	

CHEMICAL COMPOSITION (%)

ITEM	C	Si	Mn	P	S	Cu	Cr	Ni	Mo	V	Nb	N
Min	-	0.150	0.600	-	-	-	-	-	-	-	-	-
Max	0.300	0.300	1.350	0.035	0.040	0.400	0.300	0.400	0.120	0.080	0.020	-
091	0.210	0.210	0.970	0.013	0.007	0.010	0.040	0.020	0.000	0.000	0.010	-
094	0.210	0.210	0.970	0.013	0.007	0.010	0.040	0.020	0.000	0.000	0.010	-
099	0.210	0.210	0.970	0.013	0.007	0.010	0.040	0.020	0.000	0.000	0.010	-
100	0.210	0.210	0.970	0.013	0.007	0.010	0.040	0.020	0.000	0.000	0.010	-
111	0.210	0.210	0.970	0.013	0.007	0.010	0.040	0.020	0.000	0.000	0.010	-
112	0.210	0.210	0.970	0.013	0.007	0.010	0.040	0.020	0.000	0.000	0.010	-
115	0.210	0.210	0.970	0.013	0.007	0.010	0.040	0.020	0.000	0.000	0.010	-

MECHANICAL TEST

ITEM	Tensile Strength (KSI)	Yield Strength (KSI)	Elon-Gation (%)	R of A (%)	Hardness (HB)
Min	70.0	36.0	30.0	30.0	-
Max	95.0	-	-	-	197
091	70.4	44.6	32.8	67.4	137
094	70.4	44.6	32.8	67.4	137
099	70.4	44.6	32.8	67.4	137
100	70.4	44.6	32.8	67.4	137
111	70.4	44.6	32.8	67.4	137
112	70.4	44.6	32.8	67.4	137
115	70.4	44.6	32.8	67.4	137

Remark:
CONFORMS TO NACE MR0175-2003
STEEL MARKING PROCESS : ELECTRIC FURNACE
HEAT TREATED(°C) NORMALIZED:900°C TEMPERED:650°C
IMPACT VALUE(CHARPY) -50° F(-45.6°C)

HEAT NO.	HT. CD.	JOULE(J)	AVG.(J)
83523	Y025	32.0 31.0 71.0	35.6

WE CERTIFY THE ABOVE MENTIONED FITTINGS HAVE BEEN MANUFACTURED AND TESTED IN ACCORDANCE WITH THE SPECIFICATIONS SHOWN

S C Lee — Q.C. MANAGER SHENG CHENG LEE

G C Huang — INSPECTOR CHUN CHIEH HUANG

BW-D0839 REV:0

MTR #254

PIPEWORX LTD.
A PLH GROUP COMPANY

MRR #35

MATERIAL RECEIVING INSPECTION REPORT

SALES ORDER NUMBER:	4500094219
PIPEWORX JOB#:	162-113
OWNER:	PEMBINA PIPELINE CORPERATION
PO NUMBER:	
DATE:	Thursday, October 20, 2016
Ordered By:	BRENT CALVERT

* NOTE:

1. **MATERIAL TEST REPORTS** (MTR'S) AND **CRN NUMBERS** ARE REQUIRED TO BE RECEIVED WITH EACH ORDER AND REVIEWED FOR COMPLIANCE TO MATERIAL SPECIFICATIONS AS ORDERED IF SPECIFIED IN THE CONTRACT DOCUMENTS. CONSULT THE PIPEWORX QUALITY MANUAL.
2. COMPLETE OVER / SHORT / DAMAGE REPORT IF REQUIRED AND MAKE NOTE IN REMARKS.
3. ATTACH OR REFERENCE ALL SUPPORTING DOCUMENTATION FOR TRACEABILITY (i.e. PO, PACKING SLIPS etc.).
4. ALL FITTING DESIGNS MUST BE REGISTERED WITH ALBERTA BOILERS SAFEY ASSOCIATION.

ITEM #	PO ITEM#	Quantity	Size	Sch	Rating	Grade	DESCRIPTION	HEAT NUMBER	REC.	INITIAL	INSPECT FOR DAMAGE		MTR RECEIVED
		5	6"			316SS	SHOE, CLAMP ON		YES	KN	Accept		N/A
		2	8"			316SS	SHOE, CLAMP ON		YES	KN	Accept		N/A
		1	1"				SHOE, FOUR BOLT TWO CLAMP		YES	KN	Accept		N/A
		2	2"	SCH 80		WPL6	Elbow, 90 , LR, BW, sch 80, ASME B16.9, ASTM A-420-WPL6	14N01005	YES	KN	Accept		YES
		21'	2"	SCH 80		A333-6/ Gr.359	PIPE, 2, STD, CS, SMLS PIPE BE SRL ASTM A/ASME SA333 6 CSAZ245.1 GR. 359C2	655972	YES	KN	Accept		YES

REMARKS (IF NCR IS ISSUED, NOTE NCR NUMBER):

PIPEWORX QUALITY REPRESENTATIVE	DATE RECEIVED	SIGNATURE
NAME: Keith Noble	10/20/2016	
TITLE: QC Inspector		

MRC Global PACKING LIST

4482471020

Sales Order
Number 4482471-020 Page 1
Printed 10/19/16 15:47

Deliver To:	From: 73-755	Customer Purchase Order
PEMBINA PIPELINE 2000 700 - 9TH AVENUE S W PO 4500094219 ATTN BRENT @ 403-844-5751 CALGARY AB T2P 3V4	GRANDE PRAIRIE 12102 - 101 AVE GRANDE PRAIRIE AB T8V 8A9	4500094219 Customer Release/Requisition No. Ordered by:

Promised - 09/14/16 Salesman - KATLIN MCKELVEY Ship VIA - WILL CALL Terms - NET 30 DAYS
Shipped - 10/19/16 Phone - (780) 532-9542 Freight Terms - PREPAID & ALLOW A Customer Ship No. - 61723-0000

4500094219
ATTN BRENT W/ PIPEWORX
403-844-5751
ORDERED BY:
BRENT W/ PIPEWORX 403-844-5751

CPO Line	Customer Part/Item ID	Quantity Ordered	Backorder	Shipped	U/M	Description	Line No.
	24C2XXXX	5	5		EA	6" CLAMP ON PIPE SHOE 316SS SHIPPED UNITS AT $178.2300 TOTAL $.00	034
	24C2XXXX	2	2		EA	8" CLAMP-ON PIPE SHOE 316SS SHIPPED UNITS AT $299.1200 TOTAL $.00	035
	24C20030	1	1		EA	1 10PSP STEEL STL FOUR BOLT TWO CLAMP PIPE SHOE SHIPPED UNITS AT $25.4100 TOTAL $.00	041
	03C30859	20		21	FT	2 XH CS SMLS PIPE BE SRL ASTM A/ASME SA333 6 CSAZ245.1 GR.359C2 TPCO MFG: HLS: 655972 SHIPPED 21 UNITS AT $5.2700 TOTAL $110.67	042
	16C12580	2		2	EA	2 XH BLK CS LR 90 DEG WELD ELL A/SA420WPL6 IMP MFG: . HLS: 14N01005 SHIPPED 2 UNITS AT $5.7200 TOTAL $11.44	043

RECEIVING INFO: Company: Date: Oct 20/16 Signed By: Keith Noble Signature:

Tubes-	Box/Bag-	Crates-	Pallets-	Pieces-	Bundles-	Picked by-	Checked by- TDF	Staged-
Order Weight- 149.58	Material Tot- $122.11	Freight- $ .00	Other- $ .00	Tax- $ 6.10	Total- $ 128.21			

CMPACK (Rev 09/15)

Purchaser : CCTF CORPORATION

INSPECTION CERTIFICATE

TO EN10204 3.1

Thai Benkan Co., Ltd.
58 Soi Watkrunai, Bangkru, Prapadaeng,
Samutprakarn, 10130 Thailand.

Purchase Order No. 4810419-00 Job No. S759265756

D M Y 14/01/2015 Certificate No. T - 2015030127

E-No.	Specification for Material Made from Seamless Pipe	Specification for Inspection	Visual Examination	Dimensional Inspection
MD-555	ASTM A420-14/ASME SA420-14 WPL6 CSA Z245.11-13 Gr.241 CAT II M45C Sour Service	ASME B16.9-2012,B16.25-2012	Good	Good

MFG. No.	Product & Size (T:*1)	Quantity	Hardness Actual Data
14N01005	90 EL WPL6 2"S80	980	HB: 135-150

	Material Heat No.	Item No.		
	J4L8913	7560893 16C12580		

Specification	Chemical Composition %													*2 Tension Test			Hardness Max 197 HB : GOOD	
	C	Si	Mn	P	S	Cu	Ni	Cr	Mo	Al	V	Nb	C.E.	Y.S	T.S	E	Impact Test (J) 10 X 2.5 X 2V AT -45 °C	
	X 100	X 100	X 100	X 1000	X 1000	X 100	X 100	X 100	X 100	X 1000	X 1000	X 1000	X 100	MPa.		%		
Min.		15	50											240	415	30	39	
Max.	30	40	135	35	40	40	40	30	12		80	20	45		585		44	AVE. 42
	12	25	129	13	3	1	2	12	2		0	0	38	324	462	59	42	

NORMALIZING 910 C X 0.5 HR. AIR COOLING

The fittings was manufactured, sampled, tested, and inspected in accordance with the specification, and was found to meet the requirements.

The material meet ANSI/NACE MR0175/ISO15156-2 (Region 3) :2009 & MR0103-2012

C.E. = C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15 MAGNETIC PARTICLE EXAMINATION FOR TEE ONLY :

We hereby certify that the product described herein has been manufactured in accordance with the specifications concerned and also with the purchaser's requirements and that the test results shown herein are correct.

* 1 : "T" symbolized wall thickness in mm. * 2 : YS Yield strength TS = Tensile strength E = Elongation

TZ 6C/4

Rungrapa Kamphranon

Quality Assurance Manager

Thai Benkan Co., Ltd.

MT 2 #252

TPCO

MANUFACTURER: TIANJIN PIPE (GROUP) CORPORATION
ADD: JINTANG ROAD DONGLI DISTRICT, TIANJIN, CHINA
TEL: 86-22-24801073
FAX: 86-22-24801291

QR-11-8.2.4-19

QUALITY CERTIFICATE

Licence No.:
No.: 15082702

Contract No.	TPCO-14766E	L/C No.		O.D.×W.T.	2 XH(60.30MM×5.54MM)	Packing	IN BUNDLES
Order	MRC CANADA ULC.	Product	SEAMLESS STEEL LINE PIPE	Steel grade	CAT II Gr.359 Sour Service/Gr.6	Total pieces	533
P.O. No.	MRC PO#S 759 274778	Port of desti.		Man. Method	HOT ROLLING SEAMLESS	Total metres	
Standard	CSA Z245.1-14 /ASTM A333-2013/ASME SA 333-2013			Length range	19-22FT	Total Tons	26.860

Heat No.	Lot No.	Quantity: Pieces	Meters	Bundles	Tons	Delivery condition	Sample No.	Tensile test(MPa): 1*	Tem. ℃	T.S.	Type	Y.S.	Elong.%	Shrink %	Impact test(J): 2*	Tem. ℃	Size	AK1	Shear %	AK2	Shear %	AK3	Shear %	AVE	Shear %
655972	332	533			26.860	Q+T	332-002-2	A	23	580	Rt0.5	495	28.0		A	-54	10*3.3	56	100	58	100	59	100	58	100
Total		533			26.860		Note:	A:strip,L,bo=19.0mm Lo=50mm										A:V8/L							

Heat No.	Lot No.	Sample No.	HV10	Hardness test (inside): 1	2	3	4	AVE	Hardness test (middle): 1	2	3	4	AVE	Hardness test (outside): 1	2	3	4	AVE	NDE	Fla. test(1)	Fla. test(2)
655972	332	332-002-2		184.0	183.0	182.0	183.0	183.0						178.0	179.0	180.0	178.0	179.0	ET+UT/Φ1.8+L3	G	G

Heat No. / Material		Chemical composition % (L: Ladle analysis P:Product analysis) C	Si	Mn	P	S	Ni	Cr	Mo	Cu	Al	V	Nb	Ti	B	Ca	N	H	O	CE (CSA)	CE(IIW)	Hydro. Test
655972	L	0.14	0.28	1.07	0.011	0.002	0.03	0.05	0.03	0.04	0.041	0.04	<0.01	<0.01	0.0006	0.0012				0.33	0.35	3010psi/8s
14Mn5V	P	0.14	0.28	1.06	0.007	0.002	0.02	0.05	0.03	0.05	0.044	0.04	<0.01	<0.01	<0.0005	0.0016				0.33	0.35	
	P	0.15	0.28	1.08	0.008	0.002	0.02	0.05	0.03	0.05	0.044	0.04	<0.01	<0.01	<0.0005	0.0015				0.35	0.36	
	L																					
	P																					
	P																					
	L																					
	P																					
	P																					

NDE (100%)	Visual and Dimension	Hydro. Test	Pipe End NDE	Pipe End Bevelling	Residual Mag. Test	SSC	HIC
G	G	G	G	G	G		

We hereby state that all pipes are manufactured and inspected according to above standards and order.

Seal for certification:

No.
Page (1)
Date: 2015-8-1

Note: Quenched and Tempered: 910℃-20Minutes W.C.& 670℃+30Minutes A.C.; 1. NACE MR 0103-2010/NACE MR 0175-2009/ISO 15156-2 2009,2. CE (CSA) =C+F+ [Mn/6+Si/24+Cu/15+Ni/20+ (Cr+Mo+V+Nb) /5+5B] CE (IIW) =C+Mn/6+(Cr+Mo+V)/5+(Cu+Ni)/15,3. ALUMINUM KILLED STEEL. EAF-LF-CONTINUOUS CASTING4. EN10204-3.1,5. Silicon and calcium treated for inclusion morphology control at Steel Melting,6. Visual inspection and, Dimensional inspection, Lamination inspection.

Remark:desti.=destination;Tem.=Temperature;speci.= specification;Man.=Manufacture;Fla.=Flattening;G=Good;Hydro.=Hydrostatic; Mag=Magnetic

(FOR EXPORT ONLY)

PIPEWORX LTD.
A PLH GROUP COMPANY

MRR #36

MATERIAL RECEIVING INSPECTION REPORT

SALES ORDER NUMBER:	162-113-596
PIPEWORX JOB#:	162-113
OWNER:	PEMBINA PIPELINE CORPERATION
PO NUMBER:	
DATE:	Thursday, October 20, 2016
Ordered By:	BRENT CALVERT

* NOTE:

1. **MATERIAL TEST REPORTS** (MTR'S) AND **CRN NUMBERS** ARE REQUIRED TO BE RECEIVED WITH EACH ORDER AND REVIEWED FOR COMPLIANCE TO MATERIAL SPECIFICATIONS AS ORDERED IF SPECIFIED IN THE CONTRACT DOCUMENTS. CONSULT THE PIPEWORX QUALITY MANUAL.
2. COMPLETE OVER / SHORT / DAMAGE REPORT IF REQUIRED AND MAKE NOTE IN REMARKS.
3. ATTACH OR REFERENCE ALL SUPPORTING DOCUMENTATION FOR TRACEABILITY (i.e. PO, PACKING SLIPS etc.).
4. ALL FITTING DESIGNS MUST BE REGISTERED WITH ALBERTA BOILERS SAFEY ASSOCIATION.

ITEM #	PO ITEM#	Quantity	Size	Sch	Rating	Grade	DESCRIPTION	HEAT NUMBER	REC.	INITIAL	INSPECT FOR DAMAGE		MTR RECEIVED
		12	2"		600#	316SS/FLEXIBLE GRAPHITE	GASKET, RF, 600 CL, ASME B16.20, 316SS/FLEXIBLE GRAPHITE, SPIRAL WOUND C/W 316SS IR & CS OR	N/A	YES	KN	Accept		N/A
		4	6"		150#	316SS/FLEXIBLE GRAPHITE	GASKET, RF, 150 CL, ASME B16.20, 316SS/FLEXIBLE GRAPHITE, SPIRAL WOUND C/W 316SS IR & OR	N/A	YES	KN	Accept		N/A
		4	8"		150#	316SS/FLEXIBLE GRAPHITE	GASKET, RF, 150 CL, ASME B16.20, 316SS/FLEXIBLE GRAPHITE, SPIRAL WOUND C/W 316SS IR & OR	N/A	YES	KN	Accept		N/A

REMARKS (IF NCR IS ISSUED, NOTE NCR NUMBER):	

PIPEWORX QUALITY REPRESENTATIVE	DATE RECEIVED	SIGNATURE
NAME: Keith Noble	10/20/2016	
TITLE: QC Inspector		

MRC Global PACKING LIST

4520502001

Sales Order Number 4520502-001 Page 1
Printed 10/19/16 15:44

Deliver To:	From: 73-755	Customer Purchase Order
PIPEWORX LTD LOT 215C 26229 TOWN SHIP 531A ZONE 2 PO# 162-113-596 ACHESON AB T7X 5A4	GRANDE PRAIRIE 12102 - 101 AVE GRANDE PRAIRIE AB T8V 8A9	162-113-596 Customer Release/Requisition No. Ordered by:

Promised - 10/19/16 Salesman - KATLIN MCKELVEY Ship VIA - WILL CALL Terms - NET 30 DAYS
Shipped - 10/19/16 Phone - (780) 532-9542 Freight Terms - PREPAID & ALLOW A Customer Ship No. - 83599-0002

ATTN WINSTON WATCHORN
JOB# 162-113

CPO Line	Customer Part/Item ID	Quantity Ordered	Backorder	Shipped	U/M	Description	Line No.
	25C11221	12		12	EA	2 3/600# FLEXIBLE GRAPHITE SP WND GSKT 316SS SPIRALS 316 INNER RING SHIPPED 12 UNITS AT $4.5400 TOTAL $54.48	001
	25C10873	4		4	EA	6 150# FLEXIBLE GRAPHITE SP WND GSKT 316SS SPIRALS 316 INNER RING SHIPPED 4 UNITS AT $15.1000 TOTAL $60.40	002
	25C10948	4		4	EA	8 150# FLEXIBLE GRAPHITE SP WND GSKT 316SS SPIRALS 316 INNER RING SHIPPED 4 UNITS AT $19.6500 TOTAL $78.60	003

RECEIVING INFO: Company: Date: Oct 20/16 Signed By: Keith Noble Signature:

Tubes-	Box/Bag-	Crates-	Pallets-	Pieces-	Bundles-	Picked by-	Checked by- KMM	Staged-	
Order Weight-	8.00	Material Tot-	$193.48	Freight- S	.00	Other- S	.00	Tax- S	9.67	Total- S	203.15

CMPACK (Rev 09/15)

PIPEWORX LTD.
A PLH GROUP COMPANY

MRR #37

MATERIAL RECEIVING INSPECTION REPORT

SALES ORDER NUMBER:	4500091380
PIPEWORX JOB#:	162-113
OWNER:	PEMBINA PIPELINE CORPERATION
PO NUMBER:	
DATE:	Thursday, October 20, 2016
Ordered By:	BRENT CALVERT

* NOTE:

1. **MATERIAL TEST REPORTS** (MTR'S) AND **CRN NUMBERS** ARE REQUIRED TO BE RECEIVED WITH EACH ORDER AND REVIEWED FOR COMPLIANCE TO MATERIAL SPECIFICATIONS AS ORDERED IF SPECIFIED IN THE CONTRACT DOCUMENTS CONSULT THE PIPEWORX QUALITY MANUAL.
2. COMPLETE OVER / SHORT / DAMAGE REPORT IF REQUIRED AND MAKE NOTE IN REMARKS.
3. ATTACH OR REFERENCE ALL SUPPORTING DOCUMENTATION FOR TRACEABILITY (i.e. PO, PACKING SLIPS etc.).
4. ALL FITTING DESIGNS MUST BE REGISTERED WITH ALBERTA BOILERS SAFEY ASSOCIATION.

ITEM #	PO ITEM#	Quantity	Size	Sch	Rating	Grade	DESCRIPTION	HEAT NUMBER	REC.	INITIAL	INSPECT FOR DAMAGE		MTR RECEIVED
		2	12"		600#		CONICAL STRAINER (TYPE "TB") COMES WITH 11 GAUGE THICK 316SS FLANGE RING AND 16 GAUGE THICK 316SS PERFORATED PLATE	SP-06	YES	WW	Accept		YES

REMARKS (IF NCR IS ISSUED, NOTE NCR NUMBER):	

PIPEWORX QUALITY REPRESENTATIVE	DATE RECEIVED	SIGNATURE
NAME: Keith Noble	10/20/2016	
TITLE: QC Inspector		

MRC Global PACKING LIST

4424154001

Sales Order
Number 4424154-001 Page 1
Printed 10/17/16 14:33

Deliver To:	From: 73-789	Customer Purchase Order
PEMBINA PIPELINE TAYLOR TERMINAL NE 1/4-31-82-17-W6M FORT ST JOHN BC V1J 6V2	COUNTRY ORDER DESK 502 - 25 AVE NISKU AB T9E 0K6	4500091380 **Customer Release/Requisition No.** **Ordered by:**

Promised - 10/19/16 Salesman - MARIUS C NELSON Ship VIA - MANITOULIN Terms - NET 30 DAYS
Shipped - 10/17/16 Phone - (780) 979-0233 Freight Terms - PREPAID & CHARGE P Customer Ship No. - 61723-0102

MTR'S REQUIRED

CPO Line	Customer Part/Item ID	Quantity Ordered	Backorder	Shipped	U/M	Description	Line No.
	10C1XXXX	4		4	EA	IFC MODEL# TB150WFNSS6W2-150, STRAINER TYP: CONICAL STRAINER (TYPE "TB") END DETAILS: TO FIT 16" ANSI 150LB. RF FLANGES PER ASME B16.5 FLANGE RING: 11 GAUGE THICK STAINLESS STEEL (SMOOTH FINISH) PERFORATED PLATE: 16 GAUGE THICK 316SS PERFORATED PLATE WITH 3/8" DIAMETER OPENINGS OPEN AREA: 150% FLOW DIRECTION: OUTSIDE TO IN MAX ALLOWABLE DP: 103KPAG MFG: IFC HLS: SP-14 MFG: IFC HLS: W8B5	001
	10C1XXXX	4		4	EA	IFC MODEL# TB600WFNSS6W2-150, STRAINER TYPE: CONICAL STRAINER (TYPE "TB") END DETAILS: TO FIT 12" ANSI 600LB RF FLANGES PER ASME B16.5 FLANGE RING: 11 GAUGE THICK 316SS (SMOOTH FININSH) PERFORATED PLATE: 16 GAUGE THICK 316SS PERFORATED PLATE WITH 3/8" DIAMETER OPENINGS OPEN AREA: 150% FLOW DIRECTION: OUTSIDE TO IN MAX ALLOWABLE DP: 103 KPAG MFG: IFC HLS: SP-13 MFG: IFC HLS: SP-06 MFG: IFC	002

MRC Global

PACKING LIST

SO # 4424154001 Page 2
PO # 4500091380
Printed 10/17/16 14:33

CPO Line	Customer Part/Item ID	Quantity Ordered	Backorder	Shipped	U/M	Description	Line No.
						HLS: W8B5	
	10C1XXXX	1		1	EA	IFC MODEL: TB600WFNSS6W2-150, STRAINER TYPE: CONICAL STRAINER (TYOE "TB") END DETAILS: TO FIT 10"ANSI 600LB RF FLANGES PER ASME B16.5 FLANGE RING: 11 GAUGE THICK 316SS (SMOOTH FINISH) PERFORATED PLATE: 16 GAUGE THICK 316SS PERFORATED PLATE WITH 3/8" DIAMETER OPENINGS OPEN AREA: 150% FLOW DIRECTION: OUTSIDE TO IN MAX ALLOWABLE DP: 172 KPAG MFG: IFC HLS: SP-12 MFG: IFC HLS: W8B5	003
	10C1XXXX	1		1	EA	IFC MODEL: TB600WFNSS6W2-150, STRAINER TYPE: CONICAL STRAINER (TYPE "TB") END DETAILS: TO FIT 8" ANSI 600LB RF FLANGES PER ASME B16.5 FLANGE RING: 11 GAUGE THICK 316SS (SMOOTH FINISH) PERFORATED PLATE: 16 GAUGE THICK 316SS PEFORATED PLATE W/3/8" DIAMETER OPENING OPEN AREA: 150% FLOW DIRECTION: OUTSIDE TO IN MAX ALLOWABLE DP: 172 KPAG MFG: IFC HLS: SP-11 MFG: IFC HLS: W8B5	004

RECEIVING INFO: Company: Date: Signed By: Signature:

Tubes- Box/Bag- Crates- 1 Pallets- Pieces- Bundles- Picked by- REC Checked by- PG Staged-
Order Weight- 300.00 Material Tot- Freight- $ .00 Other- $ .00 Tax- $ .00 Total- $ .00

ISLIP FLOW CONTROLS Inc.

Form QC-5P, Revision 0

ISLIP FLOW CONTROLS INC. INSPECTION CHECKLIST & TEST PLAN

Customer / Purchase Order No: JLM Supply / 2314
Islip Flow Controls Work Order: 77-2099
Pembina Project: PH3 and NEBC Taylor Expansion
Job No.: PB15-02691
Canadian Registration Number / Province(s): N/A
Code Stamp Designator: N/A
National Board Number: N/A
Code Section: N/A
Maximum Allowable Working Pressure / Temperature: N/A
Minimum Design Metal Temperature / MAWP: -19° F
Non Destructive Testing: 100% Visual Inspection
Post Weld Heat Treatment: Temp / Hold Time: N/A
Vessel Serial No's: N/A
ITP Number / Revision: 77-2099-ITP-R0

Product Description: TEMPORARY BASKET STRAINERS
IFC Drawing No / Revision: D12399 Rev. 0
Item Size: 16"
Item Model No. : TB150FNSS6W2-150
Customer Tags: SP-14 (Qty 4)
IFC Drawing No / Revision: D12400 Rev. 1
Item Size: 12"
Item Model No. : TB600FNSS6W2-150
Customer Tags: SP-13 (Qty 2), SP-06 (Qty 2)
IFC Drawing No / Revision: D12401 Rev. 0
Item Size: 10"
Item Model No. : TB600FNSS6W2-150
Customer Tags: SP-12 (Qty 1)
IFC Drawing No / Revision: D12402 Rev. 0
Item Size: 8"
Item Model No. : TB600FNSS6W2-150
Customer Tags: SP-11 (Qty 1)

ITP Prepared By Vender QCM (Print): Paul Batey Signature: [signature] Date (DD-MMM-YY): 24 AUG 16
TSSA AI: Authorized Inspector (Print): Signature: Date (DD-MMM-YY):
ITP Reviewed by Client's Inspector (Print): Signature: Date (DD-MMM-YY):

H: Hold, W: Witness, M: Monitor, R: Review, N/A: Not Applicable

Activity No.	Quality Control Inspections	Referenced Procedures	Verifying Documents	H W M R N/A	Inspections Islip Flow Controls Inc., Initial / Date: (dd-mmm-yy)	H W M R N/A	Inspections Authorized Inspector (TSSA AI) Initial / Date: (dd-mmm-yy)	H W M R N/A	Inspections Buyer's Inspector Initial / Date: (dd-mmm-yy)
1	Shop Drawings Approved	IFC Q.C Manual, Sec. 3.0	Approved GA Drawing	H	[signature] 24 AUG 16	N/A			
2	MTR Required for Screen Ring	IFC Q.C Manual, Sec. 4.0	MTR	H	(W) 26 SEPT 16	N/A			
3	Visual & Dimensional Inspection including Welds	Approved GA Drawing	Visual & Dimensional Report	H	(W)	N/A			
4	Additional Hold Points Due to NCR	IFC Q.C Manual, Sec. 9.0	ISLIP FLOW CONTROLS INC. INSPECTION CHECKLIST & TEST PLAN	H		N/A			
5	Handle Information Stamped Correctly	IFC Q.C Manual, Sec. 6.0	Visual	H	(W) 26 SEPT 16	N/A			
6	Issue Certificate of Conformity		Certificate of Conformity	H	(W)	N/A			

MTL # 257

Islip Flow Controls Inc., 1145 Sutton Drive, Unit 3, Burlington , ON, Canada, L7L 5Z8

JLM SUPPLY LTD PO# 2314 - IFC 77-2099

On Behalf Of: Pembina PH3 NEBC Taylor Expansion

TAG NO.	QTY	SIZE (in.)	MODEL	DWG#
SP-14	4	16	TB150WFNSS6W2	D-12399 Rev0
SP-13	2	12	TB600WFNSS6W2	D-12400 Rev1
SP-06	2	12	TB600WFNSS6W2	D-12400 Rev1
SP-12	1	10	TB600WFNSS6W2	D-12401 Rev0
SP-11	1	8	TB600WFNSS6W2	D-12402 Rev0

Note: Each strainer will be provided with a replacement spacer

MTR #257

IFC WORK ORDER: 77-2095
MODEL: TB15OWFNSS6W2
SIZE: 16"
ISLIP FLOW CONTROLS Inc.
SUBSIDIARY—ONTARIO—CANADA / BUFFALO—N.Y.—U.S.A.
DESIGNED : RP | APPROVED : JM
DRAWN : RP | SCALE : 1 : 3
CHECKED : JM | DATE : JUL. 23/15
DRAWING DESCRIPTION: TEMPORARY BASKET STRAINER | ISLIP FLOW CONTROLS DWG. No.: D-12399 | SHEET No: 1 | REV: 0

JLM SUPPLY LTD. PO# 2314
On Behalf Of: PH3 & NEBC Taylor Expansion

TAG NO. SP-14
QTY: 4

BILL OF MATERIALS

ITEM	DESCRIPTION	SPECIFICATIONS	QTY.	HEAT NUMBERS
1	SCREEN	16 GAUGE – 3/8" PERF. – S.STEEL ASME SA240–316	1	
2	SCREEN RING	1/8" THK. (11 GAUGE) S.STEEL ASME SA240–316 (SMOOTH FINISH)	1	W8B5
3	SPACER RING	1/8" THK. (11 GAUGE) S.STEEL ASME SA240–316 (SMOOTH FINISH)	1	W8B5

IFC WORK ORDER: 77-2099
MODEL: TB60OWFNSS6W2
SIZE: 12"
ISLIP FLOW CONTROLS Inc.
SUBSIDIARY—ONTARIO—CANADA / BUFFALO—N.Y.—U.S.A.
DESIGNED : RP | APPROVED : JM
DRAWN : RP | SCALE : 1 : 3
CHECKED : JM | DATE : AUG. 02/15
DRAWING DESCRIPTION: TEMPORARY BASKET STRAINER | ISLIP FLOW CONTROLS DWG. No.: D-12400 | SHEET No: 1 | REV: 1

TAG NO. SP-13 (2 pcs)
TAG NO. SP-06 (2 pcs)

BILL OF MATERIALS

ITEM	DESCRIPTION	SPECIFICATIONS	QTY.	HEAT NUMBERS
1	SCREEN	16 GAUGE – 3/8" PERF. – S.STEEL ASME SA240–316	1	
2	SCREEN RING	1/8" THK. (11 GAUGE) S.STEEL ASME SA240–316 (SMOOTH FINISH)	1	W8B5
3	SPACER RING	1/8" THK. (11 GAUGE) S.STEEL ASME SA240–316 (SMOOTH FINISH)	1	W8B5

IFC WORK ORDER: 77-2099
MODEL: TB60OWFNSS6W2
SIZE: 10"
ISLIP FLOW CONTROLS Inc.
SUBSIDIARY—ONTARIO—CANADA / BUFFALO—N.Y.—U.S.A.
DESIGNED : RP | APPROVED : JM
DRAWN : RP | SCALE : 1 : 3
CHECKED : JM | DATE : AUG. 02/15
DRAWING DESCRIPTION: TEMPORARY BASKET STRAINER | ISLIP FLOW CONTROLS DWG. No.: D-12401 | SHEET No: 1 | REV: 0

TAG NO. SP-12
QTY: 1

BILL OF MATERIALS

ITEM	DESCRIPTION	SPECIFICATIONS	QTY.	HEAT NUMBERS
1	SCREEN	16 GAUGE – 3/8" PERF. – S.STEEL ASME SA240–316	1	
2	SCREEN RING	1/8" THK. (11 GAUGE) S.STEEL ASME SA240–316 (SMOOTH FINISH)	1	W8B5
3	SPACER RING	1/8" THK. (11 GAUGE) S.STEEL ASME SA240–316 (SMOOTH FINISH)	1	W8B5

IFC WORK ORDER: 77-2099
MODEL: TB60OWFNSS6W2
SIZE: 8"
ISLIP FLOW CONTROLS Inc.
SUBSIDIARY—ONTARIO—CANADA / BUFFALO—N.Y.—U.S.A.
DESIGNED : RP | APPROVED : JM
DRAWN : RP | SCALE : 1 : 3
CHECKED : JM | DATE : AUG. 02/15
DRAWING DESCRIPTION: TEMPORARY BASKET STRAINER | ISLIP FLOW CONTROLS DWG. No.: D-12402 | SHEET No: 1 | REV: 0

TAG NO. SP-11
QTY: 1

BILL OF MATERIALS

ITEM	DESCRIPTION	SPECIFICATIONS	QTY.	HEAT NUMBERS
1	SCREEN	16 GAUGE – 3/8" PERF. – S.STEEL ASME SA240–316	1	
2	SCREEN RING	1/8" THK. (11 GAUGE) S.STEEL ASME SA240–316 (SMOOTH FINISH)	1	W8B5
3	SPACER RING	1/8" THK. (11 GAUGE) S.STEEL ASME SA240–316 (SMOOTH FINISH)	1	W8B5

MTR #757

917897

MTR FOR SCREEN RING & SPACER RING, ALL SIZES ALL DWGs

North American Stainless Canada Inc.
740 Imperial Road North
Guelph, ON N1K1Z3
Canada

METALLURGICAL TEST REPORT

6870 Highway 42 East
Ghent, KY 41045-9615
(502) 347-6000

Certificate: 198425 1

Customer: 007040 007

Mail To:
ULBRICH OF CANADA
C/O EXCELSIOR STEEL POLISHING
34 CARSON ST
TORONTO, ON M8W3R9

Ship To:
ULBRICH OF CANADA
C/O EXCELSIOR STEEL POLISHING
34 CARSON ST
TORONTO, ON M8W3R9

Date: 7/14/2016 Page: 1
Steel: 316/316L
Finish: 2B
Corrosion: ASTM A262/14 A;180Bend-OK

Your Order: P006139 NAS Order: DS 0010165 01

PRODUCT DESCRIPTION:

STNLS STL COIL, C.R. ANNEALED & PICKLED; UNS 31600/31603
ASTM A240/15a,A480/14b,A666/15;ASME SA240/13,SA480/13,SA666/13
CHEM ONLY ON FOLLOWING ASTM: A276/13,A479/13a,A484/13a,A312/13
CHEM ONLY ON FOLLOWING ASME: SA312/11,SA479/11
AMS 5507D/5524L X MRK;
NACE MR0175/ISO 15156-3:2009 A, MR0103/07; QQS766D-A X MAG PERM
MIN. SOLUTION ANNEAL TEMP 1900F, WATER QUENCHED

REMARKS:

Mat'l is Free of Mercury Contamination. No weld repairs.
EN 10204:2004 3.1; RoHS 1 & 2 Compliant
Material is Free of Radioactive Contamination
Steel Making Process: EAF, AOD, & Cont. Casting
Product Mfg.by a Quality Mgt.Sys. in Conf. w/ISO 9001
*Melted & Manufactured in the USA; Mat'l is DFARs Compliant

QA069- 11SS-316

Product Id	Coil #	Skid #	Thickness	Width	Weight	Length	Mark	Pieces	Commodity Code
IA3245 BD	02W8B5 BD		.1163	60.0000	17,960	COIL	1	1	

Lab Accreditation Bureau, ISO/IEC 17025, Certificate# L2323

CHEMICAL ANALYSIS CM(Country of Melt) ES(Spain) US(United States) ZA(South Africa) JP(Japan) Chemical Analysis per ASTM A751/14a

HEAT	CM	C %	CR %	CU %	MN %	MO %	N %	NI %	P %	S %
W8B5	US	.0127	16.6230	.4560	1.2275	2.0085	.0538	10.0150	.0325	.0010

SI %
.3280

MECHANICAL PROPERTIES

Product Id#	Coil #	Loc	Dir	UTS 20C KSI	.2% YS 20C KSI	ELONG % %-2"	Hard RB	Tail Hard
IA3245 BD	02W8B5 BD	F	T	90.15	45.09	50.71	83.50	82.50

ISLIP FLOW CONTROLS
CERTIFIED CORRECT
Per:
Date: SEPT 26 2016

NAS hereby certifies that the analysis on this certification is correct. Based upon the results and the accuracy of the test methods used, the material meets the specifications stated. These results relate only to the items tested and this report cannot be reproduced, except in its entirety, without the written approval of NAS.

Technical Dept. Mgr. KRIS LARK 7/15/2016

MTR #257

ISLIP FLOW CONTROLS Inc.

www.islipflowcontrols.com

1145 Sutton Dr., Unit #3
Burlington, ON, Canada
L7L 5Z8
Toll Free Tel.: 1-866-872-0072

P.O. Box 2989
Buffalo, NY
14240-2989

Tel.: 905-335-8777
Fax: 905-335-0977

Toll Free Fax: 1-866-872-0073

VISUAL – DIMENSIONAL REPORT

Customer: JLM Supply Ltd.
4111 - 53rd Avenue NW
Edmonton AB T6B 3R5

On Behalf Of: Pembina PH3 NEBC Taylor Expansion

Customer PO#: 2314

Manufacturer: Islip Flow Controls Inc.

Mfr WO#: 77-2099

TAG NO.	QTY	SIZE (in.)	MODEL	DWG#
SP-14	4	16	TB150WFNSS6W2	D-12399 Rev0
SP-13	2	12	TB600WFNSS6W2	D-12400 Rev1
SP-06	2	12	TB600WFNSS6W2	D-12400 Rev1
SP-12	1	10	TB600WFNSS6W2	D-12401 Rev0
SP-11	1	8	TB600WFNSS6W2	D-12402 Rev0

Visual & Dimensional Inspection Statement

This is to certify that a visual and dimensional check was performed on the tag / serial number(s) listed above. All serial number(s) were found to be within the tolerances of the applicable "As-Built" drawings.

Paul Batey, QCM

Date: SEP 26, 2016.

MTR #237

ISLIP FLOW CONTROLS Inc.

ifc@islipflowcontrols.com

1145 Sutton Dr., Unit #3
Burlington, ON, Canada
L7L 5Z8

P.O. Box 2989
Buffalo, NY
14240-2989

Tel.: 905-335-8777 Fax: 905-335-0977
Toll Free Tel.: 1-866-872-0072
Toll Free Fax: 1-866-872-0073

CERTIFICATE OF CONFORMITY

Customer: JLM Supply Ltd.
4111 - 53rd Avenue NW
Edmonton AB T6B 3R5

On Behalf Of: Pembina PH3 NEBC Taylor Expansion

Customer PO#: 2314

Manufacturer: Islip Flow Controls Inc.

Mfr WO#: 77-2099

TAG NO.	QTY	SIZE (in.)	MODEL	DWG#
SP-14	4	16	TB150WFNSS6W2	D-12399 Rev0
SP-13	2	12	TB600WFNSS6W2	D-12400 Rev1
SP-06	2	12	TB600WFNSS6W2	D-12400 Rev1
SP-12	1	10	TB600WFNSS6W2	D-12401 Rev0
SP-11	1	8	TB600WFNSS6W2	D-12402 Rev0

STATEMENT OF CONFORMITY

We hereby certify that the above item(s), supplied by Islip Flow Controls Inc. for JLM Supply order number 2314 are in strict accordance with all purchase order requirements and specifications mentioned therein.

Paul Batey, QCM

Date: Sep 26, 2016

MTL #257

ISLIP FLOW CONTROLS Inc.

Installation and Maintenance Instructions for IFC Temporary Strainers

MTR # 257

BASKET, CONE AND PLATE TYPE TEMPORARY STRAINERS

I. Installation

Remove all shipping and crating materials carefully. Dispose of all crating materials safely. Ensure that all machined surfaces are free of defects and that the inside of the strainer is free of foreign objects.

Once installed increase line pressure gradually and check for leakage around joints. After completing installation be sure to double check connections for integrity.

Your ISLIP FLOW CONTROL Inc. type TB, TC or TP strainer is now ready for operation!

Operation

Strainer System Start-Up Procedure:

Prior to turning on the flow to the inlet service, please make sure the following checks:

1. Check inside cone strainer unit to be sure the screen is in housing and does not require cleaning or replacement.
2. You are now ready to Open the flow to the inlet service line. Slowly open the service approximately 25% of normal operational flow. Complete opening of inlet line until desired flow rate is reached

Once the desired service flow has been established, the strainer will operate efficiently until the screen becomes dirty. However, under no circumstances you should never have more than a 10 PSID differential pressure.

To prevent excessive drop through the strainer unit, regular inspection of the strainer media is required. Monitoring of differential pressure through the housing can be utilized as a means of determining whether or not the strainer media needs cleaning or replacement.

When it becomes necessary to clean or replace screen media, follow the procedure outlined below:

1. First close the flow from the inlet service line.
2. Close the flow to the outlet service line. (In some applications closing flow to the outlet is not required.
3. Relieve the pressure from the strainer unit.
4. Drain housing sufficiently to access strainer screen.
5. Remove filter screen and clean thoroughly.
6. Install clean screen into strainer unit.
7. Inspect gasket for cuts or other signs of failure and make sure it is properly seated. **(NOTE: If spiral wound gaskets have been used they must be replaced and cannot be used again.)**

For maximum efficiency, determine the length of time it takes for the pressure drop to double that in the clean condition. Once the pressure drop reaches an unacceptable value open the blow-down valve until the collected sediment is removed. If the pressure drop remains high, the line must be shut down and the strainer screen cleaned.
When line shut down is complete, remove and clean screen. **(NOTE: In some instances a high pressure water jet or steam may be required for effective cleaning.)**

II. Spare Parts List

1. Gasket 2. Screen

III. Warranty Information

All products are warranted to be free of defects in material and workmanship for a period of one year from the date of shipment, subject to the limitations below:
If the purchaser believes a product to be defective, the purchaser shall: (a) Notify the manufacturer, state the alleged defect and request permission to return the product (b) If the permission is granted, return the product with transportation prepaid. If the product is accepted for return and found to be defective, the manufacturer will, at its discretion, either repair or replace the product, f.o.b. factory within 60 days of receipt or refund the purchase price. Other that to repair replace or refund described above, the purchaser agrees that the manufacturer shall not be liable for any losses, costs, expenses or damages of any kind arising out of the product its use installation or replacement, labeling, instructions, information or technical data of any kind, description of product use, sample or model, warnings or lack of foregoing. No warranties, written or oral, expressed or implied, including the warranties of fitness for a particular purpose and merchantability, are made or authorized. No affirmation of fact, promise, description of product use or sample or model shall create any warranty from the manufacturer, unless signed by the president or vice-president. These products are not manufactured, sold or intended for personal, family or household purposes.

IV. Manufacturer Information

Islip Flow Controls Inc.
Phone: (905) 335-8777 866-872-0072
Fax: (905) 335-0977 866-872-0073

Contact: Derek Islip-Contract/Sales Inquiries

MTR #257

MRC Global™

INVENTORY SALES -

REPORT NO. CDSC0204 * * MRC GLOBAL (US) INC. * * PAGE NO. 1
PREPARED 10/17/16

INVENTORY SALES - JLM SUPPLY LTD

LINE	ITEM ID	UNIT	QUANTITY	DESCRIPTION
0001	10C1 XXXX FINALIZE	EA	4.00	IFC MODEL# TB150WFNSS6W2-150, STRAINER TYP: CONICAL STRAINER (TYPE "TB")

RECEIPT NO: 1629197300 RECEIPT DATE: 10/17/16
PO NO. : C7774424154B0 PO LINE 0001 SO NO. 4424154
CUSTOMER NAME: PEMBINA PIPELINE
SHIP-TO ADDRESS: TAYLOR TERMINAL
NE 1/4-31-82-17-W6M

FORT ST JOHN
BUYER NO: C5K NAME: MARIUS C NELSON
RECEIVER: CBXQ1
WAREHOUSE: 777 ACT: STK

LINE	ITEM ID	UNIT	QUANTITY	DESCRIPTION
0002	10C1 XXXX FINALIZE	EA	4.00	IFC MODEL# TB600WFNSS6W2-150, STRAINER TYPE: CONICAL STRAINER (TYPE "TB")

RECEIPT NO: 1629197300 RECEIPT DATE: 10/17/16
PO NO. : C7774424154B0 PO LINE 0002 SO NO. 4424154
CUSTOMER NAME: PEMBINA PIPELINE
SHIP-TO ADDRESS: TAYLOR TERMINAL
NE 1/4-31-82-17-W6M

FORT ST JOHN
BUYER NO: C5K NAME: MARIUS C NELSON
RECEIVER: CBXQ1
WAREHOUSE: 777 ACT: STK

LINE	ITEM ID	UNIT	QUANTITY	DESCRIPTION
0003	10C1 XXXX FINALIZE	EA	1.00	IFC MODEL: TB600WFNSS6W2-150, STRAINER TYPE: CONICAL STRAINER (TYOE "TB")

RECEIPT NO: 1629197300 RECEIPT DATE: 10/17/16
PO NO. : C7774424154B0 PO LINE 0003 SO NO. 4424154
CUSTOMER NAME: PEMBINA PIPELINE
SHIP-TO ADDRESS: TAYLOR TERMINAL
NE 1/4-31-82-17-W6M

FORT ST JOHN
BUYER NO: C5K NAME: MARIUS C NELSON
RECEIVER: CBXQ1
WAREHOUSE: 777 ACT: STK

MTR #257

MRC Global™

INVENTORY SALES -

INVENTORY SALES - JLM SUPPLY LTD

LINE	ITEM ID	UNIT	QUANTITY	DESCRIPTION
0004	10C1 XXXX FINALIZE	EA	1.00	IFC MODEL: TB600WFNSS6W2-150, STRAINER TYPE: CONICAL STRAINER (TYPE "TB")

RECEIPT NO: 1629197300 RECEIPT DATE: 10/17/16
PO NO. : C7774424154B0 PO LINE 0004 SO NO. 4424154
CUSTOMER NAME: PEMBINA PIPELINE
SHIP-TO ADDRESS: TAYLOR TERMINAL
NE 1/4-31-82-17-W6M

FORT ST JOHN
BUYER NO: C5K NAME: MARIUS C NELSON
RECEIVER: CBXQ1
WAREHOUSE: 777 ACT: STK

MTR # 257

PIPEWORX LTD.
A PLH GROUP COMPANY

MRR #38

MATERIAL RECEIVING INSPECTION REPORT

SALES ORDER NUMBER:	2217081-00
PIPEWORX JOB#:	162-113
OWNER:	PEMBINA PIPELINE CORPERATION
PO NUMBER:	
DATE:	Wednesday, October 19, 2016
Ordered By:	BRENT CALVERT

* NOTE:

1 **MATERIAL TEST REPORTS** (MTR'S) AND **CRN NUMBERS** ARE REQUIRED TO BE RECEIVED WITH EACH ORDER AND REVIEWED FOR COMPLIANCE TO MATERIAL SPECIFICATIONS AS ORDERED IF SPECIFIED IN THE CONTRACT DOCUMENTS CONSULT THE PIPEWORX QUALITY MANUAL

2 COMPLETE OVER / SHORT / DAMAGE REPORT IF REQUIRED AND MAKE NOTE IN REMARKS

3 ATTACH OR REFERENCE ALL SUPPORTING DOCUMENTATION FOR TRACEABILITY (i e PO, PACKING SLIPS etc.)

4 ALL FITTING DESIGNS MUST BE REGISTERED WITH ALBERTA BOILERS SAFEY ASSOCIATION

ITEM #	PO ITEM#	Quantity	Size	Sch	Rating	Grade	DESCRIPTION	HEAT NUMBER	REC.	INITIAL	INSPECT FOR DAMAGE		MTR RECEIVED
		1	8"	sch 80	900#	A350-LF2	FLANGE, RFWN, 900 CL, SCH 80, ASME B16.5, ASTM A-350-LF2 CL1	A36A6	YES	KN	YES		YES

REMARKS (IF NCR IS ISSUED, NOTE NCR NUMBER):

PIPEWORX QUALITY REPRESENTATIVE	DATE RECEIVED	SIGNATURE
NAME: Keith Noble	10/19/2016	
TITLE: QC Inspector		

CCTC CORPORATION

Invoice / Bill of Lading

SOUS RÉSERVE DE TOUTES LES CONDITIONS ET RESTRICTIONS INCORPORÉES SOUS RENVOIS AU VERSO DE LA PRÉSENTE.
SUBJECT TO ALL THE TERMS, CONDITIONS AND LIMITATIONS INCORPORATED BY REFE AS SHOWN ON BACK HEREOF.

COPIE - PREUVE DE LIVRAISON
P.O.D. COPY

N° D'INSCRIPTION AUX FINS DE LA TPS:
G.S.T. REGISTRATION NO. R857212385

N° DE FACT ORDEREAU D'EXPÉDITION
INV. PACKING SLIP NO.
2217081-00

5407 53 AVENUE BR# 482 WH# 482 *** PACKING SLIP ***
EDMONTON, AB T6B 3G2
Ph: (780)463-8700 Fax: (780)463-7433

N° DU CLIENT CUST. NO.: 2105-49
N° DE TÉL. DU CLIENT CUST. PHONE: (403)268-7333
COMMANDÉ LE: DATE ORDERED: 10/18/16
PAR: PLACED BY: TOM
1001-6624

REPRÉSENTANT: SALES REP:
INSCRIT PAR: ENTERED BY: Mike D'Aoust (mhd2)
RÉFÉRENCE: REFERENCE:

N° DE COMM. DU CLIENT CUSTOMER P.O. NO.
490-1s0275082-tt

EXPÉDIÉ SHIPPED ▶ ☐ PORT PAYÉ PPD. ☐ PORT DÛ COL. ☐ PORT PAYÉ/AJOUT PPD/ADD

FACTURER À BILL TO:
APEX DISTRIBUTION INC.
407 2 ST SW SUITE 550
CALGARY, AB T2P 2Y3

EXPÉDIER À SHIP TO:
APEX DIST POUCE COUPE BC
5011 50 AVENUE
POUCE COUPE, BC V0C 2C0

DATE / HEURE D'IMPRESSION
DATE / TIME PRINTED
10/18/16 17:07
PICKER # 2
g475

RUSH!

FRAIS DE RETARD SUR TOUS LES COMPTES EN SOUFFRANCE: 2% PAR MOIS (24% PAR AN) / 2% PER MONTH (24% PER ANNUM) SERVICE CHARGE ON ALL OVERDUE ACCOUNTS.

CASIER N° BIN LOC.	LIGNE N° LINE NO.	COMMANDÉ LE ORDERED	EXPÉDIÉ SHIPPED	U. DE M. UNIT OF MEASURE	EN SOUFF B / O	CODE DE PIÈCE SKU CODE	DESCRIPTION
							This Order Is Contained in the Following Carton(s): C001044120
							***** MAX BUNDLE WEIGHT 5000 # *****
	1	1	1	EA		7587383	8 900 RF WN FLG XH A350LF2
							Weight: 187.00
							Carton: C001044120 Qty: 1.00 EA
							HEAT#s: a36a6
							SUBTOTAL:
							GST/HST:
							TOTAL DUE:

SIGNATURE DU CLIENT CUSTOMER'S SIGNATURE _____

AUCUN RETOUR SUR LES COMMANDES SPÉCIALES SAUF AUTORISATION
NO RETURNS ALLOWED ON SPECIAL ORDERS WITHOUT PERMISSION

EXPÉDIÉ LE DATE SHIPPED	MODE D'EXPÉDITION SHIPPED VIA	POIDS WEIGHT	TOTAL DE PIÈCES TOTAL PIECES	FRÊT FREIGHT COST	N° DU CONNAISSEMENT BILL OF LADING NUMBER
10-18-16	MURRAY'S TRU	187.0	1 SKID		

DIRECTIVES SPÉCIALES SPECIAL INSTRUCTIONS	RAMASSÉ LE DATE PICKED	RAMASSÉ PAR PICKED BY	PAGE
SHIP TODAY	10/18/16		Last Page 1

C3BIL (REV. 09/07)

APEX DISTRIBUTION INC.

CONTINUATION SHEET
DELIVERY TICKET

P.O.

PAGE ______ OF ______

SOLD TO	ORDERED BY	LOCATION	UNIT / RIG NO.
Attention: PIPEWORX	Winston.		
	CUSTOMER P.O. NO.	SHIP VIA	PREPARED BY
SWEETWATER			
	CUSTOMER AFE NO.	DATE	CUSTOMER CODE
		OCT 18/16	

		QTY	U/M	PRODUCT CODE	DESCRIPTION	UNIT PRICE	☑	AMOUNT
CCTF.	✓	1		A36A6	8" 900 Sch180, Rfwn LF2			

X Keith Noble

DO NOT PAY - INVOICE TO FOLLOW

TOTAL

A36A6 8" 900 XH RAW LAL

CLIENTE / Customer / Client

CCTF CORPORATION (EDMONTON)
5407 - 53 AVENUE NW
EDMONTON, AB T6B 3G2
CANADA

CERTIFICADO DE INSPECCION

Inspection Certificate - Certificat de Réception

DIN EN 10204 / 3.1
ISO 10474 / 3.1

FECHA / Date: 03/06/2016 N.º / No. 180580 HOJA / Page: 2

ISO 14001 SGI 1922164 · ISO 9001 SGI 0008236 · OHSAS 18001 SGI 0000987

Management Systems certified by LRQAE

ULMA FORJA, S.COOP.
B.º Zubillaga, 3 - Apdo. 14
20560 OÑATI (Guipúzcoa) SPAIN
Tel.: 34 - 943 780552
Fax: 34 - 943 781808
E-mail: ulma@ulmapiping.com

Certified acc. PED 97/23/EC+AD2000-W0
PED 14/68/UE
by TÜV Rheinland
N.º 01 202 E/Q 02 7443

Packing List: 124922

PRODUCTO / Article - Produit: FLANGES

SU PEDIDO N.º / Your Order No / Votre Cde. N.º: 4898401-00

DE / of - de: 20/04/2016

NORMAS APLICABLES / Requirements - Normes Applicables: ASME B16.5-13

MATERIAL CORRESPONDIENTE / Material Correspondent - Qualité: ASME SA350LF2CL1-2-15, ASTM A350LF2CL1-2-15

MODO DE FUSION (*) / Steel Making - Elaboration de l'acier: E = Elec. Y = Oxigeno básico

NACE MR0175/ISO15156-02/03-15 & MR0103-12
Clause 7.2.1.4, Annex A.2 and SSC Region 3.
CSA-Z245.12-13 GR248 CAT II-SS (WN & BLIND FLANGES ONLY.

MARCA DEL FABRICANTE / Mark of factory / Marque du fabricant

DEPARTAMENTO / Section / Département: QUALITY ASSURANCE

PARTIDA / Item / Poste	CANTIDAD / Quantity / Quantité	DESCRIPCION / Description / Description	LOTE	OBSERVACIONES / Remarks / Observations (*)	COLADA N.º / Heat No / N.º Coulée	RESISTENCIA / T.Strength / Resist.Rupt N/mm2	LIMITE ELAST. / Y.Strength 0.2 % N/mm2	ALARGAM. / Elongation / Allongement Lo 50mm/Ø5 %	ESTRICCION / Red. Area / Striction %	RESILIENCIA / Impact test / Résilience Joules			CHARPY V 10x10mm MEDIA / Average / Moyenne	°C	DUREZA / Hardness / Dureté HBW
20 7582780	24	BLIND 6 600LB RF A350LF2	28Y16	NE	A85A6	529	322	25,00	45,00	52	55	48	52	-50	155 158
21 7587612	30	SW 1 600LB XS/80 RF A350LF2	01A15	NE	B09V4	511	314	33,20	66,00	52	55	63	57	-50	152 157
22 7588131	50	SW 1 600LB S160 RF A350LF2	26A16	NE	A27A6	529	318	25,00	45,00	51	48	47	48	-50	157 161
23 7587383	12	WN 8 900LB XS/80 RF A350LF2	03M16	NE	A36A6	516	308	30,10	50,70	52	54	56	54	-50	157 160
24 7582170	67	WN 3 900LB S160 RF A350LF2	24F16	NE	A15A6	511	306	31,10	57,20	51	54	56	54	-50	149 153
24 7582170	5	WN 3 900LB S160 RF A350LF2	27F15	NE	A44A5	533	317	25,00	55,60	69	68	71	69	-50	140 164
25 7582175	15	WN 4 900LB S160 RF A350LF2	10Y16	NE	B7AV5	504	298	33,50	57,90	44	47	48	46	-50	151 155
28 7586943	1	WN 2 1500LB S160 RF A350LF2	20F16	NE	A15A6	511	305	31,20	54,10	50	54	57	54	-50	148 152
28 7586943	47	WN 2 1500LB S160 RF A350LF2	27E16	NE	K8AV5	514	307	30,60	50,40	55	58	60	57	-50	159 162

COMPOSICION QUIMICA - STEEL MAKER'S LADLE ANALYSIS - ANALYSE CHIMIQUE

COLADA N.º / Heat No / N.º Coulée	C %	Si %	Mn %	P %	S %	Cr %	Ni %	Mo %	Nb %	V %	Cu %	Al %	Ti %	CEq %
A15A6	0,180	0,240	0,980	0,011	0,004	0,080	0,080	0,014	0,001	0,006	0,230	0,042	0,002	0,384
A27A6	0,191	0,209	0,982	0,008	0,008	0,103	0,079	0,017	0,000	0,003	0,127	0,024	0,001	0,393
A36A6	0,190	0,180	1,000	0,009	0,003	0,090	0,100	0,019	0,003	0,001	0,180	0,032	0,001	0,397
A44A5	0,210	0,210	0,990	0,009	0,005	0,064	0,098	0,025	0,000	0,000	0,230	0,035	0,002	0,415
A85A6	0,200	0,190	0,960	0,009	0,003	0,070	0,080	0,030	0,001	0,003	0,170	0,036	0,001	0,397
B09V4	0,185	0,220	0,990	0,012	0,005	0,092	0,032	0,006	0,002	0,002	0,066	0,025	0,000	0,377
B7AV5	0,190	0,224	1,010	0,013	0,003	0,064	0,090	0,010	0,010	0,005	0,142	0,030	0,005	0,390
K8AV5	0,190	0,250	1,010	0,012	0,006	0,090	0,120	0,030	0,002	0,004	0,170	0,037	0,001	0,402

- Las dimensiones y la condición superficial se hallaron satisfactorias.
- Dimension and surface condition were found acceptable.
- Les dimensions et état de surface sont satisfaisants.

- Los materiales citados cumplen las normas aplicables.
- Manufacturing requirements are satisfied.
- Les normes applicables sont respectées.

EL INSPECTOR
Works Inspector - L'Inspecteur

ULMA FORJA, S. COOP.
Dpto. de Garantía de calidad
Quality Assurance Dept.

(*) OBSERVACIONES / Remarks / Observations:
FULLY KILLED & FINE GRAIN PRACTICE.
Tensile & Impact: Transverse specimens A370.
N_NORMALIZED AT 900 C AND ALLOWED TO COOL IN STILL AIR.

Invoice: 2217081-00 PO#: 490-ts0275082-tt Line# 1 Product: 7587383 Heat: a36a6

N TR# 258

PIPEWORX LTD.
A PLH GROUP COMPANY

MRR #39

MATERIAL RECEIVING INSPECTION REPORT

SALES ORDER NUMBER:	4333346-01
PIPEWORX JOB#:	162-113
OWNER:	PEMBINA PIPELINE CORPERATION
PO NUMBER:	4500086997
DATE:	Saturday, October 22, 2016
Ordered By:	BRENT CALVERT

* NOTE:

1. **MATERIAL TEST REPORTS** (MTR'S) AND **CRN NUMBERS** ARE REQUIRED TO BE RECEIVED WITH EACH ORDER AND REVIEWED FOR COMPLIANCE TO MATERIAL SPECIFICATIONS AS ORDERED IF SPECIFIED IN THE CONTRACT DOCUMENTS. CONSULT THE PIPEWORX QUALITY MANUAL.
2. COMPLETE OVER / SHORT / DAMAGE REPORT IF REQUIRED AND MAKE NOTE IN REMARKS
3. ATTACH OR REFERENCE ALL SUPPORTING DOCUMENTATION FOR TRACEABILITY (i.e. PO, PACKING SLIPS etc.).
4. ALL FITTING DESIGNS MUST BE REGISTERED WITH ALBERTA BOILERS SAFEY ASSOCIATION

ITEM #	PO ITEM#	Quantity	Size	Sch	Rating	Grade	DESCRIPTION	HEAT NUMBER	REC.	INITIAL	INSPECT FOR DAMAGE		MTR RECEIVED
		1	2"		150#		VALVE, BALL, GROVE TRUNION	120708484-01	YES	KN	ACCEPT		YES
		1	2"		150#		VALVE, BALL, GROVE TRUNION	120729609-04	YES	KN	ACCEPT		YES
		6	2"		150#		VALVE, BALL, GROVE TRUNION	120731109-01, 02, 03, 05, 06, 09	YES	KN	ACCEPT		YES
		1	3"		150#		VALVE, BALL, GROVE TRUNION	120726802-02	YES	KN	ACCEPT		YES
		1	6"		150#		VALVE, GEAR OP, BALL, GROVE TRUNION	120682708-06	YES	KN	ACCEPT		YES

REMARKS (IF NCR IS ISSUED, NOTE NCR NUMBER):	

PIPEWORX QUALITY REPRESENTATIVE	DATE RECEIVED	SIGNATURE
NAME: Keith Noble	10/22/2016	
TITLE: QC Inspector		

Date: 10/21/16 **BILL OF LADING - SHORT FORM - NOT NEGOTIABLE** BOL # 061

SHIP FROM

Pembina Construction Warehouse 1 - 587 - 343 - 7142
11517 - 89th Ave
Grande Prairie, AB, T8V 5Z2

SHIP TO

Project Name: Sweetwater **AFE Number:**

Address:

Picked up by: PIPEWORXS

# of Pieces	Description Of Material
2 SKIDS	OF MATERIAL
	1 SKID: VALVES FROM PO # 4500086997
	1-6" 150 , 1-3" 150 , 8-2" 150
	1 SKID: ELECTRICAL & INSTRUMENTATION
	FROM PO # 4500085381
	# 4500087073
	# 4500085316
	# 4500087161
1	GUIDED WAVE RADAR (A220-LIT-001) > 2 LONG
1	LEVEL INDICATOR (A220-LG/LIT-004) < BOXES.

DECLARED VALUATION $_____

Maximum Liability of Carrier is $2.00 per LB Unless Delcared Valuation States Otherwise

SHIPPER:

Name: DEANNA GOLKAY

Signature:

CONSIGNEE:

Name: Jason Budgell

Signature:

Loading Time: 4:00pm **Date Shipped:** 10/21/16

PEMBINA

MATERIAL TRANSFER

Phase 3 Warehouse (Acheson)- to site	Phase 3 Expansion Warehouse (GP) to site		10/21/16	
Sweetwater				
MTT#				

MATERIAL TAG	BIN #	PO#	DESCRIPTION INCLUDES PART NUMBER AND SERIAL NUMBER	QTY	From	TO
		4500085381	TD2 ADVANCED SWITCH W/SENSOR, FLOW + THERMATEL (A220-FSH-001)	1	warehouse	Sweetwater
		4500087073	MAGTECH MAGNETIC LEVEL INDICATOR W/ LEVEL TRANSMITTER (A220-LG/LIT-001)	1		
		4500085316	6" SKR TYPE BURST DISC C/W HOLDER	3+1		
		4500085317	NEUTRAL GROUND RESISTOR	1		
			HV BUSHING	1		
			LV BUSHING	1		
			SET OF GASKETS	1		
		4500086777	6" 150# VALVE #1206E2708	1		
			3" 150# VALVES #120726802	1		

ADDED SENT LONG

COMMENTS:

SENT PAPERWORK! BOL # 061

Desiree Gourlay
Sender Name (printed)

Sender Signature

10/21/16
Date

Keith Noble
Reciever Name (printed)

Reciever Signature

Date

PG # 1

PEMBINA

MATERIAL TRANSFER

Phase 3 Warehouse (Acheson)- to site	Phase 3 Expansion Warehouse (GP) to site		10	21	16	
Sweetwater						
MTT#						

MATERIAL TAG	BIN #	PO#	DESCRIPTION INCLUDES PART NUMBER AND SERIAL NUMBER	QTY	From	TO
			2" 150 # VALVES #120731109, #120729609 #120708484	8	warehouse	Sweetwater
		4500087161	INTELLIGENT LEL DETECTOR	3		
			TEST GAS APPLICATOR	3		
			UNIVERSAL SENSOR HOUSING	3		
			MULTI-SPECTRAL INFRARED FLAME DET.	3		
			BALANCE AIR CYLINDER	1		
			NORLAB CYLINDER	1		
			REGULATORS	2		
			NORLAB TYGON TUBING	2		
			CALIBRATION CUPS	2		

COMMENTS:

BOL # 061

DEANNA BOURLAY
Sender Name (printed)

Sender Signature

10/21/16
Date

Keith Noble
Reciever Name (printed)

Reciever Signature

Date

PG #2

Material Receiving Form

Date: MAY 16, 2016

PO# 4500086997

SO# 4333346-01

Job Location: SPARE VALVES

Inspected By: DEANNA GOURLEY

Supplier: MRC

Quantity	Size	Description	Spec	Rating	Schedule	Heat / Serial Number
2	2" 600#	BALL VALVES				120517517-04
						120517517-10
13	2" 600#	BALL VALVES				120717646-01
						120717646-02
						120717646-04
						120717646-05
						120717646-06
						120717646-07
						120717646-09
						120717646-10
						120717647-01
						120717647-04
						120717647-05
						120717647-09
						120717647-10

#1

Material Receiving Form

Date: MAY 16, 2016
PO# 4500086997
SO# 4333346-01

Job Location: SPARE VALVES
Inspected By: DEANNA GOURLAY
Supplier: MRC

Quantity	Size	Description	Spec	Rating	Schedule	Heat / Serial Number
2	4" 600#	BALL VALVES				120493111-07
						120493111-08
2	10" 600#	BALL VALVES				120438234-04
						120717643-02
1	12" 600#	BALL VALVE				120454007-01
8	2" 150#	BALL VALVES				120708484-01
						120729609-04
						120731109-01
						120731109-02
						120731109-03
						120731109-05
						120731109-06
						120731109-09
1	3" 150#	BALL VALVE				120726802-02
2	6" 150#	BALL VALVES				120682708-03

#7

Material Receiving Form

Date: MAY 16, 2016

PO# 4500086997

SO# 4333346-001

Job Location: SPARE VALVES

Inspected By: DEANNA GOLDAY

Supplier: MRC

Quantity	Size	Description	Spec	Rating	Schedule	Heat / Serial Number
						1206827708-06

#3

MRC Global PACKING LIST

4333346001

Sales Order
Number 4333346-001 Page 1
Printed 05/13/16 16:06

Deliver To:
PEMBINA PIPELINE
PEMBINA CONSTRUCTION WAREHOUSE
11517 - 89TH AVE
ATTN: RYAN OWEN
GRANDE PRAIRIE AB T8V 5Z2

From: 73-789
COUNTRY ORDER DESK
502 - 25 AVE
NISKU AB T9E 0K6

Customer Purchase Order
4500086997

Customer Release/Requisition No.

Ordered by:

romised - 05/13/16 Salesman - DALE SLAUGHTER
Shipped - 05/13/16 Phone - (780) 979-0233

Ship VIA - MANITOULIN
Freight Terms - PREPAID & CHARGE P

Terms - NET 30 DAYS
Customer Ship No. - 61723-0036

MTR'S REQUIRED
AFE:M/15120
ORDERED BY:RAY GUINAN

CPO Line	Customer Part/Item ID	Quantity Ordered	Backorder	Shipped	U/M	Description	Line No.
	14C14438	2		2	EA	2 GROVE 9K-4C02F06FO2AX004 600# CS FP B4 B VLV RF W/PORT RELIEF B:A350 LF2 T: MFG: CAMERON HLS: 120517517-04 MFG: CAMERON HLS: 120517517-10	001
	14C14438	13		13	EA	2 GROVE 9K-4C02F06FO2AX004 600# CS FP B4 B VLV RF W/PORT RELIEF B:A350 LF2 T: MFG: CAMERON HLS: 120717646-01 MFG: CAMERON HLS: 120717646-02 MFG: CAMERON HLS: 120717646-04 MFG: CAMERON HLS: 120717646-05 MFG: CAMERON HLS: 120717646-06 MFG: CAMERON HLS: 120717646-07 MFG: CAMERON HLS: 120717646-09 MFG: CAMERON HLS: 120717646-10 MFG: CAMERON HLS: 120717647-01 MFG: CAMERON HLS: 120717647-04 MFG: CAMERON HLS: 120717647-05 MFG: CAMERON	002

MRC Global

PACKING LIST

SO # 4333346001 Page 2
PO # 4500086997
Printed 05/13/16 16:06

CPO Line	Customer Part/Item ID	Quantity Ordered	Backorder	Shipped	U/M	Description	Line No.
						HLS: 120717647-09 MFG: CAMERON HLS: 120717647-10	
	14C18046	2		2	EA	4 GROVE 9K-4C04F06FO2AX004 600# CS FP B4 B VLV RF W/PORT RELIEF B:A350 LF2 T: MFG: CAMERON HLS: 120493111-07 MFG: CAMERON HLS: 120493111-08	003
	14C18058	2		2	EA	10 GROVE 9K-5010F06FO1AX004 600# CS FP B5 B VLV RF W/PORT RELIEF B:A350 LF2 T: MFG: CAMERON HLS: 120438234-04 MFG: CAMERON HLS: 120717643-02	004
	14C18061	1		1	EA	12 GROVE 9K-5012F06FO1AX004 600# CS FP B5 B VLV RF W/PORT RELIEF B:A350 LF2 T: MFG: CAMERON HLS: 120454007-01	005
	14C11021	8		8	EA	2 GROVE 9K-4C02F01FO2AX004 150# CS FP B4 B VLV RF W/PORT RELIEF B:A350 LF2 T: MFG: CAMERON HLS: 120708484-01 MFG: CAMERON HLS: 120729609-04 MFG: CAMERON HLS: 120731109-01 MFG: CAMERON HLS: 120731109-02 MFG: CAMERON HLS: 120731109-03 MFG: CAMERON HLS: 120731109-05 MFG: CAMERON HLS: 120731109-06 MFG: CAMERON HLS: 120731109-09	006
	14C11036	1		1	EA	3 GROVE 9K-4C03F01FO2AX004 150# CS FP B4 B VLV RF W/PORT RELIEF B:A350 LF2 MFG: CAMERON HLS: 120726802-02	007
	14C18064	2		2	EA	6 GROVE 9K-5006F01FO1AX004 150# CS FP B5 B VLV RF W/PORT RELIEF B:A350 LF2 T:	008

MRC Global

PACKING LIST

SO # 4333346001 Page 3
PO # 4500086997
Printed 05/13/16 16:06

CPO Line	Customer Part/Item ID	Quantity Ordered	Quantity Backorder	Quantity Shipped	U/M	Description	Line No.
						MFG: CAMERON HLS: 120682708-03 MFG: CAMERON HLS: 120682708-06	

RECEIVING INFO: Company: Date: Signed By: Signature:

Tubes-	Box/Bag-	Crates-	Pallets-	5	Pieces-	Bundles-	Picked by-	REC	Checked by-	CJM	Staged-
Order Weight-	8778.00	Material Tot-			Freight- $	.00	Other- $	.00	Tax- $	.00	Total- $ .00

Manitoulin TRANSPORT

P.O. Box 390, 154 Hwy 540B,
Gore Bay, Ontario P0P 1H0 www.manitoulintransport.com

- Manitoulin Transport Inc.
- Manitoulin Logistics Inc.
- Northwest Transport Ltd.
- Pacific Northwest Carriers Inc.
- Rainbow Transport (1974) Ltd.
- Mid – Arctic Transporation Co. Ltd.
- Dolfo Transport Inc.

NO. DE PRO. NO.

23271331 #01

DAY JOUR	MONTH MOIS	YEAR AN	B/L or PRO. NO. NO. DE CONN. ou PRO.	UNIT NO. Nº D'UNITE	COLL/PPD	REGISTERED QUALITY SYSTEM ISO 9001:2008
13	05	16	43333460001	827088DP	PPD	

SHIPPER – EXPEDITEUR ADDRESS – ADRESSE
M R C CANADA, 502 25 AVE, NISKU, AB T9E0K6

CONSIGNEE – CONSIGNATAIRE
PEMBINA PIPELINE, PEMBINA CONST WHSE 11517 89TH, GRANDE PRAIRIE, AB T8V5Z2

TRANSFER TO – TRANSFERE A AT – A I/O

BILL TO – FACTURER A
(0103546)
M R C CANADA

PIECES	DESCRIPTION	WEIGHT / POIDS	RATE / TARIF	AMOUNT / MONTANT
5	PALLETS PALLETS THIRD PARTY BILLING 307803-17 20160513 22:43:02 ATTN: RYAN OWEN FUEL SURCHARGE BL:43333460001,PO:4500086997 GST/TPS	8778		

ANY LOSS OR DAMAGE MUST BE NOTED ON PRO BILL AT TIME OF DELIVERY, AND INITIALED BY DELIVERY DRIVER.
TOUTES PERTES OU DOMMAGES DOIVENT ÊTRE NOTÉS AU MOMENT DE LA LIVRAISON, ET INITIALÉS PAR LE CHAUFFEUR

G.S.T. / H.S.T. / T.P.S. # R103481925

TERMS: NET 21 DAYS, 2% PER MONTH (24% PER ANNUM) ON OVERDUE ACCOUNTS
TERMES: NET 21 JOURS, 2% PER MOIS (24% PAR ANNEE) SUR COMPTES EN SOUFFRANCE

RECEIVED IN GOOD ORDER BY / REÇU EN BON ÉTAT PAR
SIGNATURE: X
PRINT NAME / NOM:

TOTAL

DATE RECEIVED / DATE DE RÉCEPTION _____ TIME IN / ARRIVÉE _____ TIME OUT / DÉPART _____

CUSTOMER SERVICE 1–800–265–1485 SERVICE À LA CLIENTÈLE

PROBILL 8, NOV 13, 2006

Material Receiving Inspection Report

PEMBINA

Phase 3 - Acheson
Phase 3 Expansion Grande Prairie

Doc Title: Material Receiving Inspection Report
Rev: 0
Form Issued: 9-Sep-15

Project Number & Description: NEBC MAINLINE - BLUEBERRY	MRIR Number: 128
Date Offloaded: MAY 16,16 / Date Inspected: MAY 16,16	Material Purchased By: PEMBINA
Packing Slip Number: 4333346-01	Purchase Order Number: 4500086997
Requisition Number:	Vendor/ Supplier: MRC
Description of Shipment: 5 SKIDS OF VALVES	Carrier: MANITOULIN
	Freight Bill Number: 23271331
	Location: WAREHOUSE

		Description/ Action	Initial	Date	Date
Was Shipment Complete?	Yes ☑ No ☐ N/A ☐				
Correct Quantities?	Yes ☑ No ☐ N/A ☐				
Correct Specification and Grade?	Yes ☑ No ☐ N/A ☐				
Correct Dimensions?	Yes ☑ No ☐ N/A ☐				
O D I D & Length?	Yes ☑ No ☐ N/A ☐				
Correct Schedule?	Yes ☑ No ☐ N/A ☐				
Correct Rating?	Yes ☑ No ☐ N/A ☐				
MTR's Received With Shipment?	Yes ☑ No ☐ N/A ☐				
OS&D Report Required?	Yes ☐ No ☑ N/A ☐				
NCR Report Required?	Yes ☐ No ☑ N/A ☐				
Visible Damage?	Yes ☐ No ☑ N/A ☐				
Items in Quarantine?	Yes ☐ No ☑ N/A ☐				

	Date Quarantine: / Date Released:
Items Rejected:	

Comments:

	PRINT NAME	SIGNATURE	DATE
Received By: WAREHOUSE	DEANNA GOURLAY		MAY 16,16
Reviewed By: WAREHOUSE			
Accepted By: PEMBINA REP			

PRE-OFFLOAD INSPECTION CHECKLIST

hase 3 - Acheson
h 3 Expansion - Grande Prairie
loc Title: Pre-Off Load Inspection Checklist
evision: 0
orm Issued: Sept 9, 2015

ate: MAY 16, 2016	Arrival Time: 9:20 AM	Departure Time: 9:35 AM
ransportation Company: MANITOULIN	Truck Number: 52437	Trailer Number: 80657D
urchase Order Number: 4500086997	Vendor / Supplier:	Freight Bill Number:
ocation of Inspection: 11517 89 AVE, GRANDE PRAIRIE		Number of Pieces: 5 SKIDS

escription of Load:

5 PALLETS OF VALVES

LOAD EVALUATION	YES	NO
HIPMENT ACCOMPANIED BY PILOT TRUCK/CAR?		✓
R R(S) HAVE AND ARE WEARING SITE SPECIFIC PPE?	✓	
OAD IS TARPED AND/ OR COVERED?	✓	
HIPMENT QUANTITY AND BOL QUANTITY MATCH?	✓	
HIPMENT ARRIVED IN GOOD CONDITION?	✓	
PPROPRIATE PAPERWORK ACCOMPANIED LOAD TO SITE?	✓	
ICTURES TAKEN OF SHIPMENT PRIOR TO OFFLOAD?		✓
NY VISIBLE DAMAGE? (Must be noted on BOL prior to departure)		✓
RADE SPECIFIC PERSONNEL CONTACTED TO ASSIST IN VISUAL/PHYSICAL INSPECTION?		✓
NY HIDDEN DAMAGE DISCOVERED AFTER OFFLOAD?		✓
A/QC CONTACTED?	✓	
DDITIONAL DOCUMENTATION PROVIDED? (ie. Manuals, Binders and PS)	✓	

nload Start Time: 9:22 AM	Unload Finish Time: 9:28 AM

emarks:

eceived By: DEANNA GOURLAY	Title/Trade:	Date: MAY 16
ffloaded By: DOUG GOURLAY	Title/Trade:	Date: MAY 16
isual Inspection Assisted By: DOUG GOURLAY	Title/Trade:	Date: MAY 16
C By: DEANNA GOURLAY	Title/Trade:	Date: MAY 16
upervisor: DOUG GOURLAY	Title/Trade:	Date: MAY 16

CAMERON

Wednesday Jan-27-2016

From:

Cameron Canada
3707 97 Street

Edmonton,Alberta,Canada
T6E 6J2
780-468-2732

To:

Subject:

Serial: 120708484 Quantity/Series : -01 to -02

Comment:

Part Number:	9K-4C02F01FO2AX004
Description:	02" 150 B4C FXF NACE W/WRENCH P.R.
Sales Order:	N/A
Purchase Order:	N/A

MTR # 259

CAMERON

Wednesday Jan-27-2016

From:

Cameron Canada
3707 97 Street
Edmonton,Alberta,Canada
T6E 6J2
780-468-2732

To:

Document Summary Page

The MTR's are printed in the following order:

#	Heat #	Heat Code	Part Description	Product
1	GROVE		Grove B4, B5 Sour Low Temp.	--LOC
2	8006		BALL 1018/A105/LF2 w/ENC 02 150/600 B4	9K-292-02031-8
3	A144893		TRUNNION-UNPLATED 02 0600 B4C	9K-293-02017-V2NP
4	M52574		STEM, GROVE B4, 02 150/1500, 4140 NON PLATED	9K-295-02018-2NP
5	CB103779		PLATE-GLAND (FIRESAFE) 02 0150/900 B4C	9K-293-02063-V1
6	14E995		CLOSURE-RF-FORG LF2 02 150 B4B	9K-RS-11-V-073
7	XY-0220		BODY-FIRESAFE w/1/2"NPT PORT, 02 150/300 B4B,	9K-290V02110-9

MTR #259

VALVES & MEASUREMENT
Cameron Canada Corporation
3707 – 97 Street
Edmonton Alberta Canada T6E 6J2
Phone 780.463.6868
Fax 780.465.1244
www.c-a-m.com

LETTER OF COMPLIANCE

for:

GROVE BRAND TRUNNION VALVES

Model B4, B5 - Sour Low Temperature Service

Cameron Valves & Measurement hereby certifies that the design, manufacture, sampling, testing and quality control inspection of the GROVE brand CSA Z245.15 ball valves for Sour Low Temperature Service meet the requirements of CSA Z245.15-13 Sour Service, V&M Engineering Standards, and customer purchase order requirements. As part of compliance to these specifications, the valves are marked in accordance with MSS SP-25. The valves are also marked "SOUR" as required by CSA Z245.15-13 marking requirements for Sour Service and are suitable for use in CSA Z662 Pipeline systems.

The materials of construction for these valves conform to the metallurgical requirements of NACE MR0175/ISO 15156:2009 (Parts 1 & 2 for Carbon & Alloy Steels in SSC Region 3 Sour Service and Parts 1 & 3 for CRA's as specified in CSA Z245.15-13 Chapter 13). According to NACE MR0175-2009/ISO 15156, it is the customer's / user's responsibility to ensure that the valve materials will be satisfactory in the intended service.

The minimum service temperature of these valves is -46°C/-50°F. Impact testing has been performed in accordance with applicable ASTM requirements and those of CSA Z245.15-13 for Category II M45C Service.

The ASTM A320 Grade L7M studs and cap screws and ASTM Grade A194 7ML nuts used in the products specified above have been Quality Control inspected and meet the requirements of the applicable ASTM specifications – as is already implied fully by the statements above regarding both CSA and NACE standards compliance.

Approved by: _____
Greg Ogaranko, M.Eng. P. Eng.
Engineering Manager

08/10/15
Engrg Ref#: EWR10619-01 Rev05.docx

Control Doc#: 5A-EX-17 Rev01

MTR # 259

QIUBAO VALVE CO.,LTD.

MATERIAL TEST CERTIFICATE

Certified in accordance to EN10204 3.1

QB/CX11.02 REV D

Customer	CAMERON-VALGRO	Raw Material Supplier	TsingShan special steel	Certificate No.	F2015-4527
P.O Number	4510858120	Production Name	Ball of ball valve	Certificate Date	10/8/2015
Specificate	ASTM A350 LF2	Customer Standard/Rev.	MS-021034-(01)-(02) REV 04	Melting Practice	E.F.V.D

1. Production Description

No.	Forgings Log	Heat No.	Item No.	Size&Class	Part No./Rev.	Raw Material	Qty.
1	KP	8006	00010	02 150/600 B4	9K-292-02031-8(02)		300
2							
3							
4							
5							

2. Chemical Composition (%)

No.	Forgings Log	Heat No.	Element	C	Mn	Si	S	P	Cr	Ni	Mo	Cu	V	Nb
			Min		0.60	0.15								
			Max	0.21	1.35	0.30	0.030	0.030	0.30	0.40	0.120	0.40	0.050	0.020
1	KP	8006		0.20	0.63	0.24	0.009	0.021	0.09	0.03	0.002	0.03	0.002	0.003
2														
3														
4														
5														

No.	Forgings Log	Heat No.	Element	N	Nb+Ta	Al	Ti	W	CE	Cr+Mo	Cu+Ni+Cr +Mo+V	PREN
			Min									
			Max						0.43	0.32	1.00	
1	KP	8006							0.33	0.09	0.15	
2												
3												
4												
5												

3. Heat Treatment Process

No.	H.T Date	Heat Treatment	H.T Lot No.	Temp. (℃)	Hold Time	Cooling Medium	Temp. (℃)	Hold Time	Cooling Medium	Temp. (℃)	Hold Time	Cooling Medium
1	2015-9-19	Quenching and Tempering	JG091703-202	900	2	Water	600	4	Air			
2												
3												
4												
5												

4. Mechanical Properties

No.	Forgings Log	Heat No.	Item	Tensile Test				Hardness(HBW)	Impact Test Akv (J)		-46℃	
				Tensile (Mpa)	Yield0.2 (Mpa)	EL.2" (%)	Roa. (%)		Specimen Size:10×10×55			
			Min	485	250	22	30	143	Single Value		Min:	21
			Max	655				197	Average Value		Min:	27
1	KP	8006		555	365	33.5	67.5	158	126	130	128	128
2												
3												
4												
5												

1.We certify that all results are in accordance to the specification and meet ASTM A350 LF2.

2. After the examination, the test result of nuclear value for the above materials is less than 0.3 υ Sv/h.

Quality Inspector _____

Q.A Manager _____

QIUBAO VALVE CO., LTD. QUALITY DEPT.

Add:Dongou Industrial Estate, Oubei Town, Yongjia County, Zhejiang Province, China Tel:0086-577-67377183 Fax:0086-577-67377177 Http://www.qiubaovalve.com E-mail:qualityg@qiubaovalve.com

APPROVED
By hughesa at 7:10 am, 12/29/15

MTR # 259

QBLO

QIUBAO VALVE CO.,LTD.

ENP INSPECTION REPORT

Customer Name	CAMERON-VALGRO	Production Name	Ball of Ball Valve	Report No.
P.O. NO.	4510858120\00010	Production Material	LF2 Class1 ENP0.0127-0.025mm	Inspection Date
Production Size	02 150/600 B4	Production Quantity	300PCS	Post Heat Treatment
Drawing(Part) No.	9K-292F02031(02)\9K-292-02031-8(02)	Carry out Standard	9K-VG-6(REV03)	Heat No.

Inspection Process Description

1.Adhesion Test

Adhesion test as per ASTM B571 the sample was bend at 180 degree over a Mandrel of Same size as was observed.

2.Porosity Test

Ferroxyl test carried out as per ASTM B733 9.6.1 standard to check for porosity. None were found.

3.Visual Test

The job was inspected for visual defect like peeling, blistering etc. None Were found.

4.Thickness Test

The thickness was measured on coupon and was found to be 0.014-0.025mm With Thickness Testing

5.Composition Test

The job were plated with E.N.P having average phosphorus content of 12.52% and Remaining being

6 Hardness Test

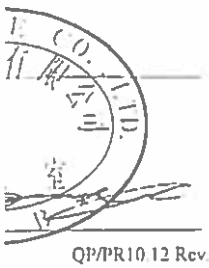
Hardness after plating average ≥850HV at 100 gm load.

Conclusion	(√)Conformity ( )Non-Conformity		
Inspector	Gaojuhe	Q.A Manager	

APPROVED
By hughesa at 7:06 am, 12/29/15

MTR #259

ENP-Z04740
9/28/2015
400℃/1hour
KP8006
s sample No peelin
g Machin
g nicke



QP/PR10.12 Rev.A

MTR # 259

Steel Dynamics, Inc.
Engineered Bar Products Division

3000 N. County Road 225 East
Pittsboro, IN 46167
Phone: (317) 892-7900
Fax: (317) 892-7238

Certified Material Test Report

Cert # : 183923 | Mill Order : 1413552 | Heat # : A144893 | Issued : 10/22/2014 17:27:52
Work Order : 172406 | Sales Order : 134725-1 | Customer : Capital Steel and Wire | PO # : 4052-1
Load # : 213996 | Reference # : | Reference Desc : | End Use :
Size : 3" | Shape : Round | Grade : A350/LF2 Chem | Length : 20'
Grain Practice : Al Fine Grain (5-8) per ASTM A26 | Reduction Ratio : 20.3 to 1 | Disposition : Rolled Prime

Ladle Chemistry Analysis (ASTM A29)

C	Mn	P	S	Si	Al	Cu	Ni	Cr	Mo	Sn	N	V	Cb	B	Ca	W	Ti	DI
0.19	1.10	0.007	0.002	0.24	0.026	0.14	0.08	0.11	0.03	0.009	0.0074	0.035	0.000	0.0003	0.0015	0.000	0.001	0.85

Pb	Co	As	Sb	Zr	Bi	H	O	Ceq	J-Factor
0.000	0.005	0.004	0.002	0.000	0.000	1.8		0.42	

Product Check Analysis (ASTM A29)

	C	Mn	P	S	Si	Al	Cu	Ni	Cr	Mo	Sn	N	V	Cb	Ti	B	Ca	O
Front																		
Back																		

Jominy (ASTM A255)

	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J12	J14	J16	J18	J20	J24	J28	J32
Calc'd																		
Front																		
Back																		

Microcleanliness (ASTM E45)

Method A								Method C		Method E	
AT	AH	BT	BH	CT	CH	DT	DH	S	O	SAM "B"	SAM "D"

Microcleanliness (DIN 50602)

K			M
S	O	Tot	Tot

Decarb

Depth	% of Diameter

Grainsize

Austenitic	Ferritic

Macrostructure (ASTM E381)

S	R	C

Magnetic Particle Inspection

Frequency	Severity

Mechanical Properties (ASTM A370)

Tensile Properties					Hardness	
Tensile Strength	0.2% Yield Strength	% Elong (2")	% ROA	0.35% EUL Yield Strength	(MR)	(Surf)

Comments/Specs

Electric Arc Furnace Melted - Vacuum Tank Degassed — EN 10204:2004 3.1 — Normalize and Machine Straighten — Normalize and Machine Straighten — ASTM A350/A350M-13 LF2 — Cameron MS-021009-01-01 Rev 16

APPROVED
By Lai at 1:06 pm, Jan 14, 2016

Part No. 8575
Lot No. 8575

Condition : Normalize, Straighten

I hereby certify that the content of this report is correct and accurate, and that all tests and operations performed on this material were in compliance with applicable material specifications and purchaser designated requirements.

Trevor Kipp - Rolling Mill Metallurgist

Any alteration to this report voids Steel Dynamics's warranting of results. No weld repair has been performed on this material. This material is not radioactive and has

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	A144893	DATE	1/7/2016
WAS USED TO MAKE PART NO.	9K-293-02017-V2NP	PO NO	4510953387
ACM QUALITY DEPT		QUANTITY	34

MTR # 259

Steel Dynamics, Inc.
Engineered Bar Products Division

8000 N. County Road 225 East
Pittsboro, IN 46167
Phone: (317) 892-7900
Fax: (317) 892-7966

Certified Material Test Report

Heat Treatment Addendum

Cert # : 183923	Mill Order : 1413552	Heat # : A144893	Issued : 10/22/2014 12:27:52
Work Order : 172406	Sales Order : 134725-1	Customer : Capital Steel and Wire	PO # : 4052-1
Load # : 213598	Reference # :	Reference Desc :	End Use :
Size : 3"	Shape : Round	Grade : A350/LF2 Chem	Length : 20'

Normalize		Austenitize		Quench Media			Temper		Stress Relieve	
Time	Temp	Time	Temp	Type	Time	Temp	Time	Temp	Time	Temp
3.5 hrs	1670 F	hrs	°F		min	°F	hrs	°F	hrs	F

* Furnaces are calibrated to API 6A Annex M, and use atmospheric thermocouples.
** QTC is 12" prolongation from longitudinal orientation ,machined to a 0.505" buttonhead for tensile

Charpy Impact (ASTM E23) (y-notch | 10mm x 10mm)

Sample ID	Orientation	Location		Temp(F)	Impact Energy (ft-lbs) 1	2	3	Avg	Lateral Expansion (0.001") 1	2	3	Avg	% Shear 1	2	3	Avg
68400	Longitudinal	Mid-Radius	Q1	-60	74	70	59	68	53	54	40	49	30	30	30	30

Hardness (ASTM A370)

Sample ID	Location		HB
68400	Mid-Radius	Q1	154

Surface Hardness (ASTM A370)

Sample ID	Location		HB
68401	Surface	Q1	143

Tensile (ASTM A370)

Sample ID	Orientation	Location		Tensile	0.2% Yield	%E (2")	%ROA
68400	Longitudinal	Mid-Radius	Q1	73,700 psi	48,500 psi	28	65

Part No. _____
Lot No. 8575

APPROVED
By Lai at 1:08 pm, Jan 14, 2016

I hereby certify that the content of this report is correct and accurate, and that all tests and operations performed on this material were in compliance with applicable material specifications and purchaser designated requirements.

Garrett Bowyer - Bar Finishing Metallurgist

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	A144893	DATE	1/7/2016
WAS USED TO MAKE PART NO.	9K-293-02017-V2NP	PO NO	4510953387
ACM QUALITY DEPT		QUANTITY	34

MTR # 259

CMC Commercial Metals

CMC IMPACT METALS PENNSYLVANIA
1024 Kittanning Pike
Chicora PA 16025-2030
888-682-7337
www.cmcimpactmetals.com

Material Test Report

Production Date	01.07.2014
Heat No.	M52574
Furnace No.	H10394

Dixie Nuelle
Dixie Nuelle, Quality Assurance

CHARPY IMPACT TESTS

Test	Average*	Specimen 1*	Shear	Lateral Expansion	Specimen 2*	Shear	Lateral Expansion	Specimen 3*	Shear	Lateral Expansion	Test Temp.	Size	Location	Orientation
	ft-lbs	ft-lbs	%	in.	ft-lbs	%	in.	ft-lbs	%	in.	°F			
1	113.7	118.0	100	0.075	110.5	100	0.072	112.5	100	0.072	-50	Full	Center	Longitudinal
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														
16														
17														
18														

APPROVED
By Lai at 1:20 pm, Jan 14, 2016

INCLUSION RATING

Method								
Test								
	Thin (T)	Heavy (H)	Thin (T)	Heavy (H)	Thin (T)	Heavy (H)	Thin (T)	Heavy (H)
1								
2								
3								

Part No. 6 dev3
Lot No. 5016

OTHER TESTS

Grain Size	Decarburization	Macrostructure Method /Result	Reduction Ratio	Ultrasonic Test
Method:		ASTM E381		
		SRC	29:1	

Additional Comments

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	M52574	DATE	1/7/2016
WAS USED TO MAKE PART NO.	9K-295-02018-2NP	PO NO	4510928305
ACM QUALITY DEPT		QUANTITY	275

MTR # 259

CMC Commercial Metals

CMC IMPACT METALS PENNSYLVANIA
1024 Gitanning Pike
Chicora PA 16025-2030
888-682-7337
www.cmcimpactmetals.com

Material Test Report

Production Date
01.07.2014

Dixie Nuelle
Dixie Nuelle, Quality Assurance

Quality Management System certified to ISO 9001:2008 and Pressure Equipment Directive (PED) 97/23/EC 7/2, Annex I, Paragraph 4.3 by SRI Quality System Registrar. Reg. # 2039.00

Sold To:	Ship To:
Capital Steel & Wire Inc 240 S Bridge St, Ste 300 Dewitt MI 48820-8825 US	Capital Steel & Wire Inc 240 S Bridge St, Ste 300 Dewitt MI 48820-8825 US

Customer PO No.	PO 2735	BOL No.	Delivery No.	Sales Order No.
Customer Part No.		930571	81162192	1382425

Product Description
ROUND:SBQ 1-1/4" 20R 4140 , 4140QT 237HB Max 100T 75Y CVN

Processing
Quench and Temper, RND - Straighten 1/8" in 5 ft

Alternate Grades :
PROCESSED PER MS-012502-01-03

CHEMICAL ANALYSIS

Heat No.	C (%)	Mn (%)	P (%)	S (%)	Si (%)	Cu (%)	Cr (%)	Ni (%)	Mo (%)	V (%)	Cb (Nb) (%)	Al (%)
M52574	0.41	0.85	0.012	0.020	0.26	0.21	1.00	0.09	0.180	0.002		0.049

Batch No.	Ti (%)	B (%)	As (%)	Pb (%)	Sb (%)	Zr (%)	N_2 (ppm)	O_2 (ppm)	H_2 (ppm)	DI (In.)	CE (%)
M52574H394										5.31	0.81

Jominy Test (HRC)	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J11	J12	J13	J14	J15	J16	J18	J20	J22	J24	J26	J28	J30	J32

THERMAL PROCESSING

Furnace No.	Austenitizing Time / Temp.°F)	Tempering Time / Temp. (°F)	Normalizing Time / Temp. (°F)	Stress Relieving Time / Temp.(°F)	Quench Media Temp. (°F)
H10394	56 Min/ 1625	160 Min/ 1300			Water /

Notes : Full Charpy = 10mmX10mm

Test	Tensile Test: Yield 0.2% (ksi)	Tensile (ksi)	Elongation (%)	Reduction of Area (%)	Yield at 0.6 % Elongation Under Load (ksi)	Yield at 0.02 % (ksi)	Test Orientation	Test Location	Hardness Test: Brinell (BHN)	Test Location	Rockwell	Test Location
1	94.4	107.7	26	65			Longitudinal	Center	217	Surface		
2									217	Mid Radius		
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												

APPROVED
By Lai at 1:21 pm, Jan 14, 2016

Part No. 9K-295-02018-2NP
Lot No. M52574

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	M52574	DATE	1/7/2016
WAS USED TO MAKE PART NO.	9K-295-02018-2NP	PO NO	4510928305
ACM QUALITY DEPT		QUANTITY	275

MTR #259

GERDAU

GERDAU SPECIAL STEEL NORTH AMERICA
5601 MARBLE ROAD
JACKSON, MICHIGAN 49201

CERTIFIED MATERIAL TEST REPORT

CUSTOMER ORDER NUMBER	CUSTOMER PART NUMBER	HEAT NUMBER	WORK ORDER NUMBER	DATE
2343		M52574	284185 101	11/15/13

Danieli Cast

SHIP TO

QUALITY ASSURANCE
CAPITAL STEEL & WIRE, INC

240 SOUTH BRIDGE STREET
SUITE 300
DEWITT , MI 48820

CAPITAL STEEL & WIRE
CUSTOMER PICKUP AT MILL

LANSING , MI 48910

ORDERED

GRADE	SIZE		LENGTH
4140	1 1/4"	RND	20'

CUSTOMER SPECIFICATIONS

AISI 4140 (5.0 MIN DI AIM)

DI CALCULATION

5.3

REDUCTION RATIO

RATIO= 29.3 TO 1.0

** MATERIAL 100% MELTED AND MANUFACTURED IN THE U.S.A. BY THE ELECTRIC ARC FURNACE AND CONTINUOUS CASTING METHOD. THE PRODUCT HAS NOT BEEN REPAIRED BY WELDING AND THIS MATERIAL HAS NOT BEEN EXPOSED TO MERCURY OR TO ANY OTHER METAL ALLOY THAT IS LIQUID AT AMBIENT TEMPERATURES DURING PROCESSING OR WHILE IN OUR POSSESSION.
GERDAU MONITORS ALL INCOMING SCRAP AND ALL HEATS OF STEEL TO ENSURE THAT PRODUCTS SHIPPED ARE FREE OF RADIOACTIVE MATERIAL.

APPROVED
By Lai at 1:22 pm, Jan 14, 2016

We certify that these data are correct and in compliance with specified requirements.

Gerdau Monroe
3000 East Front Street
Monroe, MI 48161

Wendy J. Craig
Quality Assurance Representative

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	M52574	DATE	1/7/2016
WAS USED TO MAKE PART NO.	9K-295-02018-2NP	PO NO	4510928305
ACM QUALITY DEPT		QUANTITY	275

MTR # 259

GERDAU

GERDAU SPECIAL STEEL NORTH AMERICA
5551 MORRILL ROAD
JACKSON, MICHIGAN 49201

CERTIFIED MATERIAL TEST REPORT

CUSTOMER ORDER NUMBER	CUSTOMER PART NUMBER	HEAT NUMBER	WORK ORDER NUMBER	DATE
2343		M52574	284185 101	11/15/13

Danieli Cast

SOLD TO
QUALITY ASSURANCE
CAPITAL STEEL & WIRE, INC

240 SOUTH BRIDGE STREET
SUITE 300
DEWITT , MI 48820

SHIP TO
CAPITAL STEEL & WIRE
CUSTOMER PICKUP AT MILL

LANSING , MI 48910

ORDERED

GRADE	SIZE	LENGTH
4140	1 1/4" RND	20'

CUSTOMER SPECIFICATIONS
AISI 4140 (5.0 MIN DI AIM)

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Ni	Cr	Mo	Cu	Sn	Al
0.41	0.85	0.012	0.020	0.26	0.09	1.00	0.18	0.21	0.008	0.049

V	Nb
0.002	0.002

GRAIN SIZE SPECIFICATION ASTM E112 - FINE GRAIN 5-8

HARDNESS SPECIFICATION ASTM E10

CENTER	MID RADIUS	SURFACE
311.0	321.0	285.0

APPROVED
By Lai at 1:23 pm, Jan 14, 2016

PAGE 1

We certify that these data are correct and in compliance with specified requirements.

Gerdau Monroe
3000 East Front Street
Monroe, MI 48161

Wendy J. Craig

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	M52574	DATE	1/7/2016
WAS USED TO MAKE PART NO.	9K-295-02018-2NP	PO NO	4510928305
ACM QUALITY DEPT		QUANTITY	275

MTR #259

GERDAU

GERDAU SPECIAL STEEL NORTH AMERICA
5591 MORRILL ROAD
JACKSON, MICHIGAN 49201

CERTIFIED MATERIAL TEST REPORT

CUSTOMER ORDER NUMBER	CUSTOMER PART NUMBER	HEAT NUMBER	WORK ORDER NUMBER	DATE
2343		M52574	284185 101	11/15/13

Daniell Case

REPORT TO
QUALITY ASSURANCE
CAPITAL STEEL & WIRE, INC

240 SOUTH BRIDGE STREET
SUITE 300
DEWITT , MI 48820

SHIP TO
CAPITAL STEEL & WIRE
CUSTOMER PICKUP AT MILL

LANSING , MI 48910

ORDERED

GRADE	SIZE	LENGTH
4140	1 1/4" RND	20'

CUSTOMER SPECIFICATIONS
AISI 4140 (5.0 MIN DI AIM)

HARDENABILITY SPECIFICATION ASTM A304

THEORETICAL

J1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20	22	24	26	28	30	32	34
57	57	57	57	57	57	57	56	54	52		50		48		46	45	45		43		40		38	

MICROCLEANLINESS SPECIFICATION ASTM E45 METHOD A

	A		B		C		D	
	T	H	T	H	T	H	T	H
F1	1.5	0.0	0.0	0.0	0.0	0.0	1.0	0.0
F2	1.5	0.0	0.5	0.0	0.0	0.0	1.0	0.0
M1	1.0	0.0	0.5	0.0	0.0	0.0	1.0	0.0
M2	1.5	0.0	0.0	0.0	0.0	0.0	1.0	0.0
B1	1.5	0.0	0.0	0.0	0.0	0.0	1.0	0.0
B2	1.5	0.0	0.5	0.0	0.0	0.0	1.0	0.0
WORST CASE	1.5	0.0	0.5	0.0	0.0	0.0	1.0	0.0

MACROCLEANLINESS

PLATE I PLATE II

	S	R	C
FRONT	1	1	1
MIDDLE	1	1	1
BACK	1	1	1
AVERAGE	1	1	1

NONE

APPROVED
By Lai at 1:24 pm, Jan 14, 2016

PAGE 2

We certify that these data are correct and in compliance with specified requirements.

Gerdau Monroe
3000 East Front Street
Monroe, MI 48161

Wendy J. Craig
Quality Assurance Representative

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	M52574	DATE	1/7/2016
WAS USED TO MAKE PART NO.	9K-295-02018-2NP	PO NO	4510928305
ACM QUALITY DEPT		QUANTITY	275

MTR # 259

KREHER STEEL COMPANY, LLC.

Certificate of Mill Test Results

ACM MACHINING, INC.
HOT ROLLED ROUNDS A350LF2
3.0000 X 20
PART NO.

PO/Rel 101205
SO 1 -268906-001
12Jan14
Pg 1/2

I hereby certify that this data is correct as contained in the records of this company.
I hereby certify that no mercury came in contact with or no weld repair was done to this product while in our possession.
Attn:

Steel Dynamics, Inc.
Engineered Bar Products Division

5900 N. County Road 225 East
Pittsboro, IN 46167
Phone: (317) 892-7900
Fax: (317) 892-7286

Certified Material Test Report

Cert # : 191408 | Mill Order : 1416117 | Heat # : CB103779 | Issued : 2/24/2015 09:29:14
Work Order : 177926 | Sales Order : 138739-1 | Customer : Kreher Steel Company | PO # : 42155-1
Load # : 225441 | Reference # : | Reference Desc : | End Use :
Size : 3" | Shape : Round | Grade : A350/LF2 Chem | Length : 20'
Grain Practice : Al Fine Grain (5-8) per ASTM A29 | Reduction Ratio : 20.3 to 1 | Disposition : Rolled Prime

Ladle Chemistry Analysis (ASTM A29)

C	Mn	P	S	Si	Al	Cu	Ni	Cr	Mo	Sn	N	V	Cb	B	Ca	W	Ti	Di
0.16	1.10	0.009	0.002	0.25	0.035	0.15	0.06	0.08	0.02	0.011	0.0080	0.036	0.001	0.0002	0.0020		0.003	

Pb	Co	As	Sb	Zr	Bi	H	O	Ceq	J-Factor
0.004		0.004	0.002			1.3		0.40	

Product Check Analysis (ASTM A29)

	C	Mn	P	S	Si	Al	Cu	Ni	Cr	Mo	Sn	N	V	Cb	Ti	B	Ca	O
Front																		
Back																		

Jominy (ASTM A255)

	J1	J2	J3	J4	J6	J8	J7	J8	J9	J10	J12	J14	J16	J18	J20	J24	J28	J32
Calc'd																		
Front																		
Back																		

Microcleanliness (ASTM E45)

Method A								Method C		Method E	
AT	AH	BT	BH	CT	CH	DT	DH	S	O	SAM "B"	SAM "D"

Microcleanliness (DIN 50602)

K		M	
S	O	Tot	Tot

Decarb

Depth	% of Diameter

Grainsize

Austenitic	Ferritic

Macrostructure (ASTM E381)

S	R	C

Magnetic Particle Inspection

Frequency	Severity

Mechanical Properties (ASTM A370)

Tensile Properties					Hardness	
Tensile Strength	0.2% Yield Strength	% Elong (2")	% ROA	0.35% EUL Yield Strength	(MR)	(Surf)

Comments/Specs

Electric Arc Furnace Melted - Vacuum Tank Degassed — Normalize and Machine Straighten — Normalize and Machine Straighten — Cameron MS-021034-01-02 Rev J

APPROVED
By Lai at 1:58 pm, Jan 14, 2016

Condition : Normalize, Straighten, Contact UT

UT: Passed Ultrasonic Inspection

I hereby certify that the content of this report is correct and accurate, and that all tests and operations performed on this material were in compliance with applicable material specifications and purchaser designated requirements.

Trevor Kipp - Rolling Mill Metallurgist

Any alteration to this report voids Steel Dynamic's warranting of results. No weld repair has been performed on this material. This material is not radioactive and has not been exposed to radioactivity while under the control of Steel Dynamics. This material has not been exposed to mercury while under the control of Steel Dynamics. Unless otherwise noted, this material was melted, continually cast, and rolled in the USA; w all testing performed by Steel Dynamics.

Steel Dynamics Rev Level 1 [108] - 241

reviews_cm

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO	CB103779	DATE	1/7/2016
WAS USED TO MAKE PART NO.	9K-293-02063-V1	PO NO	4510953383
ACM QUALITY DEPT		QUANTITY	238

MTR # 259

KREHER STEEL COMPANY, LLC.

Certificate of Mill Test Results

ACM MACHINING, INC.
HOT ROLLED ROUNDS A350LF2
3.0000 X 20'
PART NO.

PO/Rel 101205
I hereby certify that this data is correct as contained in the records of this company.
I hereby certify that no mercury came in contact with or no weld repair was done to this product while in our possession.
Attn:

SO # -268906-001 12Jan14
Pg 2/2

Steel Dynamics, Inc.
Engineered Bar Products Division

9000 N. County Road 225 East
Pittsboro, IN 46167
Phone: (317) 892-7000
Fax: (317) 892-7219

Certified Material Test Report
Heat Treatment Addendum

Cert # : 181408	Mill Order : 1418117	Heat # : CB103779	Issued : 2/24/2015 09:29:18
Work Order : 177925	Sales Order : 136799-1	Customer : Kreher Steel Company	PO # : 42155-1
Load # : 223441	Reference # :	Reference Desc :	End Use :
Size : 3"	Shape : Round	Grade : A350/LF2 Chem	Length : 20'

Normalize		Austenitize		Quench Media			Temper		Stress Relieve	
Time	Temp	Time	Temp	Type	Time	Temp	Time	Temp	Time	Temp
3.6 hrs	1670 F	hrs	°F		min	°F	hrs	°F	hrs	F

* Furnaces are calibrated to API 5A Annex M, and use atmospheric thermocouples.
** CTC is 12" prolongation from longitudinal orientation ,machined to ø 0.505" buttonhead for tensile.

Cherry Impact (ASTM E23) (v-notch | 10mm x 10mm)

Sample ID	Orientation	Location		Temp(F)	Impact Energy (ft-lbs) 1	2	3	Avg	Lateral Expansion (0.001") 1	2	3	Avg	% Shear 1	2	3	Avg
26800	Longitudinal	Mid-Radius	Q1	-60	38	74	48	53	38	53	74	55	20	30	20	23

Hardness (ASTM A370)

Sample ID	Location		HB
26800	Mid-Radius	Q1	148

Surface Hardness (ASTM A370)

Sample ID	Location		HB
26804	Surface	Q1	144

Tensile (ASTM A370)

Sample ID	Orientation	Location		Tensile	0.2% Yield	%E (2")	%ROA
26800	Longitudinal	Mid-Radius	Q1	74,400 psi	47,700 psi	31	69

APPROVED
By Lai at 1:59 pm, Jan 14, 2016

I hereby certify that the content of this report is correct and accurate, and that all tests and operations performed on this material were in compliance with applicable material specifications and purchaser designated requirements.

Garrett Bouyett - Bar Finishing Metallurgist

Any alteration to this report voids Steel Dynamic's warranting of results.

Page 1 of 1 Steel Dynamics Rev Level 1 [106] - 350 retrieve_cm

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	CB103779	DATE	1/7/2016
WAS USED TO MAKE PART NO.	9K-293-02063-V1	PO NO	4510953383
ACM QUALITY DEPT		QUANTITY	238

MTR # 259

Suzhou Dongwu Forging&Welding Co.,Ltd

MILL TEST CERTIFICATE REPORT

Purchaser: CAMERON Cert. No. 1411107-1 Date: 14/Dec/2014

PO No.:	4510583917		Certificatie type	EN 10204, 3.1, 2004	Tensile Test bar	Dimension	Section	Length	Testing Temperature (℃)	Brinell Hardness	Load (Kg)	Locatio n	Impact Test	Testing Temp.	Type	Dim. (mm)	Orientation
Material Specification	ASTM A350 LF2&M5-021009-01-01 REV17		Melting Practice	E.F.										-46℃ max	V-Notch	10 x 10 x 55	Longitudinal
			Test performed on	QTC Piece	Actual	12.5	122	50	room temperature	Actual	3000	Surface	Actual	-46	V-Notch	10 x 10 x 55	Longitudinal

Heat Treatment	Temperature(℃)	Time (h)	Cooling Method
QUENCHED	900ºC	7	In water
TEMPERED	600ºC	12	In Air

Item No	Description	Part No.	Qty	Heat No.	Heat Treatment Lot No.		Chemical Composition %												Mechanical Properties					Impact Test				
							C	Mn	Si	S	P	Cr*	Mo*	Ni*	Cu*	V*	Nb*	CE	YS (Mpa)	UTS (Mpa)	EL (%)	ROA (%)	Hardness (HBW)	Energy value (J) No. 1	No. 2	No. 3	Average (J)
						Min		0.6	0.15										250	485	22	30	143	27J (S)			34J
						Max	0.21	1.35	0.3	0.03	0.03	0.3	0.12	0.4	0.4	0.05	0.02	0.43		655			197				
00020	CLOSURE-RF-FORG LF2 01 150 B4B	9K-RS-11-V-073	150	14E995	141209H13		0.18	0.93	0.23	0.004	0.005	0.06	0.007	0.05	0.03	0.004	0.002	0.34	405	545	30	74	163	92	82	74	83

We hereby certify that the material provided complies with all CVM requirements as stated in the applicable purchase order and certified in accordance to EN 10204-3.1 .

Surveyor's Name, Signature & Date: Dong Cong Inspector's Name, Signature & Date: Wu Lin

APPROVED
By laia at 9:01 am, 3/2/15

452 # 714

APPROVED
By hughesa at 9:56 am, 6/22/15

JIANGYIN XINYU FORGING CO.,LTD

MATERIAL CERTIFICATION

Conforms to DIN 50049.3.1 & BS EN 10204.3.1

Ref. PO#: 101391

QTY: 467NOS

CUSTOMER NAME	ACM Machining, inc	Reduction ratio	>3	Melting practice	EF+LF+VD	CERT. NO.	ACM-266B
SPECIFICATION	ASTM A350 LF2 (MS-021009-01-01 REV13)	Manufacturing Process	Heat treatment->Rough machining			CERT. DATE	Jan. 20,2015

Item No.	Forging Logo.	Heat No.	QTY	Part No.	Desc.	Chemical Composition (%)												Mechanical Properties (Charpy Speciman Size: 10MMX10MMX55MM CVN Orientation: Longitudinal)								Heat treatment		
																		Yield	Tensile	EL2"	Roa	HB	Impact			Batch No.	C150107	
						C	Mn	Si	S	P	Cr	Mo	Ni	Cu	V	Nb	CE	(MPa)	(MPa)	(%)	(%)		(J @-46°C)				Temperature	Time
					Min.		0.60	0.15										250	485	22	30	143	20(A)/16(S)			Quenching	900℃	4.5h
					Max.	0.21	1.35	0.30	0.030	0.030	0.30	0.12	0.40	0.40	0.05	0.02	0.43		655			197				Tempering	620℃	6h
1B	XY	XY-0220	332	F002B 1C	2"body	0.20	0.85	0.20	0.002	0.013	0.03	0.04	0.01	0.03	0.002	0.001	0.36	362	549	34	68	165	75	68	72	Water Quench	17℃	Start
																											20℃	End
3B	XY	XY-0220	135	F004B 2C	4"body	0.20	0.85	0.20	0.002	0.013	0.03	0.04	0.01	0.03	0.002	0.001	0.36	362	549	34	68	165	75	68	72			

VISUAL INSPECTION:PASSED

We hereby certify that the items described herein have been inspected as above in accordance with ASTM-A350 Section 8.

QUALITY INSPECTOR: Zhao Qin

QUALITY MANAGER: Xiao Hongli

Part No. _____

Lot No. 8966

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	XY-0220	DATE	6-18-15
WAS USED TO MAKE PART NO.	9K-290V02110-9	PO NO	4510674710
ACM QUALITY DEPT	Xiaohui Bathard	QUANTITY	116

452 #2

宝钢® 宝山钢铁股份有限公司 BAOSHAN IRON&STEEL CO.,LTD.

产品质量证明书 INSPECTION CERTIFICATE

上海市宝山区富锦路 885 号 邮编 201900
No.885 Fujin ROAD. BAOSHAN DISTRICT.
201900 SHANGHAI. P. R. CHINA
TEL (021)26648104
FAX (021)26648104

制造厂：宝钢分公司
Manufacturer: BAOSTEEL BRANCH

订货单位 CUSTOMER	上海宝钢钢材贸易有限公司	产品名称 PRODUCT	碳素结构方坯
收货单位 PURCHASER	上海宝钢钢材贸易有限公司	代号 CUSTOMER'S NO.	001497 / 证书号 CERTIFICATE NO. 1714E9P0006MX21
标准 SPECIFICATION	LF2	客户订单编号 CUSTOMER ORDER NO.	
		签发日期 DATE OF ISSUE	2014/10/28 / 交货日期 DATE OF DELIVERY 2014/10/19
		许可证号 LICENSE NO.	/ 合同号 BILL'S NO. A410904C01

序号 NO.	炉号 HEAT NO.	坯号 SLAB NO.	规格及重量 MATERIAL DESCRIPTION 厚度 THICK mm	宽度 WIDTH mm	长度 LENGTH m	件数 QTY	重量 W.W. (kg)	化学成分 CHEMICAL COMPOSITION % C x10⁻²	Si x10⁻²	Mn x10⁻²	P x10⁻²	S x10⁻²	Cr x10⁻²	Ni x10⁻²	Cu x10⁻²	V x10⁻²	Mo x10⁻²	拉伸试验 TENSILE TEST 屈服 Y.S. MPa	抗拉 T.S. MPa	伸长 δ EL%	断面缩率 RA%	低倍组织 *01	硬印 *02	非金属夹杂 *03	冲击试验 IMPACT TEST 1	2	3	4	平均 *04
1	11497634		206	286	8.1	35	89360	20	20	65	13	2	3	1	3	2	4												
含计 Total				35			89360																					

备注 REMARKS	
注释 NOTES	Y.S.= YIELD STRENGTH T.S.= TENSILE STRENGTH EL= ELONGATION R.A.= REDUCTION OF AREA *01: MACROSCOPE; *02: SULFUR PRINT; *03:NONMETALLIC IMPURITY *04:AVERAGE N.W.=NET WEIGHT
	本产品按技术条件规定，可能存在尺寸公差不合或内部质量缺陷，特此说明。
检验者 SURVEYOR TO	制造管理部部长 郑贻裕 MANAGER OF MANUF.MANAGEMENT DEP.

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	XY-0220	DATE	6-18-15
WAS USED TO MAKE PART NO.	9K-290V02110-9	PO NO	4510674710
ACM QUALITY DEPT	Mark Bathard	QUANTITY	116

MTR # 259

CAMERON

VALVE PRESSURE TEST FORM

PRODUCT / WORK ORDER INFORMATION

Work Order #: 120708484 Valve Serial # : 120708484-01-02

SO # / PO #: MRC/3356926/000020 Test Specification : 5A-MI-22/REV-

Part #: 9K-4C02F01F02A Description : 02 150 B4C FXF NACE W/WRENCH P.R

Shell Test	Pressure (PSIG)	Duration (Min.)	Pass / Fail	Gauge #	Range	Cal Date
Hydrostatic	450	2 MIN	☑ ☐	G-282	0-600 PSI	04-28-2016
Nitrogen			☐ ☐			

Seat Test	Pressure (PSIG)	Duration (Min.)	Left Seat Pass / Fail	Right Seat Pass / Fail	DB&B Pass / Fail	Gauge #/Range/Cal Date
Hydrostatic	350	2 MIN	☑ ☐	☑ ☐	☑ ☐	G-282 0-600 PSI 04-28-16
Nitrogen			☐ ☐	☐ ☐	☐ ☐	
Air			☐ ☐	☐ ☐		

DIB Test (Inside-Out)	Pressure (PSIG)	Duration (Min.)	DIB-1 (DPE) Pass / Fail	DIB-2 (SRxDPE) Pass / Fail		Gauge #/Range/Cal Date
Hydrostatic			☐ ☐	☐ ☐		
Nitrogen			☐ ☐	☐ ☐		

Body Bleed Closed: ☑ Yes | Charts Req: ☐ Yes ☒ No | Confirm Valve is drained and dried : ☑ Yes

Comments / Special Customer Requests:

Tested by(Initials) /Date /Serial # AV. - JAN-27-2016 - SN.' 120708484-01-02

Tested by (Initials) /Date /Serial #

QC Reviewed & Approved	Date:	Customer Rep:	Date:	
VA CCV QC02	JAN 28 2016			The above specified requirements have been quality inspected and accepted.

MTR # 259

CAMERON

Wednesday Feb-24-2016

From:

Cameron Canada
3707 97 Street

Edmonton,Alberta,Canada
T6E 6J2
780-468-2732

To:

Subject: 04

Serial: 120729609 Quantity/Series : -01 to -08

Comment:

Part Number:	9K-4C02F01FO2AX004
Description:	02" 150 B4C FXF NACE W/WRENCH P.R.
Sales Order:	N/A
Purchase Order:	N/A

MTR #20

CAMERON

Wednesday Feb-24-2016

From:

Cameron Canada
3707 97 Street
Edmonton,Alberta,Canada
T6E 6J2
780-468-2732

To:

Document Summary Page

The MTR's are printed in the following order:

#	Heat #	Heat Code	Part Description	Product
1	GROVE		Grove B4, B5 Sour Low Temp.	--LOC
2	8006		BALL 1018/A105/LF2 w/ENC 02 150/600 B4	9K-292-02031-8
3	A130628		TRUNNION-UNPLATED 02 0600 B4C	9K-293-02017-V2NP
4	M52574		STEM, GROVE B4, 02 150/1500, 4140 NON PLATED	9K-295-02018-2NP
5	CB103779		PLATE-GLAND (FIRESAFE) 02 0150/900 B4C	9K-293-02063-V1
6	14E711		CLOSURE-RF-FORG LF2 02 150 B4B	9K-RS-11-V-073
7	15E336		CLOSURE-RF-FORG LF2 02 150 B4B	9K-RS-11-V-073
8	XY-0196		BODY-FIRESAFE w/1/2"NPT PORT, 02 150/300 B4B,	9K-290V02110-9

MTR #260

VALVES & MEASUREMENT
Cameron Canada Corporation
3707 – 97 Street
Edmonton Alberta Canada T6E 6J2
Phone 780.463.6868
Fax 780.465.1244
www.c-a-m.com

LETTER OF COMPLIANCE

for:

GROVE BRAND TRUNNION VALVES

Model B4, B5 - Sour Low Temperature Service

Cameron Valves & Measurement hereby certifies that the design, manufacture, sampling, testing and quality control inspection of the GROVE brand CSA Z245.15 ball valves for Sour Low Temperature Service meet the requirements of CSA Z245.15-13 Sour Service, V&M Engineering Standards, and customer purchase order requirements. As part of compliance to these specifications, the valves are marked in accordance with MSS SP-25. The valves are also marked "SOUR" as required by CSA Z245.15-13 marking requirements for Sour Service and are suitable for use in CSA Z662 Pipeline systems.

The materials of construction for these valves conform to the metallurgical requirements of NACE MR0175/ISO 15156:2009 (Parts 1 & 2 for Carbon & Alloy Steels in SSC Region 3 Sour Service and Parts 1 & 3 for CRA's as specified in CSA Z245.15-13 Chapter 13). According to NACE MR0175-2009/ISO 15156, it is the customer's / user's responsibility to ensure that the valve materials will be satisfactory in the intended service.

The minimum service temperature of these valves is -46°C/-50°F. Impact testing has been performed in accordance with applicable ASTM requirements and those of CSA Z245.15-13 for Category II M45C Service.

The ASTM A320 Grade L7M studs and cap screws and ASTM Grade A194 7ML nuts used in the products specified above have been Quality Control inspected and meet the requirements of the applicable ASTM specifications – as is already implied fully by the statements above regarding both CSA and NACE standards compliance.

Approved by: _____
Greg Ogaranko, M.Eng. P. Eng.
Engineering Manager

08/10/15
Engrg Ref#: EWR10619-01 Rev05.docx

Control Doc#: 5A-EX-17 Rev01

MTR # 260

QIUBAO VALVE CO.,LTD.

MATERIAL TEST CERTIFICATE

Certified in accordance to EN10204 3.1

QB/CX11.02 REV.D

Customer	CAMERON-VALGRO	Raw Material Supplier	TsingShan special steel	Certificate No.	F2015-4527
P.O Number	4510858120	Production Name	Ball of ball valve	Certificate Date	10/8/2015
Specificate	ASTM A350 LF2	Customer Standard/Rev.	MS-021034-(01)-(02) REV.04	Melting Practice	E.F.V.D

1. Production Description

No.	Forgings Log	Heat No.	Item No.	Size&Class	Part No./Rev.	Raw Material	Qty.
1	KP	8006	00010	02 150/600 B4	9K-292-02031-8(02)		300
2							
3							
4							
5							

2. Chemical Composition (%)

No.	Forgings Log	Heat No.	Element	C	Mn	Si	S	P	Cr	Ni	Mo	Cu	V	Nb
			Min		0.60	0.15								
			Max	0.21	1.35	0.30	0.030	0.030	0.30	0.40	0.120	0.40	0.050	0.020
1	KP	8006		0.20	0.63	0.24	0.009	0.021	0.09	0.03	0.002	0.03	0.002	0.003
2														
3														
4														
5														

No.	Forgings Log	Heat No.	Element	N	Nb+Ta	Al	Ti	W	CE.	Cr+Mo	Cu+Ni+Cr +Mo+V	PREN
			Min									
			Max						0.43	0.32	1.00	
1	KP	8006							0.33	0.09	0.15	
2												
3												
4												
5												

3. Heat Treatment Process

No	H.T Date	Heat Treatment	H.T Lot No.	Temp. (℃)	Hold Time	Cooling Medium	Temp. (℃)	Hold Time	Cooling Medium	Temp. (℃)	Hold Time	Cooling Medium
1	2015-9-19	Quenching and Tempering	JG091703-202	900	2	Water	600	4	Air			
2												
3												
4												
5												

4. Mechanical Properties

No.	Forgings Log	Heat No.	Item	Tensile Test				Hardness(HBW)	Impact Test Akv (J)		-46℃	
				Tensile (Mpa)	Yield0.2 (Mpa)	EL.2" (%)	Roa. (%)		Specimen Size:10×10×55			
			Min	485	250	22	30	143	Single Value		Min:	21
			Max	655				197	Average Value		Min:	27
1	KP	8006		555	365	33.5	67.5	158	126	130	128	128
2												
3												
4												
5												

1.We certify that all results are in accordance to the specification and meet ASTM A350 LF2.

2. After the examination, the test result of nuclear value for the above materials is less than 0.3 υ Sv/h.

Quality Inspector _____

Q.A Manager _____

Add:Dongou Industrial Estate, Oubei Town, Yongjia County, Zhejiang Provece, China Tel:0086-577-67377183 Fax:0086-577-67377177 Http://www.qiubaovalve.com E-mail:qiubaovalve.com

APPROVED
By hughesa at 7:10 am, 12/29/15

MTR #260

QIUBAO VALVE CO.,LTD.

ENP INSPECTION REPORT

Customer Name	CAMERON-VALGRO	Production Name	Ball of Ball Valve	Report No.
P.O. NO.	4510858120\00010	Production Material	LF2 Class1 ENP0.0127-0.025mm	Inspection Date
Production Size	02 150/600 B4	Production Quantity	300PCS	Post Heat Treatment
Drawing(Part) No.	9K-292F02031(02)\9K-292-02031-8(02)	Carry out Standard	9K-VG-6(REV03)	Heat No.

Inspection Process Description

1.Adhesion Test

Adhesion test as per ASTM B571 the sample was bend at 180 degree over a Mandrel of Same size as was observed.

2.Porosity Test

Ferroxyl test carried out as per ASTM B733 9.6.1 standard to check for porosity. None were found.

3.Visual Test

The job was inspected for visual defect like peeling, blistering etc. None Were found.

4.Thickness Test

The thickness was measured on coupon and was found to be 0.014-0.025mm With Thickness Testing

5.Composition Test

The job were plated with E.N.P having average phosphorus content of 12.52% and Remaining being

6.Hardness Test

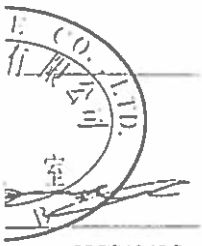
Hardness after plating average ≥850HV at 100 gm load.

Conclusion	(√)Conformity ( )Non-Conformity		
Inspector		Q.A Manager	

APPROVED
By hughesa at 7:06 am, 12/29/15

MTR #260

ENP-Z04740
9/28/2015
400℃/1hour
KP8006
s sample No peelin
g Machin
; nicke



MTR # 760

Steel Dynamics, Inc.
Engineered Bar Products Division

8000 N. County Road 225 East
Pittsboro, IN 46167
Phone: (317) 892-7000
Fax: (317) 892-7285

Certified Material Test Report

Cert # : 148437
Work Order : 142320
Load # : 178373
Size : 3-1/2"
Grain Practice : Al Fine Grain (5-8) per ASTM A29

Mill Order : 1301928
Sales Order : 113448-1
Reference # :
Shape : Round

Heat # : A130628
Customer : Solid Steel Co, INC.
Reference Desc :
Grade : A350/LF2 Chem
Reduction Ratio : 14.9 to 1

Issued : 4/30/2013 18:05:09
PO # : 021813-1-1
End Use :
Length : 20'00"
Disposition : 1

Ladle Chemistry Analysis (ASTM A29)

C	Mn	P	S	Si	Al	Cu	Ni	Cr	Mo	Sn	N	V	Cb	B	Ca	W	Ti	DI
0.18	1.05	0.009	0.002	0.23	0.025	0.19	0.08	0.18	0.03	0.011	0.0085	0.038	0.001	0.0004	0.0017	0.000	0.001	0.89

Pb	Co	As	Sb	Zr	Bi	H	O	Ceq	J-Factor
0.000	0.006	0.005	0.002	0.001	0.001	1.7		0.42	

Product Check Analysis (ASTM A29)

	C	Mn	P	S	Si	Al	Cu	Ni	Cr	Mo	Sn	N	V	Cb	Ti	B	Ca	O
Front																		
Back																		

Jominy (ASTM A255)

	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J12	J14	J16	J18	J20	J24	J28	J32
Calc'd																		
Front																		
Back																		

Microcleanliness (ASTM E45)

Method A								Method C		Method E	
AT	AH	BT	BH	CT	CH	DT	DH	S	O	SAM "B"	SAM "D"

Microcleanliness (DIN 50602)

K		M	
S	O	Tot	Tot

Decarb

Depth	% of Diameter

Grainsize

Austenitic	Ferritic

Macrostructure (ASTM E381)

S	R	C

Magnetic Particle Inspection

Frequency	Severity

Mechanical Properties (ASTM A370)

Tensile Properties				Hardness	
Tensile Strength	0.2% Yield Strength	% Elong (2")	% ROA	(MR)	(Surf)

Steel Dynamics - Engineered Bar Products has a quality system in place which has been certified ISO 9001:2008 compliant, including PED certification.

Comments/Specs

ASTM A576-90b (Reapproved 2012) — Electric Arc Furnace Melted - Vacuum Tank Degassed — ASTM A350-12 LF2 — EN 10204.2004 3.1 — Normalize and Machine Straighten — NACE MR-01-75 / ISO 15156 -2009

APPROVED
By Lai at 12:57 pm, Dec 10, 2015

Part No. 20232
Lot No. 7699

Condition : Straighten

I hereby certify that the content of this report is correct and accurate, and that all tests and operations performed on this material were in compliance with applicable material specifications and purchaser designated requirements.

Dylan Kale
Dylan Kale - Rolling Mill Metallurgist

Any alteration to this report voids Steel Dynamic's warranting of results. No weld repair has been performed on this material. This material is not radioactive and has not been exposed to radioactivity while under the control of Steel Dynamics. This material has not been exposed to mercury while under the control of

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	A130628	DATE	12/3/15
WAS USED TO MAKE PART NO.	9K-293-02017-V2NP	PO NO	4510944296
ACM QUALITY DEPT		QUANTITY	120

MTR #260

Steel Dynamics, Inc.
Engineered Bar Products Division

8000 N. County Road 225 East
Pittsboro, IN 46167
Phone: (317) 892-7000
Fax: (317) 892-7285

Certified Material Test Report

Heat Treatment Addendum

Cert # : 148437
Work Order : 142320
Load # : 178373
Size : 3-1/2"

Mill Order : 1301928
Sales Order : 113448-1
Reference # :
Shape : Round

Heat # : A130628
Customer : Solid Steel Co, INC.
Reference Desc :
Grade : A350/LF2 Chem

Issued : 4/30/2013 18:05:10
PO # : 021813-1-1
End Use :
Length : 20'00"

Normalize		Austenitize		Quench Media			Temper		Stress Relieve	
Time	Temp	Time	Temp	Type	Time	Temp	Time	Temp	Time	Temp
3.5 hrs	1670 F	hrs	°F	Water	min	°F	hrs	°F	hrs	F

* Furnaces are calibrated to API 6A Annex P, and use atmospheric thermocouples.
** OTC is 12" prolongation from longitudinal orientation ,machined to a 0.505" buttonhead for tensile.

Charpy Impact (ASTM E23) (v-notch | 10mm x 10mm)

Sample ID	Orientation	Location		Temp(F)	Impact Energy (ft-lbs) 1	2	3	Avg	Lateral Expansion (0.001") 1	1	3	Avg	% Shear 1	2	3	Avg
62401	Longitudinal	1" Below	Q1	-50	82	51	50	61	52	33	30	38	40	30	30	33

Hardness (ASTM A370)

Sample ID	Location		HB
62401	1" Below	Q1	155

Tensile (ASTM A370)

Sample ID	Orientation	Location		Tensile	0.2% Yield	%E (2")	%ROA
62401	Longitudinal	1" Below	Q1	75,800 psi	52,200 psi	30	63

APPROVED
By Lai at 12:59 pm, Dec 10, 2015

Part No. 20232
Lot No. 7699

I hereby certify that the content of this report is correct and accurate, and that all tests and operations performed on this material were in compliance with applicable material specifications and purchaser designated requirements.

Garrett Bouyett - Bar Finishing Metallurgist

Any alteration to this report voids Steel Dynamic's warranting of results.

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	A130628	DATE	12/3/15
WAS USED TO MAKE PART NO.	9K-293-02017-V2NP	PO NO	4510944296
ACM QUALITY DEPT		QUANTITY	120

MTR # 260

CMC Commercial Metals

CMC IMPACT METALS PENNSYLVANIA
1024 Kranning Pkw
Chicora PA 16025-2030
888-682-7337
www.cmcimpactmetals.com

Material Test Report

Production Date
01.07.2014

Dixie Nuelle
Dixie Nuelle, Quality Assurance

Quality Management System certified to ISO 9001:2008 and Pressure Equipment Directive (PED) 97/23/EC 7/2, Annex I, Paragraph 4.3 by SRI Quality System Registrar, Reg. # 7009.00

Sold To:
Capital Steel & Wire Inc
240 S Bridge St, Ste 300
Dewitt MI 48820-8825 US

Ship To:
Capital Steel & Wire Inc
240 S Bridge St, Ste 300
Dewitt MI 48820-8825 US

Customer PO No.	PO 2735	BOL No.	Delivery No.	Sales Order No.
Customer Part No.		930571	81162192	1382425

Product Description
ROUND:SBQ 1-1/4" 20R 4140 , 4140QT 237HB Max 100T 75Y CVN

Alternate Grades :
PROCESSED PER MS-012502-01-03

Processing
Quench and Temper, RND - Straighten 1/8" in 5 ft

CHEMICAL ANALYSIS

Heat No.	C (%)	Mn (%)	P (%)	S (%)	Si (%)	Cu (%)	Cr (%)	Ni (%)	Mo (%)	V (%)	Cb (Nb) (%)	Al (%)
M52574	0.41	0.85	0.012	0.020	0.26	0.21	1.00	0.09	0.180	0.032		0.049

Batch No.	Ti (%)	B (%)	As (%)	Pb (%)	Sb (%)	Zr (%)	N_2 (ppm)	O_2 (ppm)	H_2 (ppm)	DI (in.)	CE (%)	
M52574H394										5.31	0.81	

Jominy Test (HRC)	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J11	J12	J13	J14	J15	J16	J18	J20	J22	J24	J26	J28	J30	J32

THERMAL PROCESSING

Furnace No.	Austenitizing Time / Temp.°F)	Tempering Time / Temp. (°F)	Normalizing Time / Temp. (°F)	Stress Relieving Time / Temp.(°F)	Quench Media Temp. (°F)
H10394	56 Min/ 1625	160 Min/ 1300			Water /

Notes : Full Charpy = 10mmX10mm

Test	Tensile Test								Hardness Test			
	Yield 0.2% (ksi)	Tensile (ksi)	Elongation (%)	Reduction of Area (%)	Yield at 0.6 % Elongation Under Load (ksi)	Yield at 0.02 % (ksi)	Test Orientation	Test Location	Brinell (BHN)	Test Location	Rockwell	Test Location
1	94.4	107.7	26	65			Longitudinal	Center	217	Surface		
2									217	Mid Radius		
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												

APPROVED
By Lai at 3:18 pm, Feb 18, 2016

Part No. 60073
Lot No. 5226

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	M52574	DATE	2/12/2016
WAS USED TO MAKE PART NO.	9K-295-02018-2NP	PO NO	4510953387
ACM QUALITY DEPT		QUANTITY	103

MTR #760

CMC Commercial Metals

CMC IMPACT METALS PENNSYLVANIA
1024 Kittanning Pike
Chicora PA 16025-7039
888-582-7337
www.cmcimpactmetals.com

Material Test Report

Production Date	01.07.2014
Heat No.	M52574
Furnace No.	H10394

Dixie Nuelle
Dixie Nuelle, Quality Assurance

CHARPY IMPACT TESTS

Test	Average*	Specimen 1*	Shear	Lateral Expansion	Specimen 2*	Shear	Lateral Expansion	Specimen 3*	Shear	Lateral Expansion	Test Temp.	Size	Location	Orientation
	ft-lb	ft-lb	%	in.	ft-lb	%	in.	ft-lb	%	in.	°F			
1	113.7	118.0	100	0.075	110.5	100	0.072	112.5	100	0.072	-50	Full	Center	Longitudinal
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														
16														
17														
18														

INCLUSION RATING

Method								
Test	Thin (T)	Heavy (H)	Thin (T)	Heavy (H)	Thin (T)	Heavy (H)	Thin (T)	Heavy (H)
1								
2								
3								

OTHER TESTS

Grain Size	Decarburization	Macrostructure Method /Result	Reduction Ratio	Ultrasonic Test
Method:		ASTM E381		
		SRC	29:1	

Part No. 6 ea
Lot No. 5016

Additional Comments

APPROVED
By Lai at 3:19 pm, Feb 18, 2016

Country of Origin : United States

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	M52574	DATE	2/12/2016
WAS USED TO MAKE PART NO.	9K-295-02018-2NP	PO NO	4510953387
ACM QUALITY DEPT	Phil Lai	QUANTITY	103

MTR#260

GERDAU

GERDAU SPECIAL STEEL NORTH AMERICA
[illegible] MONROE ROAD
JACKSON, MICHIGAN 49201

CERTIFIED MATERIAL TEST REPORT

CUSTOMER ORDER NUMBER	CUSTOMER PART NUMBER	HEAT NUMBER	WORK ORDER NUMBER	DATE
2343		M52574	284185 101	11/15/13

Danieli Cast

REPORT TO:
QUALITY ASSURANCE
CAPITAL STEEL & WIRE, INC

240 SOUTH BRIDGE STREET
SUITE 300
DEWITT , MI 48820

SHIP TO:
CAPITAL STEEL & WIRE
CUSTOMER PICKUP AT MILL

LANSING , MI 48910

ORDERED

GRADE	SIZE	LENGTH
4140	1 1/4" RND	20'

CUSTOMER SPECIFICATION(S)
AISI 4140 (5.0 MIN DI AIM)

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Ni	Cr	Mo	Cu	Sn	Al
0.41	0.85	0.012	0.020	0.26	0.05	1.00	0.18	0.21	0.008	0.049

V	Nb
0.002	0.002

GRAIN SIZE — SPECIFICATION ASTM E112 - FINE GRAIN 5-8

HARDNESS — SPECIFICATION ASTM E10

CENTER	MID RADIUS	SURFACE
311.0	321.0	285.0

APPROVED
By Lai at 3:20 pm, Feb 18, 2016

PAGE 1

We certify that these data are correct and in compliance with specified requirements.

Gerdau Monroe
3000 East Front Street
Monroe, MI 48161

Wendy J. Craig

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	M52574	DATE	2/12/2016
WAS USED TO MAKE PART NO.	9K-295-02018-2NP	PO NO	4510953387
ACM QUALITY DEPT	[signature]	QUANTITY	103

MTR #260

GERDAU

GERDAU SPECIAL STEEL NORTH AMERICA
3671 NORTH ROAD
JACKSON, MICHIGAN 49201

CERTIFIED MATERIAL TEST REPORT

CUSTOMER ORDER NUMBER	CUSTOMER PART NUMBER	HEAT NUMBER	WORK ORDER NUMBER	DATE
2343		M52574	284185 101	11/15/13

Danielle Caet

REPORT TO
QUALITY ASSURANCE
CAPITAL STEEL & WIRE, INC

240 SOUTH BRIDGE STREET
SUITE 300
DEWITT , MI 48820

SOLD TO
CAPITAL STEEL & WIRE
CUSTOMER PICKUP AT MILL

LANSING , MI 48910

ORDERED

GRADE	SIZE	LENGTH
4140	1 1/4" RND	20'

CUSTOMER SPECIFICATIONS
AISI 4140 (5.0 MIN DI AIM)

HARDENABILITY SPECIFICATION ASTM A304

THEORETICAL

J1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20	22	24	26	28	30	32	34
57	57	57	57	57	57	57	55	54	52		50		48		46	45	45		43		40		38	

MICROCLEANLINESS SPECIFICATION ASTM E45 METHOD A

	A		B		C		D	
	T	H	T	H	T	H	T	H
F1	1.5	0.0	0.0	0.0	0.0	0.0	1.0	0.0
F2	1.5	0.0	0.5	0.0	0.0	0.0	1.0	0.0
M1	1.0	0.0	0.5	0.0	0.0	0.0	1.0	0.0
M2	1.5	0.0	0.0	0.0	0.0	0.0	1.0	0.0
B1	1.5	0.0	0.0	0.0	0.0	0.0	1.0	0.0
B2	1.5	0.0	0.5	0.0	0.0	0.0	1.0	0.0
WORST CASE	1.5	0.0	0.5	0.0	0.0	0.0	1.0	0.0

MACROCLEANLINESS

PLATE I

	S	R	C
FRONT	1	1	1
MIDDLE	1	1	1
BACK	1	1	1
AVERAGE	1	1	1

PLATE II

NONE

APPROVED
By Lai at 3:21 pm, Feb 18, 2016

PAGE 2

We certify that these data are correct and in compliance with specified requirements.

Gerdau Monroe
3000 East Front Street
Monroe, MI 48161

Wendy J. Craig
QUALITY ASSURANCE REPRESENTATIVE

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	M52574	DATE	2/12/2016
WAS USED TO MAKE PART NO.	9K-295-02018-2NP	PO NO	4510953387
ACM QUALITY DEPT		QUANTITY	103

MTR #260

GERDAU

GERDAU SPECIAL STEEL NORTH AMERICA
3100 NORRIS ROAD
JACKSON, MICHIGAN 49201

CERTIFIED MATERIAL TEST REPORT

CUSTOMER ORDER NUMBER	CUSTOMER PART NUMBER	HEAT NUMBER	WORK ORDER NUMBER	DATE
2343		M52574	284185 101	11/15/13

Danieli Cast

REPORT TO:
QUALITY ASSURANCE
CAPITAL STEEL & WIRE, INC

240 SOUTH BRIDGE STREET
SUITE 300
DEWITT , MI 48820

SHIP TO:
CAPITAL STEEL & WIRE
CUSTOMER PICKUP AT MILL

LANSING , MI 48910

ORDERED

GRADE	SIZE		LENGTH
4140	1 1/4"	RND	20'

CUSTOMER SPECIFICATIONS
AISI 4140 (5.0 MIN DI AIM)

DI CALCULATION

5.3

REDUCTION RATIO

RATIO= 29.3 TO 1.0

** MATERIAL 100% MELTED AND MANUFACTURED IN THE U.S.A. BY THE ELECTRIC ARC FURNACE AND CONTINUOUS CASTING METHOD. THE PRODUCT HAS NOT BEEN REPAIRED BY WELDING AND THIS MATERIAL HAS NOT BEEN EXPOSED TO MERCURY OR TO ANY OTHER METAL ALLOY THAT IS LIQUID AT AMBIENT TEMPERATURES DURING PROCESSING OR WHILE IN OUR POSSESSION. GERDAU MONITORS ALL INCOMING SCRAP AND ALL HEATS OF STEEL TO ENSURE THAT PRODUCTS SHIPPED ARE FREE OF RADIOACTIVE MATERIAL.

APPROVED
By Lai at 3:22 pm, Feb 18, 2016

We certify that these data are correct and in compliance with specified requirements.

Gerdau Monroe
3000 East Front Street
Monroe, MI 48161

Wendy J. Craig
Quality Assurance Representative

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	M52574	DATE	2/12/2016
WAS USED TO MAKE PART NO.	9K-295-02018-2NP	PO NO	4510953387
ACM QUALITY DEPT		QUANTITY	103

MTR #260

KREHER STEEL COMPANY, LLC.

Certificate of Mill Test Results

ACM MACHINING, INC.

SO # : 268936-001

Pg 1/2

HOT ROLLED ROUNDS A350LF2
3.0000 X 20
PART NO.

PO/Rel 101205

I hereby certify that this data is correct as contained in the records of this company.
I hereby certify that no mercury came in contact with or no weld repair was done to this product while in our possession.

Attn:

Steel Dynamics, Inc.
Engineered for Precision Division

5300 N. County Road 225 East
Pittsboro, IN 46167
Phone: (317) 892-7900
Fax: (317) 892-7225

Certified Material Test Report

Cert # : 191408	Mill Order : 1418117	Heat # : CB103779	Issued : 2/24/2015 09:29:14
Work Order : 177928	Sales Order : 136730-1	Customer : Kreher Steel Company	PO # : 42155-1
Load # : 223441	Reference # :	Reference Desc :	End Use :
Size : 3"	Shape : Round	Grade : A350/LF2 Chem	Length : 20'
Grain Practice : Al Fine Grain (5-8) per ASTM A29		Reduction Ratio : 20.3 to 1	Disposition : Rolled Prime

Ladle Chemistry Analysis (ASTM A29)

C	Mn	P	S	Si	Al	Cu	Ni	Cr	Mo	Sn	N	V	Cb	B	Ca	W	Ti	Di
0.16	1.10	0.009	0.002	0.25	0.035	0.15	0.06	0.08	0.02	0.011	0.0080	0.035	0.001	0.0002	0.0020		0.003	

Pb	Co	As	Sb	Zr	Bi	H	O	Ceq	J-Factor
0.004		0.004	0.002			1.3		0.49	

Product Check Analysis (ASTM A29)

	C	Mn	P	S	Si	Al	Cu	Ni	Cr	Mo	Sn	N	V	Cb	Ti	B	Ca	O
Front																		
Back																		

Jominy (ASTM A255)

	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J12	J14	J16	J18	J20	J24	J28	J32
Calc'd																		
Front																		
Back																		

Microcleanliness (ASTM E45)

Method A								Method C		Method E	
AT	AH	BT	BH	CT	CH	DT	DH	S	O	SAM "B"	SAM "D"

Microcleanliness (DIN 50602)

K		M	
S	O	Tot	Tot

Decarb

Depth	% of Diameter

Grainsize

Austenitic	Ferritic

Microstructure (ASTM E381)

S	R	C

Magnetic Particle Inspection

Frequency	Severity

Mechanical Properties (ASTM A370)

Tensile Properties					Hardness	
Tensile Strength	0.2% Yield Strength	% Elong (2")	% RDA	0.35% EUL Yield Strength	(HR)	(Sum)

Comments/Specs

Electric Arc Furnace Melted - Vacuum Tank Degassed — Normalize and Machine Straighten — Normalize and Machine Straighten — Cameron MS-021034-01-02 Rev 3

Condition : Normalize, Straighten, Contact UT

UT: Passed Ultrasonic Inspection

I hereby certify that the content of this report is correct and accurate, and that all tests and operations performed on this material were in compliance with applicable material specifications and purchaser designated requirements.

Trevor Klopp - Rolling Mill Metallurgist

Any alteration to this report voids Steel Dynamic's warranting of results. No weld repair has been performed on this material. This material is not radioactive and has not been exposed to radioactivity while under the control of Steel Dynamics. This material has not been exposed to mercury while under the control of Steel Dynamics. Unless otherwise noted, this material was melted, continually cast, and rolled in the USA; w/ all testing performed by Steel Dynamics.

Steel Dynamics Rev Level 1 [108] - 341

reviewed_on

APPROVED
By Lai at 1:46 pm, Feb 18, 2016

Part No.
Lot No. 8945

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	CB103779	DATE	2/12/2016
WAS USED TO MAKE PART NO	9K-293-02063-V1	PO NO	4510985586
ACM QUALITY DEPT		QUANTITY	169

MTR #70

KREHER STEEL COMPANY, LLC.

ACM MACHINING, INC.
HOT ROLLED ROUNDS A350LF2
3.0000 X 20'
PART NO.

PO/Rel 101205

I hereby certify that this data is correct as contained in the records of this company.
I hereby certify that no mercury came in contact with or no weld repair was done to this product while in our possession
Attn:

Certificate of Mill Test Results

SO # -268906-001

Steel Dynamics, Inc.
Engineered Bar Products Division

9000 N. County Road 225 East
Pittsboro, IN 46167
Phone: (317) 892-7000
Fax: (317) 892-7219

Certified Material Test Report
Heat Treatment Addendum

Cert # : 191405	Mill Order : 1418117	Heat # : CB103779	Issued : 2/24/2015 09:29:16
Work Order : 177926	Sales Order : 136739-1	Customer : Kreher Steel Company	PO # : 42155-1
Load # : 223441	Reference # :	Reference Desc :	End Use :
Size : 3"	Shape : Round	Grade : A350/LF2 Chem	Length : 20'

Normalize		Austenitize		Quench Media			Temper		Stress Relieve	
Time	Temp	Time	Temp	Type	Time	Temp	Time	Temp	Time	Temp
3.5 hrs	1870 F	hrs	°F		min	°F	hrs	°F	hrs	F

* Furnaces are calibrated to API 5A Annex M, and use atmospheric thermocouples.
** QTC is 12" prolongation from longitudinal orientation ,machined to a 0.505" buttonhead for tensile.

Charpy Impact (ASTM E23) (v-notch 1 10mm x 10mm)

Sample ID	Orientation	Location		Temp(F)	Impact Energy (ft-lbs) 1	2	3	Avg	Lateral Expansion (0.001") 1	2	3	Avg	% Shear 1	2	3	Avg
26800	Longitudinal	Mid-Radius	Q1	-50	38	74	48	53	38	53	74	55	20	30	20	23

Hardness (ASTM A370)

Sample ID	Location		HB
26800	Mid-Radius	Q1	148

Surface Hardness (ASTM A370)

Sample ID	Location		HB
26804	Surface	Q1	144

Tensile (ASTM A370)

Sample ID	Orientation	Location		Tensile	0.2% Yield	%E (2")	%RDA
26800	Longitudinal	Mid-Radius	Q1	74,400 psi	47,700 psi	31	69

APPROVED
By Lai at 1:47 pm, Feb 18, 2016

I hereby certify that the content of this report is correct and accurate, and that all tests and operations performed on this material were in compliance with applicable material specifications and purchaser designated requirements.

Garrett Bourett - Bar Finishing Metallurgist

Any alteration to this report voids Steel Dynamic's warranting of results.

Steel Dynamics Rev Level 1(108) - 350

retrieve_on

Part No. _____
Lot No. 8945

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	CB103779	DATE	2/12/2016
WAS USED TO MAKE PART NO.	9K-293-02063-V1	PO NO	4510985586
ACM QUALITY DEPT		QUANTITY	169

MTR # 260

Suzhou Dongwu Forging&Welding Co.,Ltd

MILL TEST CERTIFICATE REPORT

Purchaser: CAMERON Cert. No. 1411018-2 Date: 7/Dec/2014

PO No.:	4510564672		Certificatie type	EN 10204, 3.1, 2004	Tensile Test bar	Dimension	Section	Length	Testing Temperature (℃)	Brinell Hardness	Load (Kg)	Locatio n	Impact Test	Testing Temp.	Type	Dim. (mm)	Orientation
Material Specification	ASTM A350 LF2&MS-021009-01-01 REV17		Melting Practice	E.F.		(mm)	(mm^2)	(mm)						-46℃ max	V-Notch	10 x 10 x 55	Longitudinal
			Test performed on	QTC Piece	Actual	12.5	122	50	room temperature	Actual	3000	Surface	Actual	-46	V-Notch	10 x 10 x 55	Longitudinal

Heat Treatment	Temperature(°C)	Time (h)	Cooling Method
QUENCHED	900°C	6	In water
TEMPERED	600°C	10	In Air

Item No	Description	Part No.	Qty	Heat No.	Heat Treatment Lot No.		Chemical Composition % C	Mn	Si	S	P	Cr*	Mo*	Ni*	Cu*	V*	Nb*	CE	Mechanical Properties YS (Mpa)	UTS (Mpa)	EL (%)	ROA (%)	Hardness (HBW)	Impact Test Energy value (J) No. 1	No. 2	No. 3	Average (J)
						Min		0.6	0.15										250	485	22	30	143	161 (S)			201
						Max	0.21	1.35	0.3	0.03	0.03	0.3	0.12	0.4	0.4	0.05	0.02	0.43		655			197				
00010	CLOSURE-RF-FORG LF2 02 150 B4B	9K-RS-11-V-073	100	141711	141203H03		0.2	0.95	0.21	0.007	0.014	0.07	0.002	0.05	0.03	0.002	0.001	0.36	400	543	33	75	163	144	92	136	124

We hereby certify that the material provided complies with all CVM requirements as stated in the applicable purchase order and certified in accordance to EN 10204-3.1 .

Surveyor's Name, Signature & Date: Dong Cong Inspector's Name, Signature & Date: Wu Lin

APPROVED
By laia at 2:20 pm, 2/2/15

MTC #260

Suzhou Dongwu Forging&Welding Co.,Ltd

MILL TEST CERTIFICATE REPORT

Purchaser: CAMERON Cert. No. 1503029- Date: 25/Mar/2015

PO No.:	4510691000		Certificatie type	EN 10204, 3.1, 2004		Tensile Test bar	Dimension	Section	Length	Testing Temperature (℃)	Brinell Hardness	Load (Kg)	Location	Impact Test	Testing Temp.	Type	Dim. (mm)	Orientation
Material Specification	ASTM A350 LF2&MS-021009-01-01 REV1B		Melting Practice	E.F.			(mm)	(mm^2)	(mm)						-46℃ max	V-Notch	10 x 10 x 55	Longitudinal
			Test performed on	QTC	Piece	Actual	12.5	122	50	room temperature	Actual	3000	Surface	Actual	-46	V-Notch	10 x 10 x 55	Longitudinal

Heat Treatment	Temperature(°C)	Time (h)	Cooling Method
QUENCHED	900°C	6	In water
TEMPERED	600°C	12	In Air

Item No	Description	Part No.	Qty	Heat No.	Heat Treatment Lot No.		Chemical Composition %												Mechanical Properties					Impact Test				
							C	Mn	Si	S	P	Cr*	Mo*	Ni*	Cu*	V*	Nb*	CE	YS (Mpa)	UTS (Mpa)	EL (%)	ROA (%)	Hardness (HBW)	Energy value (J) No. 1	No. 2	No. 3	Average (J)
						Min		0.6	0.15										250	485	22	30	143	16J (S)			20J
						Max	0.21	1.35	0.3	0.03	0.03	0.3	0.12	0.4	0.4	0.05	0.02	0.43		655			197				
00020	CLOSURE-RF-FORG LF2 02 150 B4B	9K-RS-11-V-073	100	15E336	1503191108		0.2	0.95	0.2	0.008	0.013	0.035	0.003	0.02	0.028	0.002	0.001	0.36	430	540	35	72	163	75	80	80	78

We hereby certify that the material provided complies with all CVM requirements as stated in the applicable purchase order and certified in accordance to EN 10204-3.1 .

Surveyor's Name, Signature & Date: Dong Cong Inspector's Name, Signature & DateWu Lin

APPROVED
By laia at 12:57 pm, 4/24/15

MTR # 260

JIANGYIN XINYU FORGING CO.,LTD

MATERIAL CERTIFICATION

Conforms to DIN 50049.3.1 & BS EN 10204.3.1

Ref. PO#: 101003

QTY: 150NOS

CUSTOMER NAME	ACM Machining, inc	Reduction ratio	>3	Melting practice	EF+LF+VD	CERT. NO.	ACM-2SBB
SPECIFICATION	ASTM A350 LF2 (MS-021009-01-01 REV13)	Manufacturing Process	Heat treatment->Rough machining			CERT. DATE	September27,2014

Item No.	Forging Logo.	Heat No.	QTY	Part No.	Desc.	Chemical Composition (%)												Mechanical Properties (Charpy Speciman Size: 10MMX10MMX55MM CVN Orientation: Longitudinal)								Heat treatment		
						C	Mn	Si	S	P	Cr	Mo	Ni	Cu	V	Nb	CE	Yield (MPa)	Tensile (MPa)	El.2" (%)	Roa (%)	HB	Impact (J @-46°C)			Batch No.	C140911	
																											Temperature	Time
					Min.		0.60	0.15										250	485	22	30	143	20(A)/16(S)			Quenching	900℃	4h
					Max.	0.21	1.35	0.30	0.030	0.030	0.30	0.12	0.40	0.40	0.05	0.02	0.43		655			197				Tempering	620℃	5h
1C	XY	XY-0196	150	F0020 1C	2"body	0.21	0.97	0.19	0.010	0.015	0.03	0.002	0.01	0.02	0.003	0.018	0.38	350	525	37	75	158	110	96	91	Water Quench	18℃	Start
																											23℃	End

VISUAL INSPECTION:PASSED

We hereby certify that the items described herein have been inspected as above in accordance with ASTM-A350 Section 8.

QUALITY INSPECTOR: Zhao Qin QUALITY MANAGER: Xiao Hongli

Part No.
Lot No. 8714

APPROVED
By laia at 1:09 pm, 3/24/15

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO	XY-0196	DATE	3/18/15
WAS USED TO MAKE PART NO.	9K-290V02110-9	PO NO	4510636006
ACM QUALITY DEPT	Vivek Gathani	QUANTITY	123

M1L #260

14C225
14C226

江苏长强钢铁有限公司

JIANGSU CHANGQIANG IRON&STEEL CO.,LTD

棒材（管坯）产品质量证明书

QUALITY CERTIFICATE FOR STEEL BARS (PIPE BILLETS)

订货单位:_____ 产品名称:热轧圆钢 许可证编号:TS2732136-2016 质证书编号:No13145

收货单位:江阴正腾金属材料有限公司 总支数: 96 件 执行标准:客户标准 车船号:苏NU7501#

合同号:_____ 重量: 100.885 吨 牌号: LF2 日期:2013年12月24日

序号	轧批号	炉号	规格(mm	数量(支)	重量(t)	化学成份(%) C	Mn	Si	P	S	Cr	Ni	Cu	MO	V	Nb	Al	Ti	As	[O] ×10⁻⁴	[N] ×10⁻⁴	[H] ×10⁻⁴
1	13-09-459	11-313200	150*150	41	43.055	0.21	0.97	0.19	0.015	0.010	0.03	0.01	0.02	0.002	0.003	0.018	0.015			XY-01	96	
2	13-10-814	11-313208	150*150	55	57.830	0.20	0.95	0.19	0.013	0.012	0.02	0.01	0.02	0.002	0.003	0.019	0.011					
3																						
4																						
5																						
6																						

序号	力学性能、工艺性能 抗拉强度 Rm Mpa	屈服点 Rel Mpa	延伸率 A %	收缩率 Z %	冲击功 Akv J	冷弯	顶锻	低倍组织检验（级） 一般疏松		中心疏松		偏析		高倍组织检验（级） A 细	A 粗	B 细	B 粗	C 细	C 粗	D 细	D 粗	交货状态
1								0	0	1.0	1.5	0	0									热轧
2								0	0	1.0	1.0	0	0									
3																						
4																						
5																						
6																						

说明：1、酸浸低倍组织只填报疏松与偏析级别，白点、皮下汽泡、缩孔等标准规定不允许有的缺陷，我们均保证符合标准出厂，故只检验，不填报

2、有异议时请标明牌号、炉号、规格、发货日期、原因，并保供货状态的实物，出示质量证明原件。

证书章 江苏长强钢铁有限公司 检验专用章 改邦

地址：江苏省江阴开发区靖江园区惠丰信箱32-6号 电话：0510-88610693

APPROVED
By laia at 1:09 pm, 3/24/15

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	XY-0196	DATE 3/18/15
WAS USED TO MAKE PART NO.	9K-290V02110-9	PO NO 4510636006
ACM QUALITY DEPT	Vlad Bakhal	QUANTITY 123

MTR # 760

CAMERON

VALVE PRESSURE TEST FORM

PRODUCT / WORK ORDER INFORMATION

Work Order #: 120729609 Valve Serial # : 120729609-01/08

SO # / PO #: MRL 3371290/0151 Test Specification : 5A-MI-22 Rev. 07

Part #: 9K-9K-4602F01F02AX004 Description : 2" 150 BHC FxF NACE w/wrench P.R.

Shell Test	Pressure (PSIG)	Duration (Min.)	Pass / Fail	Gauge #	Range	Cal Date
Hydrostatic	450	2	☑ ☐	C1P81, C1P82	0-7500 psi	2/28/16
Nitrogen			☐ ☐			

Seat Test	Pressure (PSIG)	Duration (Min.)	Left Seat	Right Seat	DB&B	Gauge #/Range/Cal Date
			Pass / Fail	Pass / Fail	Pass / Fail	
Hydrostatic	325	2	☑ ☐	☑ ☐	☑ ☐	C1P81, C1P82 0-7500 psi 2/28/16
Nitrogen			☐ ☐	☐ ☐	☐ ☐	
Air			☐ ☐	☐ ☐		

DIB Test	Pressure (PSIG)	Duration (Min.)	DIB-1 (DPE)	DIB-2 (SRxDPE)		Gauge #/Range/Cal Date
(Inside-Out)	N/A		Pass / Fail	Pass / Fail		
Hydrostatic			☐ ☐	☐ ☐		
Nitrogen			☐ ☐	☐ ☐		

Body Bleed Closed: ☑ Yes Charts Req: ☐ Yes ☒ No Confirm Valve is drained and dried : ☑ Yes

Comments / Special Customer Requests:

Tested by(Initials) /Date /Serial # PMD Feb. 24/16 120729609-07,08

Tested by (Initials) /Date /Serial # FV Feb. 24, 2016 #01, #02, #03, #04, #05, #06

QC Reviewed & Approved:	Date:	Customer Rep:	Date:	The above specified requirements have been quality inspected and accepted.
	FEB 25 2016			

MTR # 250

CAMERON

Monday Feb-22-2016

From:

Cameron Canada
3707 97 Street

Edmonton,Alberta,Canada
T6E 6J2
780-468-2732

To:

Subject:

Serial: 120726802 Quantity/Series : -01 to -06

Comment:

Part Number:	9K-4C03F01FO2AX004
Description:	BV 03X03 RF B4C 150 CS/1M WRENCH X004
Sales Order:	N/A
Purchase Order:	N/A

MTR #267

CAMERON

Friday Feb-26-2016

From:

Cameron Canada
3707 97 Street

Edmonton,Alberta,Canada
T6E 6J2
780-468-2732

To:

Subject:

Serial: 120731109 Quantity/Series : -01 to -09

Comment:

Part Number:	9K-4C02F01FO2AX004
Description:	02" 150 B4C FXF NACE W/WRENCH P.R.
Sales Order:	N/A
Purchase Order:	N/A

MTR # 261

CAMERON

Friday Feb-26-2016

From:

Cameron Canada
3707 97 Street
Edmonton,Alberta,Canada
T6E 6J2
780-468-2732

To:

Document Summary Page

The MTR's are printed in the following order:

#	Heat #	Heat Code	Part Description	Product
1	GROVE		Grove B4, B5 Sour Low Temp.	--LOC
2	8006		BALL 1018/A105/LF2 w/ENC 02 150/600 B4	9K-292-02031-8
3	A130628		TRUNNION-UNPLATED 02 0600 B4C	9K-293-02017-V2NP
4	M52574		STEM, GROVE B4, 02 150/1500, 4140 NON PLATED	9K-295-02018-2NP
5	CB103779		PLATE-GLAND (FIRESAFE) 02 0150/900 B4C	9K-293-02063-V1
6	14E711		CLOSURE-RF-FORG LF2 02 150 B4B	9K-RS-11-V-073
7	XY-0196		BODY-FIRESAFE w/1/2"NPT PORT, 02 150/300 B4B,	9K-290V02110-9

MTR # 261

VALVES & MEASUREMENT
Cameron Canada Corporation
3707 – 97 Street
Edmonton Alberta Canada T6E 6J2
Phone 780.463.6868
Fax 780.465.1244
www.c-a-m.com

LETTER OF COMPLIANCE

for:

GROVE BRAND TRUNNION VALVES

Model B4, B5 - Sour Low Temperature Service

Cameron Valves & Measurement hereby certifies that the design, manufacture, sampling, testing and quality control inspection of the GROVE brand CSA Z245.15 ball valves for Sour Low Temperature Service meet the requirements of CSA Z245.15-13 Sour Service, V&M Engineering Standards, and customer purchase order requirements. As part of compliance to these specifications, the valves are marked in accordance with MSS SP-25. The valves are also marked "SOUR" as required by CSA Z245.15-13 marking requirements for Sour Service and are suitable for use in CSA Z662 Pipeline systems.

The materials of construction for these valves conform to the metallurgical requirements of NACE MR0175/ISO 15156:2009 (Parts 1 & 2 for Carbon & Alloy Steels in SSC Region 3 Sour Service and Parts 1 & 3 for CRA's as specified in CSA Z245.15-13 Chapter 13). According to NACE MR0175-2009/ISO 15156, it is the customer's / user's responsibility to ensure that the valve materials will be satisfactory in the intended service.

The minimum service temperature of these valves is -46°C/-50°F. Impact testing has been performed in accordance with applicable ASTM requirements and those of CSA Z245.15-13 for Category II M45C Service.

The ASTM A320 Grade L7M studs and cap screws and ASTM Grade A194 7ML nuts used in the products specified above have been Quality Control inspected and meet the requirements of the applicable ASTM specifications – as is already implied fully by the statements above regarding both CSA and NACE standards compliance.

Approved by: _____
Greg Ogaranko, M.Eng. P. Eng.
Engineering Manager

08/10/15
Engrg Ref#: EWR10619-01 Rev05.docx

Control Doc#: 5A-EX-17 Rev01

MTR #261

QIUBAO VALVE CO.,LTD.

MATERIAL TEST CERTIFICATE

Certified in accordance to EN10204 3.1

QB/CX11.02 REV D

Customer	CAMERON-VALGRO	Raw Material Supplier	TsingShan special steel	Certificate No.	F2015-4527
P.O Number	4510858120	Production Name	Ball of ball valve	Certificate Date	10/8/2015
Specificate	ASTM A350 LF2	Customer Standard/Rev.	MS-021034-(01)-(02) REV.04	Melting Practice	E.F.V.D

1. Production Description

No.	Forgings Log	Heat No.	Item No.	Size&Class	Part No./Rev.	Raw Material	Qty.
1	KP	8006	00010	02 150/600 B4	9K-292-02031-8(02)		300
2							
3							
4							
5							

2. Chemical Composition (%)

No.	Forgings Log	Heat No.	Element	C	Mn	Si	S	P	Cr	Ni	Mo	Cu	V	Nb
			Min		0.60	0.15								
			Max	0.21	1.35	0.30	0.030	0.030	0.30	0.40	0.120	0.40	0.050	0.020
1	KP	8006		0.20	0.63	0.24	0.009	0.021	0.09	0.03	0.002	0.03	0.002	0.003
2														
3														
4														
5														

No	Forgings Log	Heat No.	Element	N	Nb+Ta	Al	Ti	W	CE.	Cr+Mo	Cu+Ni+Cr +Mo+V	PREN
			Min									
			Max						0.43	0.32	1.00	
1	KP	8006							0.33	0.09	0.15	
2												
3												
4												
5												

3. Heat Treatment Process

No	H.T Date	Heat Treatment	H.T Lot No.	Temp. (℃)	Hold Time	Cooling Medium	Temp. (℃)	Hold Time	Cooling Medium	Temp. (℃)	Hold Time	Cooling Medium
1	2015-9-19	Quenching and Tempering	JG091703-202	900	2	Water	600	4	Air			
2												
3												
4												
5												

4. Mechanical Properties

No	Forgings Log	Heat No.	Item	Tensile Test				Hardness(HBW)	Impact Test Akv (J)		-46℃	
				Tensile (Mpa)	Yield0.2 (Mpa)	EL.2" (%)	Roa. (%)		Specimen Size:10×10×55			
			Min	485	250	22	30	143	Single Value		Min:	21
			Max	655				197	Average Value		Min:	27
1	KP	8006		555	365	33.5	67.5	158	126	130	128	128
2												
3												
4												
5												

1. We certify that all results are in accordance to the specification and meet ASTM A350 LF2.

2. After the examination, the test result of nuclear value for the above materials is less than 0.3 u Sv/h.

Quality Inspector _____

Q.A Manager _____

Add:Dongou Industrial Estate, Oubei Town, Yongjia County, Zhejiang Province, China Tel:0086-577-67377183 Fax:0086-577-67377177 Http://www.qiubaovalve.com E-mail:quality@qiubaovavle.com

APPROVED
By hughesa at 7:10 am, 12/29/15

MTR # 261

QIUBAO VALVE CO.,LTD.

ENP INSPECTION REPORT

Customer Name	CAMERON-VALGRO	Production Name	Ball of Ball Valve	Report No.
P.O. NO.	4510858120\00010	Production Material	LF2 Class1 ENP0.0127-0.025mm	Inspection Date
Production Size	02 150/600 B4	Production Quantity	300PCS	Post Heat Treatment
Drawing(Part) No.	9K-292F02031(02)\9K-292-02031-8(02)	Carry out Standard	9K-VG-6(REV03)	Heat No.

Inspection Process Description

1.Adhesion Test

Adhesion test as per ASTM B571 the sample was bend at 180 degree over a Mandrel of Same size as was observed.

2.Porosity Test

Ferroxyl test carried out as per ASTM B733 9.6.1 standard to check for porosity. None were found.

3.Visual Test

The job was inspected for visual defect like peeling, blistering etc. None Were found.

4.Thickness Test

The thickness was measured on coupon and was found to be 0.014-0.025mm With Thickness Testing

5.Composition Test

The job were plated with E.N.P having average phosphorus content of 12.52% and Remaining being

6.Hardness Test

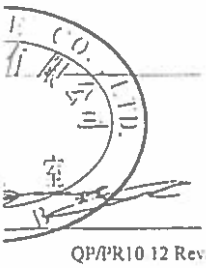
Hardness after plating average ≥850HV at 100 gm load.

Conclusion	(√)Conformity ( )Non-Conformity		
Inspector	Gaojuhe	Q.A Manager	

APPROVED
By hughesa at 7:06 am, 12/29/15

MTR # 261

ENP-Z04740
9/28/2015
400℃/1hour
KP8006
s sample No peelin
g Machin
; nicke



MTR #261

Steel Dynamics, Inc.
Engineered Bar Products Division

8000 N. County Road 225 East
Pittsboro, IN 46167
Phone: (317) 892-7000
Fax: (317) 892-7285

Certified Material Test Report

Cert # : 148437
Work Order : 142320
Load # : 178373
Size : 3-1/2"
Grain Practice : Al Fine Grain (5-8) per ASTM A29

Mill Order : 1301928
Sales Order : 113448-1
Reference # :
Shape : Round

Heat # : A130628
Customer : Solid Steel Co, INC
Reference Desc :
Grade : A350/LF2 Chem
Reduction Ratio : 14.9 to 1

Issued : 4/30/2013 18:05:09
PO # : 021813-1-1
End Use :
Length : 20'00"
Disposition : 1

Ladle Chemistry Analysis (ASTM A29)

C	Mn	P	S	Si	Al	Cu	Ni	Cr	Mo	Sn	N	V	Cb	B	Ca	W	Ti	DI
0.18	1.05	0.009	0.002	0.23	0.025	0.19	0.08	0.18	0.03	0.011	0.0085	0.038	0.001	0.0004	0.0017	0.000	0.001	0.89

Pb	Co	As	Sb	Zr	Bi	H	O	Ceq	J-Factor
0.000	0.006	0.005	0.002	0.001	0.001	1.7		0.42	

Product Check Analysis (ASTM A29)

	C	Mn	P	S	Si	Al	Cu	Ni	Cr	Mo	Sn	N	V	Cb	Ti	B	Ca	O
Front																		
Back																		

Jominy (ASTM A255)

	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J12	J14	J16	J18	J20	J24	J28	J32
Calc'd																		
Front																		
Back																		

Microcleanliness (ASTM E45)

Method A								Method C		Method E	
AT	AH	BT	BH	CT	CH	DT	DH	S	O	SAM "B"	SAM "D"

Microcleanliness (DIN 50602)

K		M	
S	O	Tot	Tot

Decarb

Depth	% of Diameter

Grainsize

Austenitic	Ferritic

Macrostructure (ASTM E381)

S	R	C

Magnetic Particle Inspection

Frequency	Severity

Mechanical Properties (ASTM A370)

Tensile Properties				Hardness	
Tensile Strength	0.2% Yield Strength	% Elong (2")	% ROA	(MR)	(Surf)

Steel Dynamics - Engineered Bar Products has a quality system in place which has been certified ISO 9001:2008 compliant, including PED certification

Comments/Specs

ASTM A576-90b (Reapproved 2012) — Electric Arc Furnace Melted - Vacuum Tank Degassed — ASTM A350-12 LF2 — EN 10204:2004 3.1 — Normalize and Machine Straighten — NACE MR-01-75 / ISO 15156 -2009

APPROVED
By Lai at 12:57 pm, Dec 10, 2015

Part No. 20232
Lot No. 7699

Condition : Straighten

I hereby certify that the content of this report is correct and accurate, and that all tests and operations performed on this material were in compliance with applicable material specifications and purchaser designated requirements.

Dylan Kale
Dylan Kale - Rolling Mill Metallurgist

Any alteration to this report voids Steel Dynamic's warranting of results. No weld repair has been performed on this material. This material is not radioactive and has not been exposed to radioactivity while under the control of Steel Dynamics. This material has not been exposed to mercury while under the control of Steel Dynamics. Unless otherwise noted, this material

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	A130628	DATE	12/3/15
WAS USED TO MAKE PART NO.	9K-293-02017-V2NP	PO NO	4510944296
ACM QUALITY DEPT		QUANTITY	120

MTR # 261

Steel Dynamics, Inc.
Engineered Bar Products Division

8000 N. County Road 225 East
Pittsboro, IN 46167
Phone: (317) 892-7000
Fax: (317) 892-7285

Certified Material Test Report

Heat Treatment Addendum

Cert # : 148437
Work Order : 142320
Load # : 178373
Size : 3-1/2"

Mill Order : 1301928
Sales Order : 113448-1
Reference # :
Shape : Round

Heat # : A130628
Customer : Solid Steel Co, INC
Reference Desc :
Grade : A350/LF2 Chem

Issued : 4/30/2013 18:05:10
PO # : 021813-1-1
End Use :
Length : 20'00"

Normalize		Austenitize		Quench Media		Temper		Stress Relieve	
Time	Temp	Time	Temp	Type	Time	Temp	Time	Temp	Time	Temp
3.5 hrs	1670 F	hrs	°F	Water	min	°F	hrs	°F	hrs	F

* Furnaces are calibrated to API 6A Annex P, and use atmospheric thermocouples.
** QTC is 12" prolongation from longitudinal orientation ,machined to a 0.505" buttonhead for tensile

Charpy Impact (ASTM E23) (v-notch | 10mm x 10mm)

Sample ID	Orientation	Location		Temp(F)	Impact Energy (ft-lbs) 1	2	3	Avg	Lateral Expansion (0.001") 1	1	3	Avg	% Shear 1	2	3	Avg
62401	Longitudinal	1" Below	Q1	-50	82	51	50	61	52	33	30	38	40	30	30	33

Hardness (ASTM A370)

Sample ID	Location		HB
62401	1" Below	Q1	155

Tensile (ASTM A370)

Sample ID	Orientation	Location		Tensile	0.2% Yield	%E (2")	%ROA
62401	Longitudinal	1" Below	Q1	75,800 psi	52,200 psi	30	63

APPROVED
By Lai at 12:59 pm, Dec 10, 2015

Part No. 20232
Lot No. 7699

I hereby certify that the content of this report is correct and accurate, and that all tests and operations performed on this material were in compliance with applicable material specifications and purchaser designated requirements.

Garrett Bouyett - Bar Finishing Metallurgist

Any alteration to this report voids Steel Dynamic's warranting of results.

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	A130628	DATE	12/3/15
WAS USED TO MAKE PART NO.	9K-293-02017-V2NP	PO NO	4510944296
ACM QUALITY DEPT		QUANTITY	120 MTL # 281

CMC Commercial Metals

CMC IMPACT METALS PENNSYLVANIA
1024 Manning Pike
Clicors PA 16025-2030
800-682-7337
www.cmcimpactmetals.com

Material Test Report

Production Date
01.07.2014

Dixie Nuelle

Dixie Nuelle, Quality Assurance

Quality Management System certified to ISO 9001:2008 and Pressure Equipment Directive (PED) 97/23/EC 7/2, Annex I, Paragraph 4.3 by SRI Quality System Registrar, Reg. # 3034-00

Sold To:	Ship To:
Capital Steel & Wire Inc 240 S Bridge St, Ste 300 Dewitt MI 48820-8825 US	Capital Steel & Wire Inc 240 S Bridge St, Ste 300 Dewitt MI 48820-8825 US

Customer PO No.	PO 2735	BOL No.	Delivery No.	Sales Order No.
Customer Part No.		930571	81162192	1382425

Product Description	Alternate Grades :
ROUND:SBQ 1-1/4" 20R 4140 , 4140QT 237HB Max 100T 75Y CVN	PROCESSED PER MS-012502-01-03
Processing Quench and Temper, RND - Straighten 1/8" in 5 ft	

CHEMICAL ANALYSIS

Heat No.	C (%)	Mn (%)	P (%)	S (%)	Si (%)	Cu (%)	Cr (%)	Ni (%)	Mo (%)	V (%)	Cb (Nb) (%)	Al (%)
M52574	0.41	0.85	0.012	0.020	0.26	0.21	1.00	0.09	0.180	0.002		0.049

Batch No.	Ti (%)	B (%)	As (%)	Pb (%)	Sb (%)	Zr (%)	N_2 (ppm)	O_2 (ppm)	H_2 (ppm)	DI (In.)	CE (%)	
M52574H394										5.31	0.81	

Jominy Test (HRC)	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J11	J12	J13	J14	J15	J16	J18	J20	J22	J24	J26	J28	J30	J32

THERMAL PROCESSING

Furnace No.	Austenitizing Time / Temp.°F)	Tempering Time / Temp. (°F)	Normalizing Time / Temp. (°F)	Stress Relieving Time / Temp.(°F)	Quench Media Temp. (°F)
H10394	56 Min/ 1625	160 Min/ 1300			Water /

Notes : Full Charpy = 10mmX10mm

Test	Tensile Test: Yield 0.2% (ksi)	Tensile (ksi)	Elongation (%)	Reduction of Area (%)	Yield at 0.6 % Elongation Under Load (ksi)	Yield at 0.02 % (ksi)	Test Orientation	Test Location	Hardness Test: Brinell (BHN)	Test Location	Rockwell	Test Location
1	94.4	107.7	26	65			Longitudinal	Center	217	Surface		
2									217	Mid Radius		
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												

APPROVED
By Lai at 3:18 pm, Feb 18, 2016

Part No. 6003 9295
Lot No. 295

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	M52574	DATE	2/12/2016
WAS USED TO MAKE PART NO.	9K-295-02018-2NP	PO NO	4510953387
ACM QUALITY DEPT		QUANTITY	103

MTR # 261

CMC Commercial Metals

CMC IMPACT METALS PENNSYLVANIA
1024 Kittanning Pike
Chicora PA 16025-2030
888-582-7337
www.cmcimpactmetals.com

Material Test Report

Production Date	01.07.2014
Heat No.	M52574
Furnace No.	H10394

Dixie Nuelle

Dixie Nuelle, Quality Assurance

CHARPY IMPACT TESTS

Test	Average*	Specimen 1*	Shear	Lateral Expansion	Specimen 2*	Shear	Lateral Expansion	Specimen 3*	Shear	Lateral Expansion	Test Temp.	Size	Location	Orientation
	ft-lb	ft-lb	%	in.	ft-lb	%	in.	ft-lb	%	in.	°F			
1	113.7	118.0	100	0.075	110.5	100	0.072	112.5	100	0.072	-50	Full	Center	Longitudinal
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														
16														
17														
18														

INCLUSION RATING

Method								
Test	Thin (T)	Heavy (H)	Thin (T)	Heavy (H)	Thin (T)	Heavy (H)	Thin (T)	Heavy (H)
1								
2								
3								

OTHER TESTS

Grain Size	Decarburization	Macrostructure Method /Result	Reduction Ratio	Ultrasonic Test
Method:		ASTM E381		
		SRC	29:1	

Part No. 6 Dowel
Lot No. 5016

Additional Comments

APPROVED
By Lai at 3:19 pm, Feb 18, 2016

Country of Origin : United States

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	M52574	DATE	2/12/2016
WAS USED TO MAKE PART NO.	9K-295-02018-2NP	PO NO	4510953387
ACM QUALITY DEPT	Phil Garcia	QUANTITY	103

MTR # 261

GERDAU

GERDAU SPECIAL STEEL NORTH AMERICA
5461 MONROE ROAD
JACKSON, MICHIGAN 49201

CERTIFIED MATERIAL TEST REPORT

CUSTOMER SALES NUMBER	CUSTOMER PART NUMBER	HEAT NUMBER	WORK ORDER NUMBER	DATE
2343		M52574	284185 101	11/15/13

Danieli Cast

REPORT TO
QUALITY ASSURANCE
CAPITAL STEEL & WIRE, INC

240 SOUTH BRIDGE STREET
SUITE 300
DEWITT , MI 48820

SHIP TO
CAPITAL STEEL & WIRE
CUSTOMER PICKUP AT MILL

LANSING , MI 48910

ORDERED

GRADE	SIZE	LENGTH
4140	1 1/4" RND	20'

CUSTOMER SPECIFICATION(S)
AISI 4140 (5.0 MIN DI AIM)

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Ni	Cr	Mo	Cu	Sn	Al
0.41	0.85	0.012	0.020	0.26	0.09	1.00	0.18	0.21	0.006	0.049

V	Nb
0.002	0.002

GRAIN SIZE SPECIFICATION ASTM E112 - FINE GRAIN 5-8

HARDNESS SPECIFICATION ASTM E10

CENTER	MID RADIUS	SURFACE
311.0	321.0	285.0

APPROVED
By Lai at 3:20 pm, Feb 18, 2016

PAGE 1

We certify that these data are correct and in compliance with specified requirements.

Gerdau Monroe
3000 East Front Street
Monroe, MI 48161

Wendy J. Craig

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	M52574	DATE	2/12/2016
WAS USED TO MAKE PART NO.	9K-295-02018-2NP	PO NO	4510953387
ACM QUALITY DEPT		QUANTITY	103

MTR #261

GERDAU

TOKYO SPECIAL STEEL NORTH AMERICA
1551 MERRILL ROAD
JACKSON, MICHIGAN 49201

CERTIFIED MATERIAL TEST REPORT

CUSTOMER ORDER NUMBER	CUSTOMER PART NUMBER	HEAT NUMBER	WORK ORDER NUMBER	DATE
2343		M52574	284185 101	11/15/13

Danieli Cast

REPORT TO
QUALITY ASSURANCE
CAPITAL STEEL & WIRE, INC

240 SOUTH BRIDGE STREET
SUITE 300
DEWITT , MI 48820

SOLD TO
CAPITAL STEEL & WIRE
CUSTOMER PICKUP AT MILL

LANSING , MI 48910

ORDERED

GRADE	SIZE	LENGTH
4140	1 1/4" RND	20'

CUSTOMER SPECIFICATIONS
AISI 4140 (5.0 MIN DI AIM)

HARDENABILITY SPECIFICATION ASTM A304

THEORETICAL

J1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20	22	24	26	28	30	32	34
57	57	57	57	57	57	57	55	54	52		50		48		46	45	45		43		40		38	

MICROCLEANLINESS SPECIFICATION ASTM E45 METHOD A

	A		B		C		D	
	T	H	T	H	T	H	T	H
F1	1.5	0.0	0.0	0.0	0.0	0.0	1.0	0.0
F2	1.5	0.0	0.5	0.0	0.0	0.0	1.0	0.0
M1	1.0	0.0	0.5	0.0	0.0	0.0	1.0	0.0
M2	1.5	0.0	0.0	0.0	0.0	0.0	1.0	0.0
B1	1.5	0.0	0.0	0.0	0.0	0.0	1.0	0.0
B2	1.5	0.0	0.5	0.0	0.0	0.0	1.0	0.0
WORST CASE	1.5	0.0	0.5	0.0	0.0	0.0	1.0	0.0

MACROCLEANLINESS

PLATE I

	S	R	C
FRONT	1	1	1
MIDDLE	1	1	1
BACK	1	1	1
AVERAGE	1	1	1

PLATE II

NONE

APPROVED
By Lai at 3:21 pm, Feb 18, 2016

We certify that these data are correct and in compliance with specified requirements.

Gerdau Monroe
3000 East Front Street
Monroe, MI 48161

Wendy J. Craig
Quality Assurance Representative

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	M52574	DATE	2/12/2016
WAS USED TO MAKE PART NO.	9K-295-02018-2NP	PO NO	4510953387
ACM QUALITY DEPT		QUANTITY	103

MTR # 261

GERDAU

GERDAU SPECIAL STEEL NORTH AMERICA
3100 NORRIS ROAD
JACKSON, MICHIGAN 49201

CERTIFIED MATERIAL TEST REPORT

CUSTOMER ORDER NUMBER	CUSTOMER PART NUMBER	HEAT NUMBER	MORE GROUP NUMBER	DATE
2343		M52574	284185 101	11/15/13

Danieli Cast

EXPORT TO

QUALITY ASSURANCE
CAPITAL STEEL & WIRE, INC

240 SOUTH BRIDGE STREET
SUITE 300
DEWITT , MI 48820

SHIP TO

CAPITAL STEEL & WIRE
CUSTOMER PICKUP AT MILL

LANSING , MI 48910

ORDERED

GRADE	SIZE	LENGTH
4140	1 1/4" RND	20'

CUSTOMER SPECIFICATIONS

AISI 4140 (5.0 MIN DI AIM)

DI CALCULATION

5.3

REDUCTION RATIO

RATIO= 29.3 TO 1.0

** MATERIAL 100% MELTED AND MANUFACTURED IN THE U.S.A. BY THE ELECTRIC ARC FURNACE AND CONTINUOUS CASTING METHOD. THE PRODUCT HAS NOT BEEN REPAIRED BY WELDING AND THIS MATERIAL HAS NOT BEEN EXPOSED TO MERCURY OR TO ANY OTHER METAL ALLOY THAT IS LIQUID AT AMBIENT TEMPERATURES DURING PROCESSING OR WHILE IN OUR POSSESSION.
GERDAU MONITORS ALL INCOMING SCRAP AND ALL HEATS OF STEEL TO ENSURE THAT PRODUCTS SHIPPED ARE FREE OF RADIOACTIVE MATERIAL.

APPROVED
By Lai at 3:22 pm, Feb 18, 2016

We certify that these data are correct and in compliance with specified requirements.

Gerdau Monroe
3000 East Front Street
Monroe, MI 48161

Wendy J. Craig
Quality Assurance Representative

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	M52574	DATE	2/12/2016
WAS USED TO MAKE PART NO.	9K-295-02018-2NP	PO NO	4510953387
ACM QUALITY DEPT		QUANTITY	103

MTR # 261

KREHER STEEL COMPANY, LLC.

ACM MACHINING, INC.
HOT ROLLED ROUNDS A350LF2
3.0000 X 20
PART NO.

PO/Rel 101205
I hereby certify that this data is correct as contained in the records of this company.
I hereby certify that no mercury came in contact with or no weld repair was done to this product while in our possession.
Attn:

Certificate of Mill Test Results

SO # -268936-001 12Jan14

Steel Dynamics, Inc.
Engineered Bar Products Division
5000 N. County Road 225 East
Pittsboro, IN 46167
Phone: (317) 892-7990
Fax: (317) 892-7218

Certified Material Test Report

Cert # : 191408	Mill Order : 1418117	Heat # : CB103779	Issued : 2/24/2015 09:29:14
Work Order : 177928	Sales Order : 136739-1	Customer : Kreher Steel Company	PO # : 42155-1
Load # : 223441	Reference # :	Reference Desc :	End Use :
Size : 3"	Shape : Round	Grade : A350/LF2 Chem	Length : 20'
Grain Practice : Al Fine Grain (5-8) per ASTM A29		Reduction Ratio : 20.3 to 1	Disposition : Rolled Prime

Ladle Chemistry Analysis (ASTM A29)

C	Mn	P	S	Si	Al	Cu	Ni	Cr	Mo	Sn	N	V	Cb	B	Ca	W	Ti	Di
0.18	1.10	0.009	0.002	0.25	0.035	0.15	0.09	0.08	0.02	0.011	0.0080	0.035	0.001	0.0002	0.0020		0.003	

Pb	Co	As	Sb	Zr	Bi	H	O	Ceq	J-Factor
0.004		0.004	0.002			1.3		0.40	

Product Check Analysis (ASTM A29)

	C	Mn	P	S	Si	Al	Cu	Ni	Cr	Mo	Sn	N	V	Cb	Ti	B	Ca	O
Front																		
Back																		

Jominy (ASTM A255)

	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J12	J14	J16	J18	J20	J24	J28	J32
Calc'd																		
Front																		
Back																		

Microcleanliness (ASTM E45)

Method A								Method C		Method E	
AT	AH	BT	BH	CT	CH	DT	DH	S	O	SAM "B"	SAM "D"

Microcleanliness (DIN 50602)

K		M	
S	O	Tot	Tot

Decarb		Grainsize		Macrostructure (ASTM E381)			Magnetic Particle Inspection	
Depth	% of Diameter	Austenitic	Ferritic	S	R	C	Frequency	Severity

Mechanical Properties (ASTM A370)

Tensile Properties					Hardness	
Tensile Strength	0.2% Yield Strength	% Elong (2")	% ROA	0.35% EUL Yield Strength	(MR)	(Surf)

Comments/Specs

Electric Arc Furnace Melted - Vacuum Tank Degassed — Normalize and Machine Straighten — Normalize and Machine Straighten — Cameron MS-021034-01-02 Rev 3

Condition : Normalize, Straighten, Contact UT

UT: Passed Ultrasonic Inspection

I hereby certify that the content of this report is correct and accurate, and that all tests and operations performed on this material were in compliance with applicable material specifications and purchaser designated requirements.

Trevor Kipp - Rolling Mill Metallurgist

Any alteration to this report voids Steel Dynamic's warranting of results. No weld repair has been performed on this material. This material is not radioactive and has not been exposed to radioactivity while under the control of Steel Dynamics. This material has not been exposed to mercury vapor under the control of Steel Dynamics. Unless otherwise noted, this material was melted, continually cast, and rolled in the USA; w/ all testing performed by Steel Dynamics.

Steel Dynamics Rev Level 1 (103) - 341

reviewer_cn

APPROVED
By Lai at 1:46 pm, Feb 18, 2016

Part No.
Lot No. B945

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	CB103779	DATE	2/12/2016
WAS USED TO MAKE PART NO.	9K-293-02063-V1	PO NO	4510985586
ACM QUALITY DEPT		QUANTITY	169

MTR #261

KREHER STEEL COMPANY, LLC.

Certificate of Mill Test Results

SO 1 -268906-001 12Jan14

Pg 2/2

ACM MACHINING, INC.
HOT ROLLED ROUNDS A350LF2
3.0000 X 30'
PART NO.

PO/Rel 101205

I hereby certify that this data is correct as contained in the records of this company.
I hereby certify that no mercury came in contact with or no weld repair was done to this product while in our possession.
Attn:

Steel Dynamics, Inc.
Engineered for Positive Results

6000 N. County Road 225 East
Pittsboro, IN 46167
Phone: (317) 892-7000
Fax: (317) 892-7239

Certified Material Test Report
Heat Treatment Addendum

Cert # : 191408	Mill Order : 1418117	Heat # : CB103779	Issued : 2/24/2015 09:29:16
Work Order : 177926	Sales Order : 138739-1	Customer : Kreher Steel Company	PO # : 42155-1
Load # : 223441	Reference # :	Reference Date :	End Use :
Size : 3"	Shape : Round	Grade : A350/LF2 Chem	Length : 20'

Normalize		Austenitize		Quench Media			Temper		Stress Relieve	
Time	Temp	Time	Temp	Type	Time	Temp	Time	Temp	Time	Temp
3.6 hrs	1870 F	hrs	°F		min	°F	hrs	°F	hrs	F

* Furnaces are calibrated to API 5A Annex M, and use atmospheric thermocouples.
** CTC is 12" prolongation from longitudinal orientation, machined to a 0.505" buttonhead for tensile.

Charpy Impact (ASTM E23) (v-notch | 10mm x 10mm) — Impact Energy (ft-lbs) — Lateral Expansion (0.001") — % Shear

Sample ID	Orientation	Location		Temp(F)	Impact Energy 1	2	3	Avg	Lateral Expansion 1	2	3	Avg	% Shear 1	2	3	Avg
26800	Longitudinal	Mid-Radius	Q1	-50	38	74	48	53	38	53	74	55	20	30	20	23

Hardness (ASTM A370)

Sample ID	Location		HB
26800	Mid-Radius	Q1	149

Surface Hardness (ASTM A370)

Sample ID	Location		HB
26804	Surface	Q1	144

Tensile (ASTM A370)

Sample ID	Orientation	Location		Tensile	0.2% Yield	%E (2")	%ROA
26800	Longitudinal	Mid-Radius	Q1	74,400 psi	47,700 psi	31	69

APPROVED
By Lai at 1:47 pm, Feb 18, 2016

I hereby certify that the content of this report is correct and accurate, and that all tests and operations performed on this material were in compliance with applicable material specifications and purchase or designated requirements.

Garrett Bouyett - Bar Finishing Metallurgist

Any alteration to this report voids Steel Dynamic's warranting of results.

Page 1 of 1 — Steel Dynamics Rev Level 1 (108) - 360 — retrieve_cn

Part No. _____
Lot No. 8945

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	CB103779	DATE	2/12/2016
WAS USED TO MAKE PART NO.	9K-293-02063-V1	PO NO	4510985586
ACM QUALITY DEPT		QUANTITY	169

MTR # 761

Suzhou Dongwu Forging&Welding Co.,Ltd

MILL TEST CERTIFICATE REPORT

Purchaser: CAMERON Cert. No. 1411018-2 Date: 7/Dec/2014

PO No.:	4510564672		Certificatie type	EN 10204, 3.1, 2004	Tensile Test bar	Dimension	Section	Length	Testing Temperature (℃)	Brinell Hardness	Load (Kg)	Location	Impact Test	Testing Temp.	Type	Dim. (mm)	Orientation
Material Specification	ASTM A350 LF2&MS-021009-01-01 REV17		Melting Practice	E.F.		(mm)	(mm^2)	(mm)						-46℃ max	V-Notch	10 x 10 x 55	Longitudinal
			Test performed on	QTC Piece	Actual	12.5	122	50	room temperature	Actual	3000	Surface	Actual	-46	V-Notch	10 x 10 x 55	Longitudinal

Heat Treatment	Temperature(°C)	Time (h)	Cooling Method
QUENCHED	900°C	6	In water
TEMPERED	600°C	10	In Air

Item No	Description	Part No.	Qty	Heat No.	Heat Treatment Lot No.		Chemical Composition %												Mechanical Properties					Impact Test				
							C	Mn	Si	S	P	Cr*	Mo*	Ni*	Cu*	V*	Nb*	CE	YS (Mpa)	UTS (Mpa)	EL (%)	ROA (%)	Hardness (HBW)	Energy value (J) No. 1	No. 2	No. 3	Average (J)
						Min		0.6	0.15										250	485	22	30	143	161 (S)			201
						Max	0.21	1.35	0.3	0.03	0.03	0.3	0.12	0.4	0.4	0.05	0.02	0.43		655			197				
00020	CLOSURE-RF-FORG LF2 02 150 B4B	9K-RS-11-V-073	100	14E711	1412031103		0.2	0.95	0.21	0.007	0.014	0.07	0.002	0.05	0.03	0.002	0.001	0.36	400	543	33	75	163	144	92	136	124

We hereby certify that the material provided complies with all CVM requirements as stated in the applicable purchase order and certified in accordance to EN 10204-3.1 .

Surveyor's Name, Signature & Date: Dong Cong

Inspector's Name, Signature & DateWu Lin

APPROVED
By laia at 2:20 pm, 2/2/15

MTR # 261

APPROVED
By lala at 9:59 am, 12/17/14

14C225
14C226

江苏长强钢铁有限公司

JIANGSU CHANGQIANG IRON&STEEL CO.,LTD

棒材（管坯）产品质量证明书

QUALITY CERTIFICATE FOR STEEL BARS (PIPE BILLETS)

订货单位:_____ 产品名称:热轧圆钢 许可证编号:TS2732136-2016 质证书编号:No13145

收货单位:江阴正腾金属材料有限公司 总支数: 96 件 执行标准:客户标准 车船号:苏NU7501#

合同号:_____ 重量: 100.885 吨 牌号: LF2 日期:2013年12月24日

序号	轧批号	炉号	规格(mm)	数量(支)	重量(t)	化学成份(%) C	Mn	Si	P	S	Cr	Ni	Cu	MO	V	Nb	Al	Ti	As	[O] ×10⁻⁶	[N] ×10⁻⁴	[H] ×10⁻⁶
1	13-09-459	11-313200	150*150	41	43.055	0.21	0.97	0.19	0.015	0.010	0.03	0.01	0.02	0.002	0.003	0.018	0.015			XY-0196		
2	13-10-814	11-313208	150*150	55	57.830	0.20	0.95	0.19	0.013	0.012	0.02	0.01	0.02	0.002	0.003	0.019	0.011					
3																						
4																						
5																						
6																						

序号	力学性能、工艺性能 抗拉强度 Rm Mpa	屈服点 ReL Mpa	延伸率 A %	收缩率 Z %	冲击功 Akv J	冷弯	顶锻	低倍组织检验（级） 一般疏松		中心疏松		偏析		高倍组织检验（级） A 细	A 粗	B 细	B 粗	C 细	C 粗	D 细	D 粗	交货状态
1								0	0	1.0	1.5	0	0									热轧
2								0	0	1.0	1.0	0	0									
3																						
4																						
5																						
6																						

说明：1、酸浸低倍组织只填报疏松与偏析级别，白点、皮下汽泡、缩孔等标准规定不允许有的缺陷，我们均保证符合标准出厂，故只检验，不填报

2、有异议时请标明牌号、炉号、规格、发货日期、原因，并保供货状态的实物，出示质量证明原件。

证书章 江苏长强钢铁有限公司 检验专用章 审核:[illegible]改邦 地址：江苏省江阴开发区靖江园区惠丰信箱32-6号 电话：0510-88610693

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	XY-0196	DATE	12-8-14
WAS USED TO MAKE PART NO.	9K-290V02110-9	PO NO	4510559049
ACM QUALITY DEPT	Vlasiki Baltsan4	QUANTITY	145

192 件 2 LW

JIANGYIN XINYU FORGING CO.,LTD

MATERIAL CERTIFICATION

Conforms to DIN 50049.3.1 & BS EN 10204.3.1

Ref. PO#: 101003 QTY: 150NOS

CUSTOMER NAME	ACM Machining, inc	Reduction ratio	>3	Melting practice	EF+LF+VD	CERT. NO.	ACM-258B
SPECIFICATION	ASTM A350 LF2 (MS-021009-01-01 REV13)	Manufacturing Process	Heat treatment->Rough machining			CERT. DATE	September27,2014

Item No.	Forging Logo.	Heat No.	QTY	Part No.	Desc.	Chemical Composition (%)												Mechanical Properties (Charpy Speciman Size: 10MMX10MMX55MM CVN Orientation: Longitudinal)								Heat treatment		
						C	Mn	Si	S	P	Cr	Mo	Ni	Cu	V	Nb	CE	Yield (MPa)	Tensile (MPa)	El.2" (%)	Roa (%)	HB	Impact (J @-46°C)			Batch No.	C140911	
																											Temperature	Time
					Min.		0.60	0.15										250	485	22	30	143	20(A)/16(S)			Quenching	900℃	4h
					Max.	0.21	1.35	0.30	0.030	0.030	0.30	0.12	0.40	0.40	0.05	0.02	0.43		655			197				Tempering	620℃	5h
1C	XY	XY-0196	150	F002B 1C	1"body	0.21	0.97	0.19	0.010	0.015	0.03	0.002	0.01	0.02	0.003	0.018	0.38	350	525	37	75	158	110	96	91	Water Quench	18℃	Start
																											23℃	End

VISUAL INSPECTION:PASSED

We hereby certify that the items described herein have been inspected as above in accordance with ASTM-A350 Section 8.

QUALITY INSPECTOR: Zhao Qin QUALITY MANAGER: Xiao Hongli

Part No.
Lot No. 8714

APPROVED
By laia at 10:14 am, 12/17/14

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	XY-0196	DATE	12-8-14
WAS USED TO MAKE PART NO.	9K-290V02110-9	PO NO	4510559049
ACM QUALITY DEPT	Vasiliy Baltacha	QUANTITY	145

MTR #261

CAMERON

VALVE PRESSURE TEST FORM

PRODUCT / WORK ORDER INFORMATION

Work Order #: 120731109 Valve Serial # : 120731109 - 01/09

SO # / PO #: MRC 3371290/0150 Test Specification : 5A-MI-22 Rev. 07

Part #: 9K-4C02F01F02AX004 Description : 2" 150 B4C FxF NACE w/wrench P.R.

Shell Test	Pressure (PSIG)	Duration (Min.)	Pass / Fail	Gauge #	Range	Cal Date
Hydrostatic	450	2	☑ ☐	C1PB1, C1PB2	0-7500psi	2/28/17
Nitrogen			☐ ☐			

Seat Test	Pressure (PSIG)	Duration (Min.)	Left Seat	Right Seat	DB&B	Gauge #/Range/Cal Date
			Pass / Fail	Pass / Fail	Pass / Fail	
Hydrostatic	325	2	☑ ☐	☑ ☐	☑ ☐	C1PB1, C1PB2 0-7500psi 2/28/17
Nitrogen			☐ ☐	☐ ☐	☐ ☐	
Air			☐ ☐	☐ ☐		

DIB Test	Pressure (PSIG)	Duration (Min.)	DIB-1 (DPE)	DIB-2 (SRxDPE)		Gauge #/Range/Cal Date
(Inside-Out)	N/A		Pass / Fail	Pass / Fail		
Hydrostatic			☐ ☐	☐ ☐		
Nitrogen			☐ ☐	☐ ☐		

Body Bleed Closed: ☑ Yes | Charts Req: ☐ Yes ☒ No | Confirm Valve is drained and dried : ☑ Yes

Comments / Special Customer Requests:

Tested by(Initials) /Date /Serial # PMD Feb. 29/16 120731109 - 01/09

Tested by (Initials) /Date /Serial #

QC Reviewed & Approved:	Date:	Customer Rep:	Date:	The above specified requirements have
CCV	FEB 29 2016			been quality inspected and accepted.

MRC #261

CAMERON

Monday Feb-22-2016

From:

Cameron Canada
3707 97 Street
Edmonton,Alberta,Canada
T6E 6J2
780-468-2732

To:

Document Summary Page

The MTR's are printed in the following order:

#	Heat #	Heat Code	Part Description	Product
1	GROVE		Grove B4, B5 Sour Low Temp.	--LOC
2	8006		BALL, 03 150/600 ASTM A350 LF2 1 MIL ENC	9K-292-03024-8
3	XY-0156		TRUNNION(NP) SPECIAL 03 150/900 B4	9K-293V03011-V2NP
4	M51349		STEM, GROVE B4, 03" 150/900, 4140 NON PLATED	9K-295-03023-NP
5	XY-0223		PLATE-GLAND (FIRESAFE) 03 0600 B4C	9K-293-03042-V1
6	15E826		CLOSURE RF 3" 150# B4B/B4C	9K-RS-11-V-493
7	14E1447		CLOSURE RF 3" 150# B4B/B4C	9K-RS-11-V-493
8	15E491		CLOSURE RF 3" 150# B4B/B4C	9K-RS-11-V-493
9	XY-0227		BODY (F.S.) 1/2 NPT 03 150/300 B4B	9K-290V03101-9

MTR # 267

VALVES & MEASUREMENT
Cameron Canada Corporation
3707 – 97 Street
Edmonton Alberta Canada T6E 6J2
Phone 780.463.6868
Fax 780.465.1244
www.c-a-m.com

LETTER OF COMPLIANCE

for:

GROVE BRAND TRUNNION VALVES

Model B4, B5 - Sour Low Temperature Service

Cameron Valves & Measurement hereby certifies that the design, manufacture, sampling, testing and quality control inspection of the GROVE brand CSA Z245.15 ball valves for Sour Low Temperature Service meet the requirements of CSA Z245.15-13 Sour Service, V&M Engineering Standards, and customer purchase order requirements. As part of compliance to these specifications, the valves are marked in accordance with MSS SP-25. The valves are also marked "SOUR" as required by CSA Z245.15-13 marking requirements for Sour Service and are suitable for use in CSA Z662 Pipeline systems.

The materials of construction for these valves conform to the metallurgical requirements of NACE MR0175/ISO 15156:2009 (Parts 1 & 2 for Carbon & Alloy Steels in SSC Region 3 Sour Service and Parts 1 & 3 for CRA's as specified in CSA Z245.15-13 Chapter 13). According to NACE MR0175-2009/ISO 15156, it is the customer's / user's responsibility to ensure that the valve materials will be satisfactory in the intended service.

The minimum service temperature of these valves is -46°C/-50°F. Impact testing has been performed in accordance with applicable ASTM requirements and those of CSA Z245.15-13 for Category II M45C Service.

The ASTM A320 Grade L7M studs and cap screws and ASTM Grade A194 7ML nuts used in the products specified above have been Quality Control inspected and meet the requirements of the applicable ASTM specifications – as is already implied fully by the statements above regarding both CSA and NACE standards compliance.

Approved by: _____
Greg Ogarenko, M.Eng. P. Eng.
Engineering Manager

08/10/15
Engrg Ref#: EWR10619-01 Rev05.docx

Control Doc#: 5A-EX-17 Rev01

MTR #267

QIUBAO VALVE CO.,LTD.

MATERIAL TEST CERTIFICATE

Certified in accordance to EN10204 3.1

QB/CX11.02 REV D

Customer	CAMERON-VALGRO	Raw Material Supplier	TsingShan special steel	Certificate No.	F2015-4529
P.O Number	4510858120	Production Name	Ball of ball valve	Certificate Date	10/8/2015
Specificate	ASTM A350 LF2	Customer Standard/Rev.	MS-021034-(01)-(02) REV.04	Melting Practice	E.F.V.D

1. Production Description

No.	Forgings Log	Heat No.	Item No.	Size&Class	Part No./Rev.	Raw Material	Qty.
1	KP	8006	00020	03 150/600 B4C	9K-292-03024-8(02)		125
2							
3							
4							
5							

2. Chemical Composition (%)

No.	Forgings Log	Heat No.	Element	C	Mn	Si	S	P	Cr	Ni	Mo	Cu	V	Nb
			Min		0.60	0.15								
			Max	0.21	1.35	0.30	0.030	0.030	0.30	0.40	0.120	0.40	0.050	0.020
1	KP	8006		0.20	0.63	0.24	0.009	0.021	0.09	0.03	0.002	0.03	0.002	0.003
2														
3														
4														
5														

No.	Forgings Log	Heat No.	Element	N	Nb+Ta	Al	Ti	W	CE.	Cr+Mo	Cu+Ni+Cr +Mo+V	PREN
			Min									
			Max						0.43	0.32	1.00	
1	KP	8006							0.33	0.09	0.15	
2												
3												
4												
5												

3. Heat Treatment Process

No.	H.T Date	Heat Treatment	H.T Lot No.	Temp. (℃)	Hold Time	Cooling Medium	Temp. (℃)	Hold Time	Cooling Medium	Temp. (℃)	Hold Time	Cooling Medium
1	2015-9-19	Quenching and Tempering	JG091703-202	900	2	Water	600	4	Air			
2												
3												
4												
5												

4. Mechanical Properties

No.	Forgings Log	Heat No.	Item	Tensile Test				Hardness(HBW)	Impact Test Akv (J)		-46℃	
				Tensile (Mpa)	Yield0.2 (Mpa)	EL.2" (%)	Roa. (%)		Specimen Size:10×10×55			
			Min	485	250	22	30	143	Single Value		Min.	21
			Max	655				197	Average Value		Min.	27
1	KP	8006		555	365	33.5	67.5	158	126	130	128	128
2												
3												
4												
5												

1.We certify that all results are in accordance to the specification and meet ASTM A350 LF2.

2. After the examination, the test result of nuclear value for the above materials is less than 0.3 u Sv/h.

Quality Inspector _____

Q.A Manager _____

Add: Dongou Industrial Estate, Oubei Town, Yongjia County, Zhejiang Province, China Tel:0086-577-67377183 Fax:0086-577-67377177 Http://www.qiubaovalve.com E-mail:quality@qiubaovalve.com

APPROVED
By hughesa at 7:09 am, 12/29/15

MTR # 267

QBLO

QIUBAO VALVE CO.,LTD.

ENP INSPECTION REPORT

Customer Name	CAMERON-VALGRO	Production Name	Ball of Ball Valve	Report No.	ENP-Z04741
P.O. NO.	4510858120\00020	Production Material	LF2 Class1 ENP0.0127-0.025mm	Inspection Date	9/28/2015
Production Size	03 150/600 B4C	Production Quantity	125PCS	Post Heat Treatment	400℃/1hour
Drawing(Part) No.	9K-292F03024(02)\9K-292-03024-8(02)	Carry out Standard	9K-VG-6(REV03)	Heat No.	KP8006

Inspection Process Description

1.Adhesion Test

Adhesion test as per ASTM B571 the sample was bend at 180 degree over a Mandrel of Same size as sample No peeling was observed.

2.Porosity Test

Ferroxyl test carried out as per ASTM B733 9.6.1 standard to check for porosity. None were found.

3.Visual Test

The job was inspected for visual defect like peeling, blistering etc. None Were found.

4.Thickness Test

The thickness was measured on coupon and was found to be 0.014-0.025mm With Thickness Testing Machine.

5.Composition Test

The job were plated with E.N.P having average phosphorus content of 12.52% and Remaining being nickel.

6.Hardness Test

Hardness after plating average ≥850HV at 100 gm load.

Conclusion	(√)Conformity ( )Non-Conformity		
Inspector	Gaojuhe	Q.A Manager	

QP/PR10.12 Rev.A

APPROVED
By hughesa at 7:06 am, 12/29/15

MTR # 267

JIANGYIN XINYU FORGING CO.,LTD

MATERIAL CERTIFICATION

Conforms to DIN 50049.3.1 & BS EN 10204.3.1

Ref. PO#: 80593

QTY: 2000NOS

CUSTOMER NAME	ACM Machining, Inc	Reduction ratio	>3	Melting practice	EF+LF+VD	CERT. NO.	ACM-2438
SPECIFICATION	ASTM A350 LF2 (MS-021009-01-01 REV.13)	Manufacturing Process	Heat treatment->Rough machining			CERT. DATE	February 21,2014

Item No.	Forging Logo.	Heat No.	QTY	Part No.	Desc.	Chemical Composition (%)												Mechanical Properties Charpy Specimen Size: 10MM*10MM*55MM CVN Orientation: Longitudinal								Heat treatment		
						C	Mn	Si	S	P	Cr	Mo	Ni	Cu	V	Nb	CE	Yield (MPa)	Tensile (MPa)	1.2" (%)	Ros (%)	HB	Impact (J @-46°C)			Batch No.	C14012S	
					Min.		0.60	0.15										250	485	22	30	143	20(A)/16(S)			Quenching	900℃	3.5h
					Max.	0.21	1.35	0.30	0.030	0.030	0.30	0.12	0.40	###	0.05	0.02	0.43		655			197				Tempering	620℃	6.5h
1	XY	XY-0156	1000	GPL-03-1500-00700	3"Gland Plate	0.21	0.92	0.24	0.004	0.014	0.02	0.02	0.01	0.01	0.006	0.008	0.37	342	530	36	68	165	85	76	94	Water Quench	21℃	Start
																										24℃	End
2	XY	XY-0156	1000	TRN-03-1500-00700	3"Trunnion	0.21	0.92	0.24	0.004	0.014	0.02	0.02	0.01	0.01	0.006	0.008	0.37	342	530	36	68	165	85	76	94			

VISUAL INSPECTION:PASSED

We hereby certify that the items described herein have been inspected as above in accordance with ASTM-A350 Section 8.

QUALITY INSPECTOR: Zhao Qin QUALITY MANAGER: Xiao Hongli

Part No. 20146

Lot No. 816

APPROVED

By Lai at 12:55 pm, Oct 20, 2015

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	XY-0156	DATE	10/15/15
WAS USED TO MAKE PART NO.	9K-293V03011-V2NP	PO NO	4510848021
ACM QUALITY DEPT		QUANTITY	39

MTR #67

13C989
13C990

江苏长强钢铁有限公司

JIANGSU CHANGQIANG IRON&STEEL CO.,LTD

棒材(管坯)产品质量证明书

QUALITY CERTIFICATE FOR STEEL BARS (PIPE BILLETS)

表单编号:CQ/04/01-02H

订货单位:
收货单位: [redacted]
合同号:

产品名称:热轧圆管坯　许可证编号:TS2732136-2016　质证书编号:№8814
总件数: 4 件　执行标准: 客户标准　车船号:苏BF67725
总重量:19.455 吨　牌　号:LF2　日　期:2013年08月24日

序号	轧批号	炉号	规格(mm)	件数	重量(t)	化学成份(%) C	Mn	Si	P	S	Cr	Ni	Cu	Mo	Ti	Als	Nb	V	As	[O] x 10^{-6}	[N] x 10^{-6}	[H] x 10^{-4}
1	13-06-533	13-109078	Φ65	2	9.295	0.23	0.91	0.23	0.029	0.009	0.03	0.01	0.01									
2	13-07-1085	13-108996	Φ80	2	10.160	0.21	0.92	0.24	0.014	0.004	0.02	0.01	0.01			XY-0156						
3																						
4																						
5																						
6																						

序号	力学性能、工艺性能 抗拉强度 Rm Mpa	屈服点 ReL Mpa	延伸率 A %	收缩率 Z %	冲击功 Akv J	冷弯	顶锻	低倍组织检验(级) 一般疏松		中心疏松		偏析		高倍组织检验(级) A 细	A 粗	B 细	B 粗	C 细	C 粗	D 细	D 粗	交货状态
1								0	0	1.0	1.0	0	0									
2								1.0	1.0	0	0	0	0									
3																						
4																						
5																						
6																						

热轧

说明:1、酸浸低倍组织只填报疏松与偏析级别。白点、皮下气泡、缩孔等标准规定不允许有的缺陷,我们均保证符合标准出厂,故只检验,不填报。

2、有异议时请标明批号、炉号、规格、发货日期、原因,并保留供货状态的实物,出示质量证明原件。

江苏长强钢铁有限公司 证书检验专用章

毛改邦

地址:江苏省江阴开发区璜江园区思丰信箱32-6号　电话:0510-88610693　邮编:214532

APPROVED
By Lai at 12:55 pm, Oct 20, 2015

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	XY-0156	DATE	10/15/15
WAS USED TO MAKE PART NO.	9K-293V03011-V2NP	PO NO	4510848021
ACM QUALITY DEPT		QUANTITY	39

MTR #274

CMC Commercial Metals

CMC IMPACT METALS PENNSYLVANIA
1024 Kittanning Pike
Chicora PA 16025-2030
888-682-7337
www.cmcimpactmetals.com

Material Test Report

Production Date
12.20.2013

Dixie Nuelle

Dixie Nuelle, Quality Assurance

Quality Management System certified to ISO 9001:2008 and Pressure Equipment Directive (PED) 97/23/EC 7/2, Annex I, Paragraph 4.3 by SRI Quality System Registrar. Reg. # 7079-00

*Cert certificate does not apply to Medical products per Sec 3.7.5

Sold To:	Ship To:
Capital Steel & Wire Inc 240 S Bridge St, Ste 300 Dewitt MI 48820-8825 US	Capital Steel & Wire Inc 240 S Bridge St, Ste 300 Dewitt MI 48820-8825 US

Customer PO No.	PO 2576	BOL No.	Delivery No.	Sales Order No.
Customer Part No.		926043	81156002	1325732

Product Description
ROUND:SBQ 1-3/4" 20R 4140 , 4140QT 237HB Max 100T 75Y CVN

Alternate Grades :
PROCESSED PER MS-012502-01-03

Processing
Quench and Temper, RND - Straighten 1/8" in 5 ft

CHEMICAL ANALYSIS

Heat No.	C (%)	Mn (%)	P (%)	S (%)	Si (%)	Cu (%)	Cr (%)	Ni (%)	Mo (%)	V (%)	Cb (Nb) (%)	Al (%)
M51349	0.41	0.83	0.012	0.021	0.25	0.24	0.95	0.11	0.190	0.003		0.022
Batch No.	**Ti (%)**	**B (%)**	**As (%)**	**Pb (%)**	**Sb (%)**	**Zr (%)**	**N2 (ppm)**	**O2 (ppm)**	**H2 (ppm)**	**DI (in.)**	**CE (%)**	
M51349H366										5.20	0.80	

Jominy Test (HRC)	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J11	J12	J13	J14	J15	J16	J18	J20	J22	J24	J26	J28	J30	J32

THERMAL PROCESSING

Furnace No.	Austenitizing Time / Temp.°F)	Tempering Time / Temp. (°F)	Normalizing Time / Temp. (°F)	Stress Relieving Time / Temp.(°F)	Quench Media Temp. (°F)
H10366	77 Min/ 1625	180 Min/ 1300			Water /

Notes : Full Charpy = 10mmX10mm

Test	Tensile Test: Yield 0.2% (ksi)	Tensile (ksi)	Elongation (%)	Reduction of Area (%)	Yield at 0.6 % Elongation Under Load (ksi)	Yield at 0.02 % (ksi)	Test Orientation	Test Location	Hardness Test: Brinell (BHN)	Test Location	Rockwell	Test Location
1	90.5	107.2	26	66			Longitudinal	Mid Radius	222	Surface		
2									223	Mid Radius		
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												

APPROVED
By Lai at 10:55 am, Feb 11, 2016

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	M51349	DATE	2/3/2016
WAS USED TO MAKE PART NO.	9K-295-03023-NP	PO NO	4510928305
ACM QUALITY DEPT		QUANTITY	128

MTR #267

CMC Commercial Metals

CMC IMPACT METALS PENNSYLVANIA
1024 Kittanning Pike
Chicora PA 16025-2330
888-687-7337
www.cmcimpactmetals.com

Material Test Report

Production Date	12.20.2013
Heat No.	M51349
Furnace No.	H10366

Dixie Nuelle
Dixie Nuelle, Quality Assurance

CHARPY IMPACT TESTS

Test	Average*	Specimen 1*	Shear	Lateral Expansion	Specimen 2*	Shear	Lateral Expansion	Specimen 3*	Shear	Lateral Expansion	Test Temp.	Size	Location	Orientation
	ft-lbs	ft-lbs	%	in.	ft-lbs	%	in.	ft-lbs	%	in.	°F			
1	98.2	98.0	100	0.066	97.0	100	0.067	99.5	100	0.067	-50	Full	Mid Radius	Longitudinal
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														
16														
17														
18														

INCLUSION RATING

Method								
Test	Thin (T)	Heavy (H)	Thin (T)	Heavy (H)	Thin (T)	Heavy (H)	Thin (T)	Heavy (H)
1								
2								
3								

OTHER TESTS

Grain Size	Decarburization	Macrostructure Method /Result	Reduction Ratio	Ultrasonic Test
Method:		ASTM E381		
		SRC		

Additional Comments

APPROVED
By Lai at 10:57 am, Feb 11, 2016

Country of Origin : United States

Part No. 60026

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	M51349	DATE	2/3/2016
WAS USED TO MAKE PART NO.	9K-295-03023-NP	PO NO	4510928305
ACM QUALITY DEPT		QUANTITY	128

#267

GERDAU

GERDAU SPECIAL STEEL NORTH AMERICA
5591 MORRILL ROAD
JACKSON, MICHIGAN 49201

CERTIFIED MATERIAL TEST REPORT

CUSTOMER ORDER NUMBER	CUSTOMER PART NUMBER	HEAT NUMBER	WORK ORDER NUMBER	DATE
1915		M51349	281801 101	10/16/13

Danieli Cast

REPORT TO
QUALITY ASSURANCE
CAPITAL STEEL & WIRE, INC

240 SOUTH BRIDGE STREET
SUITE 300
DEWITT , MI 48820

SHIP TO
CAPITAL STEEL & WIRE
CUSTOMER PICKUP AT MILL

LANSING , MI 48910

ORDERED

GRADE	SIZE	LENGTH
4140H	1 3/4" RND	20'

CUSTOMER SPECIFICATIONS
FEDERAL MOGUL MS-306 REV B; MS-301; MS-302

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Ni	Cr	Mo	Cu	Sn	Al
0.41	0.83	0.012	0.021	0.25	0.11	0.95	0.19	0.24	0.009	0.022

V	Nb
0.003	0.002

GRAIN SIZE SPECIFICATION ASTM E112 FINE GRAIN 5-8

HARDNESS SPECIFICATION ASTM E10

HARDENABILITY SPECIFICATION ASTM A304

THEORETICAL																							
J1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20	22	24	26	28	30	32	34
57	57	57	57	57	57	56	55	53	52		49		48		45	45	44		42		39		37	

APPROVED
By Lai at 10:57 am, Feb 11, 2016

PAGE 1

We Certify that these data are correct and in compliance with specified requirements.
Gerdau Monroe
3100 East Front Street

Wendy J. Craig

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	M51349	DATE	2/3/2016
WAS USED TO MAKE PART NO.	9K-295-03023-NP	PO NO	4510928305
ACM QUALITY DEPT		QUANTITY	128

AATM #267

GERDAU

GERDAU SPECIAL STEEL NORTH AMERICA
5591 MORRILL ROAD
JACKSON, MICHIGAN 49201

CERTIFIED MATERIAL TEST REPORT

CUSTOMER ORDER NUMBER	CUSTOMER PART NUMBER	HEAT NUMBER	WORK ORDER NUMBER	DATE
1915		M51349	281801 101	10/16/13

Danieli Cast

REPORT TO
QUALITY ASSURANCE
CAPITAL STEEL & WIRE, INC

240 SOUTH BRIDGE STREET
SUITE 300
DEWITT , MI 48820

SHIP TO
CAPITAL STEEL & WIRE
CUSTOMER PICKUP AT MILL

LANSING , MI 48910

ORDERED

GRADE	SIZE	LENGTH
4140H	1 3/4" RND	20'

CUSTOMER SPECIFICATIONS
FEDERAL MOGUL MS-306 REV B; MS-301; MS-302

MICROCLEANLINESS SPECIFICATION ASTM E45 METHOD A

	A		B		C		D	
	T	H	T	H	T	H	T	H
F1	1.5	0.0	1.0	0.0	0.5	0.0	2.0	0.5
F2	1.5	0.5	0.5	0.0	0.0	0.0	1.0	0.5
M1	1.5	0.0	0.5	0.0	0.0	0.0	1.5	0.5
M2	2.0	0.5	0.5	0.0	0.0	0.0	1.0	0.5
B1	1.0	0.5	0.5	0.0	0.0	0.0	1.0	0.5
B2	1.5	0.5	0.5	0.0	0.0	0.0	1.0	0.5
WORST CASE	2.0	0.5	1.0	0.0	0.5	0.0	2.0	0.5

MACROCLEANLINESS

PLATE I

	S	R	C
FRONT	1	1	1
MIDDLE	1	1	1
BACK	1	1	1
AVERAGE	1	1	1

PLATE II

NONE

DI CALCULATION

5.21

APPROVED
By Lai at 10:58 am, Feb 11, 2016

PAGE 2

We certify that these data are correct and in accordance with specified requirements.
Gerdau Monroe
Metallurgical Engineer

Wendy J. Craig
Wendy J. Craig

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	M51349	DATE	2/3/2016
WAS USED TO MAKE PART NO.	9K-295-03023-NP	PO NO	4510928305
ACM QUALITY DEPT		QUANTITY	128

MTR # 767

GERDAU

GERDAU SPECIAL STEEL NORTH AMERICA
5591 MORRILL ROAD
JACKSON, MICHIGAN 49201

CERTIFIED MATERIAL TEST REPORT

CUSTOMER ORDER NUMBER	CUSTOMER PART NUMBER	HEAT NUMBER	WORK ORDER NUMBER	DATE
1915		M51349	281801 101	10/16/13

Danieli Cast

REPORT TO
QUALITY ASSURANCE
CAPITAL STEEL & WIRE, INC

240 SOUTH BRIDGE STREET
SUITE 300
DEWITT , MI 48820

SHIP TO
CAPITAL STEEL & WIRE
CUSTOMER PICKUP AT MILL

LANSING , MI 48910

ORDERED

GRADE	SIZE	LENGTH
4140H	1 3/4" RND	20'

CUSTOMER SPECIFICATIONS
FEDERAL MOGUL MS-306 REV B; MS-301; MS-302

DECARB SPECIFICATION SAE J419 TYPE 3

F COMPLETE= 0.000 TOTAL= 0.006
M COMPLETE= 0.000 TOTAL= 0.005
B COMPLETE= 0.000 TOTAL= 0.006

REDUCTION RATIO

RATIO= 15.0 TO 1.0

CERTIFICATION STATEMENT..... SPECIFICATION ZERO DECARB ON TURNED BAR

** MATERIAL 100% MELTED AND MANUFACTURED IN THE U.S.A. BY THE ELECTRIC ARC FURNACE AND CONTINUOUS CASTING METHOD. THE PRODUCT HAS NOT BEEN REPAIRED BY WELDING AND THIS MATERIAL HAS NOT BEEN EXPOSED TO MERCURY OR TO ANY OTHER METAL ALLOY THAT IS LIQUID AT AMBIENT TEMPERATURES DURING PROCESSING OR WHILE IN OUR POSSESSION.
GERDAU MONITORS ALL INCOMING SCRAP AND ALL HEATS OF STEEL TO ENSURE THAT PRODUCTS SHIPPED ARE FREE OF RADIOACTIVE MATERIAL.

APPROVED
By Lai at 10:59 am, Feb 11, 2016

We certify that tests, inspection and production practices comply with requirements.
Gerdau Monroe
3100 East Front Street

Wendy J. Craig
Wendy J. Craig

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	M51349	DATE	2/3/2016
WAS USED TO MAKE PART NO.	9K-295-03023-NP	PO NO	4510928305
ACM QUALITY DEPT		QUANTITY	128

MTR #267

JIANGYIN XINYU FORGING CO.,LTD

MATERIAL CERTIFICATION

Conforms to DIN 50049.3.1 & BS EN 10204.3.1

Ref. PO#: 101546 QTY: 2000NOS

CUSTOMER NAME	ACM Machining, Inc	Reduction ratio	>3	Melting practice	EF+LF+VD	CERT. NO.	ACM-2688
SPECIFICATION	ASTM A350 LF2 (MS-023009-01-01 REV13)	Manufacturing Process	Heat treatment->Rough machining			CERT. DATE	Mar. 9,2015

Item No.	Forging Logo.	Heat No.	QTY	Part No.	Desc.	Chemical Composition (%)												Mechanical Properties (Charpy Specimen Size: 10MMX10MMX55MM CVN Orientation: Longitudinal)								Heat treatment		
						C	Mn	Si	S	P	Cr	Mo	Ni	Cu	V	Nb	CE	Yield (MPa)	Tensile (MPa)	EL2" (%)	Roa (%)	HB	Impact (J @-46°C)			Batch No.	C1S0202	
																											Temperature	Time
					Min.		0.60	0.15										250	485	22	30	143	20(A)/16(S)			Quenching	900℃	3h
					Max.	0.21	1.35	0.30	0.030	0.030	0.30	0.12	0.40	0.40	0.05	0.02	0.43		655			197				Tempering	620℃	4.5h
1A	XY	XY-0223	500	FD03G LC	5"1500 Gland Plate	0.21	0.91	0.22	0.007	0.024	0.030	0.01	0.01	0.01	0.001	0.002	0.37	345	560	38	71	165、163、165	75	65	78	Water Quench	17℃	Start
																											21℃	End
2A	XY	XY-0223	500	FD04G LC	4"1500 Gland Plate	0.21	0.91	0.22	0.007	0.024	0.030	0.01	0.01	0.01	0.001	0.002	0.37	345	560	38	71	165、163、165	75	65	78			
3A	XY	XY-0223	500	FD03T RC	5"1500T run-on	0.21	0.91	0.22	0.007	0.024	0.030	0.01	0.01	0.01	0.001	0.002	0.37	345	560	38	71	165、163、165	75	65	78			
4A	XY	XY-0223	500	FD03G LC	5"1500T run-on	0.21	0.91	0.22	0.007	0.024	0.030	0.01	0.01	0.01	0.001	0.002	0.37	345	560	38	71	165、163、165	75	65	78			

VISUAL INSPECTION:PASSED

We hereby certify that the items described herein have been inspected as above in accordance with ASTM-A350 Section 8.

QUALITY INSPECTOR: Zhao Qin QUALITY MANAGER: Xiao Hongli

Part No. _____

Lot No. LOT 9012

APPROVED

By Lai at 2:06 pm, Oct 20, 2015

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO	XY-0223
WAS USED TO MAKE PART NO.	9K-293-03042-V1
ACM QUALITY DEPT	

DATE	10/15/15
PO NO	4510848057
QUANTITY	55

MTL # 167

产品质量证明书

北京首钢新钢有限责任公司特钢部
Special Steel Department of Beijing Shougang New Steel Co., Ltd.

合同号：40-SX-10-0665　　生产单位：轧钢二车间
生产号：51475　　证明书序号：HGZ14000509
订货单位：

14C76

产品名称		执行标准	炉(批、熔次)号	钢号		规格(mm)	件(根)数	重量(t)
圆钢		GB/T 699-1999	14ST04611	LF2		φ70	2	39.98
交货状态		热处理制度		试样状态		表面质量	合格	检验	2	支数	-
热处理	—	—	正火	试样							

化学成分 %	C	Si	Mn	P	S	Cr	Ni	Cu	Mo	W	V	Ti	B	Al	Sn	Nb	—	—
	0.21	0.32	0.91	0.004	0.007	0.09	0.016	0.010	—	—	—	—	—	—	—	—	—	—

力学性能	淬火工艺 温度℃	淬火工艺 时间min	淬火工艺 介质	回火工艺 温度℃	回火工艺 时间min	回火工艺 介质	正火工艺 温度℃	正火工艺 时间min	正火工艺 介质	抗拉强度 R_m N/mm²	下屈服强度 R_{eL} N/mm²	断后伸长率 A %	断面收缩率 Z %	冲击吸收功 A_k J	冷弯试验	布氏硬度 HBW		冲击	硬度	备注

热处理	正火工艺	温度℃	时间min	晶粒度	温度℃	时间min	离开淬火温度(min)			
		—	—	工艺	—	—	淬后硬度 HRC	—	—	—

金相检验(级)	硫化物A		氧化物B		硅酸盐C		点状D		—		显微孔隙	碳化物(级)			晶粒度	显微组织	脱碳层深度 mm	—
	粗	细	粗	细	粗	细	粗	细	—	—		网状	带状	点状				
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

低倍(级)	疏松		中心疏松		偏析		一般点状偏析		边缘点状偏析		—	超声波检验
	0.5	0.5	1.0	1.0	0	0	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	
	—	—	—	—	—	—	—	—	—	—	—	

质检人　　复核员　　开证人　　主任师

质量证明专用章

2015-10-20 14:25:06

北京市海淀区学院南路76号　邮编：100081　电话：010-62187213

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	XY-0223	DATE	10/15/15
WAS USED TO MAKE PART NO.	9K-293-03042-V1	PO NO	4510848057
ACM QUALITY DEPT		QUANTITY	55

APPROVED
By Lai at 2:06 pm, Oct 20, 2015

MTR # 767

Suzhou Dongwu Forging&Welding Co.,Ltd

MILL TEST CERTIFICATE REPORT

Purchaser: CAMERON Cert. No. 1510060-1 Date: 5/Nov/2015

PO No.:	4510927660	Certificatie type	EN 10204, 3.1, 2004	Tensile Test bar	Dimension (mm)	Section (mm^2)	Length (mm)	Testing Temperature (℃)	Brinell Hardness	Load (Kg)	Location	Impact Test	Testing Temp.	Type	Dim. (mm)	Orientation
Material Specification	ASTM A350 LF2&MS-021009-01-01 REV18	Melting Practice	E.F.										-46℃ max	V-Notch	10 x 10 x 55	Longitudinal
		Test performed on	QTC + Piece	Actual	12.5	122	50	room temperature	Actual	3000	Surface	Actual	-46	V-Notch	10 x 10 x 55	Longitudinal

Heat Treatment	Temperature(℃)	Time (h)	Cooling Method
QUENCHED	900℃	6	In water
TEMPERED	600℃	10	In Air

Item No	Description	Part No.	Qty	Heat No.	Heat Treatment Lot No.		Chemical Composition % C	Mn	Si	S	P	Cr*	Mo*	Ni*	Cu*	V*	Nb*	CE	Mechanical Properties YS (Mpa)	UTS (Mpa)	EL (%)	ROA (%)	Hardness (HBW)	Impact Test Energy value (J) No. 1	No. 2	No. 3	Average (J)
						Min		0.6	0.15										250	485	22	30	143	16J (S)			201
						Max	0.21	1.35	0.3	0.03	0.03	0.3	0.12	0.4	0.4	0.05	0.02	0.43		655			197				
00010	CLOSURE-RF-FORG LF2 03 150 B4B/B4C	9K-RS-11-V-493	30	15E826	151028H08		0.2	0.95	0.23	0.083	0.013	0.069	0.006	0.009	0.011	0.002	0.001	0.36	360	555	35	72	165	85	100	100	95
00020	CLOSURE-FE FORGING A350 LF2 06 900 B5	9K-RS-11-V-498	20	15E826	151028H08		0.2	0.95	0.23	0.083	0.013	0.069	0.006	0.009	0.011	0.002	0.001	0.36	360	555	35	72	165	85	100	100	95

APPROVED
By hughesj at 2:39 pm, 11/27/15

We hereby certify that the material provided complies with all CVM requirements as stated in the applicable purchase order and certified in accordance to EN 10204-3.1 .

Surveyor's Name, Signature & Date: Dong Cong Inspector's Name, Signature & Date Wu Lin

MTR #267

Suzhou Dongwu Forging&Welding Co.,Ltd

MILL TEST CERTIFICATE REPORT

Purchaser: CAMERON Cert. No. 1411107-4 Date: 19/Jan/2015

PO No.:	4510583917			Certificatie type	EN 10204, 3.1, 2004		Tensile Test bar	Dimension	Section	Length	Testing Temperature (℃)	Brinell Hardness	Load (Kg)	Locatio n	Impact Test	Testing Temp.	Type	Dim. (mm)	Orientation
Material Specification	ASTM A350 LF2&MS-021009-01-01 REV17			Melting Practice	E.F.			(mm)	(mm^2)	(mm)						-46℃ max	V-Notch	10 x 10 x 55	Longitudinal
				Test performed on	QTC	Piece	Actual	12. 5	122	50	room temperature	Actual	3000	Surface	Actual	-46	V-Notch	10 x 10 x 55	Longitudinal

Heat Treatment	Temperature(℃)	Time (h)	Cooling Method			Chemical Composition												Mechanical Properties					Impact Test			
QUENCHED	900ºC	8	In water			C	Mn	Si	S	P	Cr*	Mo*	Ni*	Cu*	V*	Nb*	CE	YS	UTS	EL	ROA	Hardness	Energy value (J)			Average
TEMPERED	600ºC	14	In Air			%												(Mpa)	(Mpa)	(%)	(%)	(HBW)	No. 1	No. 2	No. 3	(J)
Item No	Description	Part No.	Qty	Heat No.	Heat Treatment Lot No.	Min		0.6	0.15									250	485	22	30	143	27J (5)			34J
						Max	0.21	1.35	0.3	0.03	0.03	0.3	0.12	0.4	0.4	0.05	0.02	0.43		655			197				
00840	CLOSURE-RF-FORG LF2 03 150 B4B/B4C	9K-RS-11-V-493	10	14E1447	150115H13		0.19	0.93	0.2	0.006	0.007	0.074	0.006	0.058	0.032	0.005	0.001	0.35	350	525	35	77	156	100	125	130	118

We hereby certify that the material provided complies with all CVM requirements as stated in the applicable purchase order and certified in accordance to EN 10204-3.1 .

Surveyor's Name, Signature & Date: Dong Cong Inspector's Name, Signature & DateWu Lin

APPROVED
By laia at 9:02 am, 3/2/15

MTR #267

Suzhou Dongwu Forging&Welding Co.,Ltd

MILL TEST CERTIFICATE REPORT

Purchaser: CAMERON Cert. No. 1508027-1 Date: 19/Sep/2015

PO No.:	4510852131	Certificatie type	EN 10204, 3.1, 2004	Tensile Test bar	Dimension	Section	Length	Testing Temperature (℃)	Brinell Hardness	Load (Kg)	Locatio n	Impact Test	Testing Temp.	Type	Dim. (mm)	Orientation
Material Specification	ASTM A350 LF2&MS-021009-01-01 REV18	Melting Practice	E.F.		(mm)	(mm^2)	(mm)						-46℃ max	V-Notch	10 x 10 x 55	Longitudinal
		Test performed on	QTC / Piece	Actual	12.5	122	50	room temperature	Actual	3000	Surface	Actual	-46	V-Notch	10 x 10 x 55	Longitudinal

Heat Treatment	Temperature(°C)	Time (h)	Cooling Method
QUENCHED	900°C	8	In water
TEMPERED	600°C	14	In Air

Item No	Description	Part No.	Qty	Heat No.	Heat Treatment Lot No.		C	Mn	Si	S	P	Cr*	Mo*	Ni*	Cu*	V*	Nb*	CE		YS (Mpa)	UTS (Mpa)	EL (%)	ROA (%)	Hardness (HBW)	Impact Test Energy value (J) No. 1	No. 2	No. 3	Average (J)
							Chemical Composition %													Mechanical Properties								
						Min		0.6	0.15											250	485	22	30	143	16J (S)			20J
						Max	0.21	1.35	0.3	0.03	0.03	0.3	0.12	0.4	0.4	0.05	0.02	0.43			655			197				
00010	CLOSURE-RF-FORG LF2 03 150 B4B/B4C	9K-RS-11-V-493	30	15E491	150914H13		0.2	0.96	0.23	0.008	0.016	0.038	0.01	0.015	0.02	0.002	0.001	0.36		350	550	35	73	165	100	120	115	112
00010	CLOSURE-RF-FORG A350 LF2 02 600 B4C	9K-RS-11-V-155	220	15E491	150914H13		0.2	0.96	0.23	0.008	0.016	0.038	0.01	0.015	0.02	0.002	0.001	0.36		350	550	35	73	165	100	120	115	112

APPROVED
By hughesa at 8:35 am, 10/21/15

We hereby certify that the material provided complies with all CVM requirements as stated in the applicable purchase order and certified in accordance to EN 10204-3.1 .

Surveyor's Name, Signature & Date: Dong Cong Inspector's Name, Signature & DateWu Lin

MTR #267

JIANGYIN XINYU FORGING CO.,LTD

MATERIAL CERTIFICATION

Conforms to DIN 50049.3.1 & BS EN 10204.3.1

Ref. PO#: 101391 QTY: 500NOS

CUSTOMER NAME	ACM Machining, Inc	Reduction ratio	>3	Melting practice	EF+LF+VD	CERT. NO.	ACM-269B
SPECIFICATION	ASTM A350 LF2 (MS-021009-01-01 REV13)	Manufacturing Process	Heat treatment->Rough machining			CERT. DATE	April 9,2015

Item No.	Forging Logo.	Heat No.	QTY	Part No.	Desc.	Chemical Composition (%)												Mechanical Properties: Tensile Test Specimen Size:12.7mm; Impact Specimen Size: 10mmX10mmX55mm; Charpy-V Impact Test: Longitudinal; Test Specimen taken from 1/4T							Heat treatment: QTC SIZE:4"×4"×8"		
																		Yield	Tensile	El.2"	Roa	NB	Impact		Batch No.	C150325	
						C	Mn	Si	S	P	Cr	Mo	Ni	Cu	V	Nb	CE	(MPa)	(MPa)	(%)	(%)		U @-46°C			Temperature	Time
					Min.		0.60	0.15										250	485	22	30	143	20(A)/16(S)		Quenching	920℃	4.5h
					Max.	0.21	1.35	0.30	0.030	0.030	0.30	0.12	0.40	0.40	0.05	0.02	0.03		655			197			Tempering	620℃	5.5h
1D	XY	XY-0227	250	F003B 1C	1st body	0.20	0.95	0.20	0.005	0.011	0.01	0.002	0.01	0.03	0.002	0.001	0.38	348	519	35	69	164	79	82	75	Water Quench	18℃	Start
																											21℃	End
2D	XY	XY-0227	250	F003B 1C	2nd body	0.20	0.95	0.20	0.005	0.011	0.01	0.002	0.01	0.03	0.002	0.001	0.36	346	529	35	69	164	79	82	75			

VISUAL INSPECTION:PASSED

We hereby certify that the items described herein have been inspected as above in accordance with ASTM-A350 Section 8.

QUALITY INSPECTOR: Zhao Qin QUALITY MANAGER: Xiao Hongli

Part No. _____
Lot No. 9070

APPROVED
By Lai at 11:01 am, Jan 28, 2016

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	XY-0227	DATE	1/21/16
WAS USED TO MAKE PART NO.	9K-290V03101-9	PO NO	4510971016
ACM QUALITY DEPT		QUANTITY	3

MTL #267

CAMERON

VALVE PRESSURE TEST FORM

PRODUCT / WORK ORDER INFORMATION

Work Order #: 12072680 2 Valve Serial # : 12072680 2-01-06

SO # / PO #: MRC 3370337/000100 Test Specification : 5A-MF-29 / Rev. 07

Part #: 9K-4C03F01F02AX004 Description : FV 03X03RF BAC 150 CS/IM WRENCH X004

Shell Test	Pressure (PSIG)	Duration (Min.)	Pass / Fail	Gauge #	Range	Cal Date
Hydrostatic	450	2	☑ ☐	G-249	0-600 psi	07/28/2016
Nitrogen			☐ ☐			

Seat Test	Pressure (PSIG)	Duration (Min.)	Left Seat Pass / Fail	Right Seat Pass / Fail	DB&B Pass / Fail	Gauge #/Range/Cal Date
Hydrostatic	330	2	☑ ☐	☑ ☐	☑ ☐	G-249 0-600 psi 07/28/2016
Nitrogen			☐ ☐	☐ ☐	☐ ☐	
Air			☐ ☐	☐ ☐		

DIB Test (Inside-Out)	Pressure (PSIG)	Duration (Min.)	DIB-1 (DPE) Pass / Fail	DIB-2 (SRxDPE) Pass / Fail		Gauge #/Range/Cal Date
Hydrostatic	N/A		☐ ☐	☐ ☐		
Nitrogen			☐ ☐	☐ ☐		

Body Bleed Closed: ☑ Yes | Charts Req: ☐ Yes ☒ No | Confirm Valve is drained and dried : ☑ Yes

Comments / Special Customer Requests:

Tested by(Initials) /Date /Serial # FV Feb. 23, 2016 #01 to #06

Tested by (Initials) /Date /Serial #

QC Reviewed & Approved:	Date:	Customer Rep:	Date:	The above specified requirements have been quality inspected and accepted.
FV CCV QC02	FEB 24 2016			

MTR # 267

CAMERON

Friday Dec-18-2015

From:

Cameron Canada
3707 97 Street

Edmonton,Alberta,Canada
T6E 6J2
780-468-2732

To:

Subject:

Serial: 120682708 Quantity/Series : -01 to -06

Comment:

Part Number:	9K-5006F01FO1AX004
Description:	06 150 B5 FXF NACE W/G.O., PEP
Sales Order:	N/A
Purchase Order:	N/A

MTR #268

CAMERON

Friday Dec-18-2015

From:

Cameron Canada
3707 97 Street
Edmonton,Alberta,Canada
T6E 6J2
780-468-2732

To:

Document Summary Page

The MTR's are printed in the following order:

#	Heat #	Heat Code	Part Description	Product
1	GROVE		Grove B4, B5 Sour Low Temp.	--LOC
2	8004	KD	BALL 1018/A350LF2/A105 ENC 06 600 B5/D2	9K-292-06016-V3
3	A150602		(NP) STEM, GROVE B5, 06 1/6, 4140 ANTI D	9K-295V06006-V1
4	CB103783		PLATE-GLAND 06 0600 B5	9K-293-06050-V2
5	15E332		CLOSURE-FE FORGING LF2 06 150 B5	9K-RS-11-V-115
6	15E348		CLOSURE-FE FORGING LF2 06 150 B5	9K-RS-11-V-115
7	14E1777		BODY FORGING LF2 06 150/600 B5	9K-RS-11-V-030

MTR # 268

VALVES & MEASUREMENT
Cameron Canada Corporation
3707 – 97 Street
Edmonton Alberta Canada T6E 6J2
Phone 780.463.6868
Fax 780.465.1244
www.c-a-m.com

LETTER OF COMPLIANCE

for:

GROVE BRAND TRUNNION VALVES

Model B4, B5 - Sour Low Temperature Service

Cameron Valves & Measurement hereby certifies that the design, manufacture, sampling, testing and quality control inspection of the GROVE brand CSA Z245.15 ball valves for Sour Low Temperature Service meet the requirements of CSA Z245.15-13 Sour Service, V&M Engineering Standards, and customer purchase order requirements. As part of compliance to these specifications, the valves are marked in accordance with MSS SP-25. The valves are also marked "SOUR" as required by CSA Z245.15-13 marking requirements for Sour Service and are suitable for use in CSA Z662 Pipeline systems.

The materials of construction for these valves conform to the metallurgical requirements of . NACE MR0175/ISO 15156:2009 (Parts 1 & 2 for Carbon & Alloy Steels in SSC Region 3 Sour Service and Parts 1 & 3 for CRA's as specified in CSA Z245.15-13 Chapter 13). According to NACE MR0175-2009/ISO 15156, it is the customer's / user's responsibility to ensure that the valve materials will be satisfactory in the intended service.

The minimum service temperature of these valves is -46°C/-50°F. Impact testing has been performed in accordance with applicable ASTM requirements and those of CSA Z245.15-13 for Category II M45C Service.

The ASTM A320 Grade L7M studs and cap screws and ASTM Grade A194 7ML nuts used in the products specified above have been Quality Control inspected and meet the requirements of the applicable ASTM specifications – as is already implied fully by the statements above regarding both CSA and NACE standards compliance.

Approved by: _____
Greg Ogaranko, M.Eng. P. Eng.
Engineering Manager

08/10/15
Engrg Ref#: EWR10619-01 Rev05.docx

Control Doc#: 5A-EX-17 Rev01

MTR # 268

QIUBAO VALVE CO.,LTD.

MATERIAL TEST CERTIFICATE

Certified in accordance to EN10204 3.1

QB/CX11 02 REV D

Customer	CAMERON-VALGRO	Raw Material Supplier	shuangjiu special steel	Certificate No.	2015-3647
P.O Number	4510818990	Production Name	Ball of ball valve	Certificate Date	8/10/2015
Specificate	ASTM A350 LF2 Class1	Customer Standard/Rev.	MS-021009--(01)-(01) REV.13	Melting Practice	E.F.V.D

1. Production Description

No.	Forgings Log	Heat No.	Item No.	Size&Class	Part No./Rev.	Raw Material	Qty.
1	KD	8004	00030	06 600 B5/D2	9K-292-06016-V3(03)		145
2							
3							
4							
5							

2. Chemical Composition (%)

No.	Forgings Log	Heat No.	Element	C	Mn	Si	S	P	Cr	Ni	Mo	Cu	V	Nb
			Min		0.60	0.15								
			Max	0.21	1.35	0.30	0.030	0.03	0.30	0.40	0.12	0.40	0.05	0.02
1	KD	8004		0.20	0.99	0.22	0.009	0.012	0.03	0.02	0.001	0.02	0.002	0.001
2														
3														
4														
5														

No.	Forgings Log	Heat No.	Element	N	Nb+Ta	Al	Ti	W	CE	Cr+Mo	Cu+Ni-Cr +Mo+V	PREN
			Min									
			Max						0.43	0.32	1.00	
1	KD	8004							0.37	0.03	0.07	
2												
3												
4												
5												

3. Heat Treatment Process

No.	H.T Date	Heat Treatment	H.T Lot No.	Temp. (℃)	Hold Time	Cooling Medium	Temp. (℃)	Hold Time	Cooling Medium	Temp. (℃)	Hold Time	Cooling Medium
1	7/24/2015	Quenching and Tempering	JG07220102	900	2	Water	600	4	Air			
2												
3												
4												
5												

4. Mechanical Properties

No.	Forgings Log	Heat No.	Item	Tensile Test				Hardness(HBW)	Impact Test Akv (J)			-46℃
				Tensile (Mpa)	Yield0.2 (Mpa)	EL.2" (%)	Roa (%)		Specimen Size:10×10×55			
			Min	485	250	22	30	143	Single Value		Min:	16
			Max	655				197	Avcrage Value		Min:	20
1	KD	8004		600	365	33	64.5	152	130	145	145	140
2												
3												
4												
5												

1.We certify that all resuilts are in accordance to the specification and meet ASTM A350 LF2.

2. After the examination, the test result of nuclear value for the above materials is less than 0.3 u Sv/h.

Quality Inspector _____

Q.A Manager _____

QIUBAO VALVE CO.,LTD.

Add:Dongou Industrial Estate, Oubei Town, Yongjia County, Zhejiang Province, China Tel:0086-577-67377183 Fax:0086-577-67377177 Http://www.qiubaovalve.com E-mail:quality@qiubaovalve.com

APPROVED
By Lai at 9:32 am, Oct 29, 2015

MTR #268

CMC Commercial Metals

CMC IMPACT METALS PENNSYLVANIA
1024 Kittanning Pike
Chicora PA 16025 2030
888-682-7337
www.cmcimpactmetals.com

Material Test Report

Production Date
03.26.2015

Dixie Nuelle
Dixie Nuelle, Quality Assurance
Dixie.nuelle@cmc.com

Sold To:	Ship To:
Capital Steel & Wire Inc 240 S Bridge St, Ste 300 Dewitt MI 48820-8825 US	Capital Steel & Wire Inc 240 S Bridge St, Ste 300 Dewitt MI 48820-8825 US

Quality Management System certified to ISO 9001:2008 and Pressure Equipment Directive (PED) 97/23/EC 7/2, Annex I, Paragraph 4.3 by SRI Quality System Registrar Reg. # 7039.00

Customer PO No.	PO 5588	BOL No.	Delivery No.	Sales Order No.
Customer Part No.		1190867	81484993	1831176

Product Description	Alternate Grades :
ROUND:SBQ 2-1/2" 20R 4140	PROCESSED PER MS-012502-01-03
Processing Quench and Temper, RND - Straighten 1/8" in 5 ft	

CHEMICAL ANALYSIS

Heat No.	C (%)	Mn (%)	P (%)	S (%)	Si (%)	Cu (%)	Cr (%)	Ni (%)	Mo (%)	V (%)	Cb (Nb) (%)	Al (%)
A150602	0.41	0.86	0.011	0.013	0.27	0.21	0.96	0.12	0.220	0.004		0.032

Batch No.	Ti (%)	B (%)	As (%)	Pb (%)	Sb (%)	Zr (%)	N_2 (ppm)	O_2 (ppm)	H_2 (ppm)	DI (in.)	CE (%)	
150602H632											0.81	

Jominy Test (HRC)	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J11	J12	J13	J14	J15	J16	J18	J20	J22	J24	J26	J28	J30	J32

THERMAL PROCESSING

Furnace No.	Austenitizing Time / Temp.°F)	Tempering Time / Temp. (°F)	Normalizing Time / Temp. (°F)	Stress Relieving Time / Temp.(°F)	Quench Media Temp. (°F)
H11632	11 Min/ 1690	263 Min/ 1300			Water /-

Notes : Furnace Type = Continuous Heat Treat Charpy size = 10mmX10mm Meets NACE MR0175

Test	Tensile Test								Hardness Test			
	Yield 0.2% (ksi)	Tensile (ksi)	Elongation (%)	Reduction of Area (%)	Yield at 0.6 % Elongation Under Load (ksi)	Yield at 0.02 % (ksi)	Test Orientation	Test Location	Brinell (BHN)	Test Location	Rockwell	Test Location
1	85.6	102.2	27	66			Longitudinal	Mid Radius	214	Surface		
2									217	Mid Radius		
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												

APPROVED
By Lai at 10:15 am, Nov 02, 2015

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	A150602	DATE	10/22/15
WAS USED TO MAKE PART NO.	9K-295V06006-V1	PO NO	4510848021
ACM QUALITY DEPT		QUANTITY	131

MTR #768

CMC IMPACT METALS PENNSYLVANIA
1024 Kittanning Pike
Chicora PA 16025-2030
888-682-7337
www.cmcimpactmetals.com

Material Test Report

Production Date	03.26.2015
Heat No.	A150602
Furnace No.	H11632

Dixie Nuelle

Dixie Nuelle, Quality Assurance
Dixie.nuelle@cmc.com

CHARPY IMPACT TESTS

Test	Average*	Specimen 1*	Shear	Lateral Expansion	Specimen 2*	Shear	Lateral Expansion	Specimen 3*	Shear	Lateral Expansion	Test Temp.	Size	Location	Orientation
	ft-lb	ft-lb	%	in.	ft-lb	%	in.	ft-lb	%	in.	°F			
1	60.0	66.0	74	0.045	54.5	65	0.042	59.5	65	0.042	-50	Full	Mid Radius	Longitudinal
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														
16														
17														
18														

INCLUSION RATING

Method								
Test	Thin (T)	Heavy (H)	Thin (T)	Heavy (H)	Thin (T)	Heavy (H)	Thin (T)	Heavy (H)
1								
2								
3								

OTHER TESTS

Grain Size	Decarburization	Macrostructure Method /Result	Reduction Ratio	Ultrasonic Test
Method:		ASTM E381		
		SRC		

Additional Comments

APPROVED
By Lai at 10:17 am, Nov 02, 2015

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	A150602	DATE	10/22/15
WAS USED TO MAKE PART NO.	9K-295V06006-V1	PO NO	4510848021
ACM QUALITY DEPT		QUANTITY	131

MTR #268

Steel Dynamics, Inc.
Engineered Bar Products Division

8000 N. County Road 225 East
Pittsboro, IN 46167
Phone: (317) 892-7000
Fax: (317) 892-7285

Certified Material Test Report

Cert # : 192842	Mill Order : 1502042	Heat # : A150602	Issued : 2/26/2015 12:40:14
Work Order : 182084	Sales Order : 143360-1	Customer : Capital Steel and Wire	PO # : 5321-1
Load # : 223552	Reference # :	Reference Desc :	End Use :
Size : 2-1/2"	Shape : Round	Grade : 4140	Length : 20'
Grain Practice : Al Fine Grain (5-8) per ASTM A29		Reduction Ratio : 29.3 to 1	Disposition : Rolled Prime

Ladle Chemistry Analysis (ASTM A29)

C	Mn	P	S	Si	Al	Cu	Ni	Cr	Mo	Sn	N	V	Cb	B	Ca	W	Ti	DI
0.41	0.86	0.011	0.013	0.27	0.032	0.21	0.12	0.96	0.22	0.010	0.0084	0.004	0.000	0.0003	0.0005	0.002	0.001	5.69

Pb	Co	As	Sb	Zr	Bi	H	O	Ceq	J-Factor
0.000	0.009	0.004	0.004	0.000	0.000	1.4		0.81	

Product Check Analysis (ASTM A29)

	C	Mn	P	S	Si	Al	Cu	Ni	Cr	Mo	Sn	N	V	Cb	Ti	B	Ca	O
Front																		
Back																		

Jominy (ASTM A255)

	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J12	J14	J16	J18	J20	J24	J28	J32
Calc'd	57	57	57	57	57	57	57	57	55	54	50	50	48	48	48	45	43	40
Front																		
Back																		

Microcleanliness (ASTM E45)

Method A								Method C		Method E	
AT	AH	BT	BH	CT	CH	DT	DH	S	O	SAM "B"	SAM "D"

Microcleanliness (DIN 50602)

K			M
S	O	Tot	Tot

Decarb

Depth	% of Diameter

Grainsize

Austenitic	Ferritic
7	

Macrostructure (ASTM E381)

S	R	C

Magnetic Particle Inspection

Frequency	Severity

Mechanical Properties (ASTM A370)

Tensile Properties					Hardness	
Tensile Strength	0.2% Yield Strength	% Elong (2")	% ROA	0.35% EUL Yield Strength	(MR)	(Surf)

Steel Dynamics - Engineered Bar Products has a quality system in place which has been certified ISO 9001:2008 compliant, including PED certification.

Comments/Specs

ASTM A322-13 --- Electric Arc Furnace Melted - Vacuum Tank Degassed --- Cameron MS-012502 Rev 5 (Chem Only)

APPROVED
By Lai at 10:17 am, Nov 02, 2015

Condition : As-Rolled, Hot-Rolled

I hereby certify that the content of this report is correct and accurate, and that all tests and operations performed on this material were in compliance with applicable material specifications and purchaser designated requirements.

Trevor Kipp - Rolling Mill Metallurgist

Any alteration to this report voids Steel Dynamic's warranting of results. No weld repair has been performed on this material. This material is not radioactive and has not been exposed to radioactivity while under the control of Steel Dynamics. This material has not been exposed to mercury while under the control of Steel Dynamics. Unless otherwise noted, this material was melted, continually cast, and rolled in the USA; w/ all testing performed by Steel Dynamics.

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	A150602	DATE	10/22/15
WAS USED TO MAKE PART NO.	9K-295V06006-V1	PO NO	4510848021
ACM QUALITY DEPT		QUANTITY	131

MTR #268

KREHER STEEL COMPANY, LLC.

ACM MACHINING, INC.
HOT ROLLED ROUNDS A350LF2
4.5000 X 20'
PART NO.

PO/Ref 101205

I hereby certify that this data is correct as contained in the records of this company.
I hereby certify that no mercury came in contact with or no weld repair was done to this product while in our possession.
Attn:

Certificate of Mill Test Results

SO # -268909-00

Steel Dynamics, Inc.
Engineered Bar Products Division

8000 N. County Road 325 East
Flatsburg, IN 46157
Phone: (717) 868-7000
Fax: (717) 868-7186

Certified Material Test Report

Cert # : 180084
Work Order : 177807
Lead # : 221302
Size : 4-1/2"
Grain Practice : Al Fine Grain (6-8) per ASTM A29

Mill Order : 1417523
Sales Order : 136741-1
Reference # :
Shape : Round

Heat # : CB103783
Customer : Kreher Steel Company
Reference Desc :
Grade : A350/LF2 Chem
Reduction Ratio : 8.0 to 1

Issued : 9/4/2015 15:50:19
PO # : 42157-1
End Use :
Length : 20'
Disposition : Rolled Prime

Ladle Chemistry Analysis (ASTM A29)

C	Mn	P	S	Si	Al	Cu	Ni	Cr	Mo	Sn	N	V	Cb	B	Ca	W	Ti	Zr
0.19	1.12	0.009	0.002	0.25	0.029	0.15	0.06	0.07	0.02	0.010	0.0087	0.004	0.001	0.0003	0.0018		0.003	

Pb	Co	As	Sb	Zr	Bi	H	O	Ceq	J-Factor
0.0004		0.004	0.003			1.3		0.42	

Product Check Analysis (ASTM A29)

	C	Mn	P	S	Si	Al	Cu	Ni	Cr	Mo	Sn	N	V	Cb	Ti	B	Ca	O
From Heat																		

Jominy (ASTM A255)

	J1	J2	J3	J4	J6	J8	J7	J5	J9	J10	J12	J14	J16	J18	J20	J24	J28	J32
Calc'd																		
Front																		
Back																		

Microcleanliness (ASTM E45)

Method A								Method C		Method B	
AT	AH	BT	BH	CT	CH	DT	DH	B	D	SAM "B"	SAM "D"

Microcleanliness (DIN EN10247)

K		M	
B	D	Tot	Tot

Decarb

Depth	% of Diameter

Grain Size

Austenitic	Ferritic

Macroinclusions (ASTM E381)

S	R	C

Magnetic Particle Inspection

Frequency	Severity

Mechanical Properties (ASTM A370)

Tensile Properties					Hardness	
Tensile Strength	0.2% Yield Strength	% Elong (2")	% ROA	0.35% EUL Yield Strength	(BH)	(Surf)

Comments/Specs

Electric Arc Furnace Melted - Vacuum Tank Degassed — Normalize and Machine Straighten — Normalize and Machine Straighten — ASTM A350/A350M-13 LF2 — Cameron MS-021034-01-02 Rev 3 — Cameron MS-021035-01-02 Rev 3

APPROVED
By Lai at 9:37 am, Nov 19, 2015

Condition : Normalize, Straighten, Contact UT

UT: Passed Ultrasonic Inspection

I hereby certify that the contents of this report is correct and accurate, and that all tests and operations performed on this material were in compliance with applicable material specifications and purchaser designated requirements.

Trevor Klipp - Rolling Mill Metallurgist

Any alteration to this report voids Steel Dynamic's warranting of results. No weld repair has been performed on this material. This material is not radioactive and has not been exposed to radioactivity while under the control of Steel Dynamics. This material has not been exposed to mercury while under the control of Steel Dynamics. Unless otherwise noted, this material was melted, continuously cast, and rolled in the USA; all testing performed by Steel Dynamics.

Steel Dynamics Rev Level 1 (105[-24)

retrieved_on

Part No. _____
Lot No. 8894

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	CB103783	DATE	11/12/15
WAS USED TO MAKE PART NO.	9K-293-06050-V2	PO NO	4510852431
ACM QUALITY DEPT		QUANTITY	125

MTR #268

KREHER STEEL COMPANY, LLC.

ACM MACHINING, INC.
HOT ROLLED ROUNDS A350LF2
4.5000 X 20'
PART NO.

PO/Rel 101205
I hereby certify that this data is correct as contained in the records of this company
I hereby certify that no mercury came in contact

Certificate of Mill Test Results

SO # 268909-001 12/xx/15
with or no weld repair was done to this product Pg 2/2
while in our possession
Attn:

Steel Dynamics, Inc.
Engineered Bar Products Division

8000 N. County Road 325 East
Pittsboro, IN 46167
Phone: (317) 892-7800
Fax: (317) 892-7888

Certified Material Test Report
Heat Treatment Addendum

Cert # : 190064
Work Order : 177897
Load # : 221382
Size : 4-1/2"

Mill Order : 1417523
Sales Order : 158741-1
Reference # :
Shape : Round

Heat # : CB103783
Customer : Kreher Steel Company
Reference Desc :
Grade : A350LF2 Chem

Issued : 2/4/2015 10:56:20
PO # : 43157-1
End Use :
Length : 20'

Normalize		Austenitize		Quench Media			Temper		Stress Relieve	
Time	Temp	Time	Temp	Type	Time	Temp	Time	Temp	Time	Temp
3.5 hrs	1670 F	hrs	°F		min	°F	hrs	°F	hrs	F

* Furnaces are calibrated to API 6A Annex M, and use atmospheric thermocouples.
** CTC is 13" prolongation from longitudinal orientation, machined to a 0.505" buttonhead for tensile.

Charpy Impact (ASTM E23) (V-notch | 10mm x 10mm)

Sample ID	Orientation	Location		Temp (F)	Impact Energy (ft-lbs) 1	2	3	Avg	Lateral Expansion (0.001") 1	2	3	Avg	% Shear 1	2	3	Avg
09800	Longitudinal	Mid-Radius	Q1	-50	49	65	61	58	34	50	55	46	30	40	40	37

Hardness (ASTM A370)

Sample ID	Location		HB
09800	Mid Radius	Q1	180

Surface Hardness (ASTM A370)

Sample ID	Location		HB
09804	Surface	Q1	167

Tensile (ASTM A370)

Sample ID	Orientation	Location		Tensile	0.2% Yield	%E (1")	%RA
09800	Longitudinal	Mid-Radius	Q1	74,300 psi	47,900 psi	30	68

APPROVED
By Lai at 9:39 am, Nov 19, 2015

I hereby certify that the contents of this report is correct and accurate, and that all tests and operations performed on this material were in compliance with applicable material specifications and purchaser designated requirements.

Gerrit Bouyer - Bar Finishing Metallurgist

Any alteration to this report voids Steel Dynamics's warranting of results.

Page 1 of 1 Steel Dynamics Rev Level 1 (100) - 350 mtrform_cn

ACM Machining Inc. hereby certify that all test results and process information contained in this report are correct and true as contained in the records of the company and meet purchase order and or specification requirements.

WE CERTIFY THAT HEAT TEST NO.	CB103783	DATE	11/12/15
WAS USED TO MAKE PART NO.	9K-293-06050-V2	PO NO	4510852431
ACM QUALITY DEPT		QUANTITY	125

MTR # 268

Suzhou Dongwu Forging&Welding Co.,Ltd

MILL TEST CERTIFICATE REPORT

Purchaser: CAMERON Cert. No. 1504090-2 Date: 30/May/2015

PO No.:	4510739089		Certificatie type	EN 10204, 3.1, 2004		Tensile Test bar	Dimension (mm)	Section (mm^2)	Length (mm)	Testing Temperature (℃)	Brinell Hardness	Load (Kg)	Location	Impact Test	Testing Temp.	Type	Dim. (mm)	Orientation
Material Specification	ASTM A350 LF2&MS-021009-01-01 REV18		Melting Practice	E.F.											-46℃ max	V-Notch	10 x 10 x 55	Longitudinal
			Test performed on	QTC	Piece	Actual	12.5	122	50	room temperature	Actual	3000	Surface	Actual	-46	V-Notch	10 x 10 x 55	Longitudinal

Heat Treatment	Temperature(°C)	Time (h)	Cooling Method
QUENCHED	900°C	5	In water
TEMPERED	600°C	10	In Air

Item No	Description	Part No.	Qty	Heat No.	Heat Treatment Lot No.		Chemical Composition % C	Mn	Si	S	P	Cr*	Mo*	Ni*	Cu*	V*	Nb*	CE	Mechanical Properties YS (Mpa)	UTS (Mpa)	EL (%)	ROA (%)	Hardness (HBW)	Impact Test Energy value (J) No. 1	No. 2	No. 3	Average (J)
						Min		0.6	0.15										250	485	22	30	143	163 (5)			203
						Max	0.21	1.35	0.3	0.03	0.03	0.3	0.12	0.4	0.4	0.05	0.02	0.43		655			197				
00820	CLOSURE-FE FORGING LF2 86 150 BS	9K-RS-11-V-115	20	15E332	150511H07		0.2	0.97	0.2	0.008	0.015	0.04	0.02	0.01	0.04	0.003	0.002	0.37	425	550	35	72	160	85	90	90	88

APPROVED
By hughesp at 7:37 am, 7/21/15

We hereby certify that the material provided complies with all CVM requirements as stated in the applicable purchase order and certified in accordance to EN 10204-3.1 .

Surveyor's Name, Signature & Date: Dong Cong Inspector's Name, Signature & DateWu Lin

MTR # 268

Suzhou Dongwu Forging&Welding Co.,Ltd

MILL TEST CERTIFICATE REPORT

Purchaser: CAMERON Cert. No. 1505020-1 Date: 30/Jun/2015

PO No.:	4510751002	Certificatie type	EN 10204, 3.1, 2004
Material Specification	ASTM A350 LF2&MS-021009-01-01 REV18	Melting Practice	E.F.
		Test performed on	QTC – Piece

Tensile Test bar	Dimension (mm)	Section (mm^2)	Length (mm)	Testing Temperature (℃)	Brinell Hardness	Load (Kg)	Location	Impact Test	Testing Temp.	Type	Dim. (mm)	Orientation
									-46℃ max	V-Notch	10 x 10 x 55	Longitudinal
Actual	12.5	122	50	room temperature	Actual	3000	Surface	Actual	-46	V-Notch	10 x 10 x 55	Longitudinal

Heat Treatment	Temperature(°C)	Time (h)	Cooling Method
QUENCHED	900°C	8	In water
TEMPERED	600°C	14	In Air

Item No	Description	Part No.	Qty	Heat No.	Heat Treatment Lot No.		Chemical Composition % C	Mn	Si	S	P	Cr*	Mo*	Ni*	Cu*	V*	Nb*	CE	Mechanical Properties YS (Mpa)	UTS (Mpa)	EL (%)	ROA (%)	Hardness (HBW)	Impact Test Energy value (J) No. 1	No. 2	No. 3	Average (J)
						Min		0.6	0.15										250	485	22	30	143	16J (S)			20J
						Max	0.21	1.35	0.3	0.03	0.03	0.3	0.12	0.4	0.4	0.05	0.02	0.43		655			197				
00010	BODY FORGING LF2 08 150/900 B5	9K-RS-11-V-041	80	15E348	150523H13		0.19	0.98	0.22	0.008	0.012	0.035	0.005	0.025	0.03	0.002	0.001	0.36	410	560	35	76	170	135	100	120	118
00020	BODY FORGING LF2 06 150/600 B5	9K-RS-11-V-030	50	15E348	150523H13		0.19	0.98	0.22	0.008	0.012	0.035	0.005	0.025	0.03	0.002	0.001	0.36	410	560	35	76	170	135	100	120	118
00030	CLOSURE-FE FORGING LF2 08 150 B5	9K-RS-11-V-116	20	15E348	150523H13		0.19	0.98	0.22	0.008	0.012	0.035	0.005	0.025	0.03	0.002	0.001	0.36	410	560	35	76	170	135	100	120	118
00040	CLOSURE-FE FORGING LF2 06 150 B5	9K-RS-11-V-115	20	15E348	150523H13		0.19	0.98	0.22	0.008	0.012	0.035	0.005	0.025	0.03	0.002	0.001	0.36	410	560	35	76	170	135	100	120	118

APPROVED
By hughesa at 7:39 am, 7/21/15

We hereby certify that the material provided complies with all CVM requirements as stated in the applicable purchase order and certified in accordance to EN 10204-3.1 .

Surveyor's Name, Signature & Date: Dong Cong Inspector's Name, Signature & DateWu Lin

MTR #268

Suzhou Dongwu Forging&Welding Co.,Ltd

MILL TEST CERTIFICATE REPORT

Purchaser: CAMERON Cert. No. 1507026-1 Date: 28/Jul/2015

PO No.:	4510813437	Certificatie type	EN 10204, 3.1, 2004		Tensile Test bar	Dimension	Section	Length	Testing Temperature (℃)	Brinell Hardness	Load (Kg)	Location	Impact Test	Testing Temp.	Type	Dim. (mm)	Orientation
Material Specification	ASTM A350 LF2&MS-021009-01-01 REV18	Melting Practice	E.F.			(mm)	(mm²)	(mm)						-46℃ max	V-Notch	10 x 10 x 55	Longitudinal
		Test performed on	QTC –	Piece	Actual	12.5	122	50	room temperature	Actual	3000	Surface	Actual	-46	V-Notch	10 x 10 x 55	Longitudinal

Heat Treatment	Temperature(°C)	Time (h)	Cooling Method
QUENCHED	900°C	8	In water
TEMPERED	600°C	14	In Air

Item No	Description	Part No.	Qty	Heat No.	Heat Treatment Lot No.		C	Mn	Si	S	P	Cr*	Mo*	Ni*	Cu*	V*	Nb*	CE	YS	UTS	EL	ROA	Hardness	No. 1	No. 2	No. 3	Average
							Chemical Composition %												Mechanical Properties (Mpa)	(Mpa)	(%)	(%)	(HBW)	Impact Test Energy value (J)			(J)
						Min		0.6	0.15										250	485	22	30	143	16J (5)			20J
						Max	0.21	1.35	0.3	0.03	0.03	0.3	0.12	0.4	0.4	0.05	0.02	0.43		655			197				
00010	BODY FORGING LF2 06 150/600 BS	9K-HS-11-V-038	50	14E1777	150721H13		0.2	0.98	0.2	0.01	0.013	0.038	0.01	0.019	0.025	0.002	0.001	0.37	355	545	36	70	157	100	95	90	95

We hereby certify that the material provided complies with all CVM requirements as stated in the applicable purchase order and certified in accordance to EN 10204-3.1 .

Surveyor's Name, Signature & Date: Dong Cong

Inspector's Name, Signature & DateWu Lin

APPROVED
By Lai at 9:56 am, Sep 03, 2015

MTR #268