TUBACERO INFORMATION

Last Update: May 2011.

Tubacero

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I. COMPANY PROFILE

TUBACERO is a privately owned, 100% Mexican company, with more than 60 years of experience and tradition, a leader in the manufacture of steel pipes.

When **TUBACERO** began its operations, in 1943, its production was rolled and manually welded; as time went by, it was substituted for those manufactured by hydraulic press and automatic submerged arc welding (DSAW). Later the process of Continuous Formation and Electric Resistance Welding (ERW) were installed.

At the present time, **TUBACERO** has five plants with a total installed annual capacity of 350,000 metric tons on a 439,961 square meter surface area where carbon steel pipes, are welded longitudinally in diameters of 6.625" to 150", and in wall thickness that range from 0.156" to 2.50".

Our products are the best option for the Petroleum, Electrical, Mining and Construction Industries, as well as for the Hydraulic Sector, which conducts fluid, semi-solid and solids in diverse environmental conditions. They perfectly adapt to the ground configuration because of its distinguishing characteristics such as: security, impact resistance, static and dynamic charge resistance, ductility and durability.

The concept of quality in **TUBACERO** has permitted the company to remain in the vanguard position in the manufacturing of steel pipe, guaranteeing excellent quality, delivery and service. This concept is based on **TUBACERO´S** Quality Assurance Program, which is active from the acquisition of the raw materials to the shipment and delivery of the finished product. This program is certified by international organizations such as API-Q1 and ISO-9000, which testify to the manufacturing and administrative performance of our company. Besides is certified as a reliable supplier by Pemex (Petroleos Mexicanos).

Since its beginnings, **TUBACERO** has participated in international markets. Its products and services have been exported to different countries around the world, such as: Saudi Arabia, Argentina, Australia, Bangladesh, Bolivia, Canada, Chile, China, Colombia, Costa Rica, Ecuador, United States of America, Guatemala, Honduras, India,

Indonesia, Italy, Kuwait, Malaysia, Oman, Peru, Great Britain, Dominican Republic, Switzerland, Trinidad y Tobago, Turkey and Venezuela. Tubacero is represented commercially in many other countries in every continent.

By 1993, **TUBACERO** established a pipe coating facility in Monterrey, in association with BREDERO SHAW MEXICO of Houston, Texas, U.S.A. where Fusion Bonded Epoxy, 3-layer Polyethylene, Polypropylene and Flow Efficiency Coating is applied to the pipe.

II. CERTIFICATES

The concept of quality in Tubacero also is part of its way of living, because of this, Tubacero has become one of the manufacturers that produces the pipe according the specifications requested by the market.

Quality is the main factor for us: in 1959 we received the license API 5L and presently we are part of the technical committee.

In 1989 we got the certification of API Q1 issued by the American Petroluem Institute. In 1993 Tubacero was the first company in Latin America that received the ISO-9002 certification for its longitudinal welded process. Since 1st of July of 2002, we have the ISO-9001:2000 certification.

1. ISO

QMS REGISTERED

Certificate of Registration

APIQR® REGISTRATION NUMBER

0279

This certifies that the quality management system of

TUBACERO, S DE RL DE CV.
Ave. Guerrero 3729 Nte.
Monterrey, N. L.
Mexico

has been assessed by the American Petroleum Institute Quality Registrar (APIQR®) and found it to be in conformance with the following standard:

ISO 9001:2008

The scope of this registration and the approved quality management system applies to the

Manufacture of Steel Line Pipe and Casing for the Oil and Gas Industry; Manufacture of Pipe for the Construction, Water Utility and Electric Utility Industries

APIQR® approves the organization's justification for excluding:

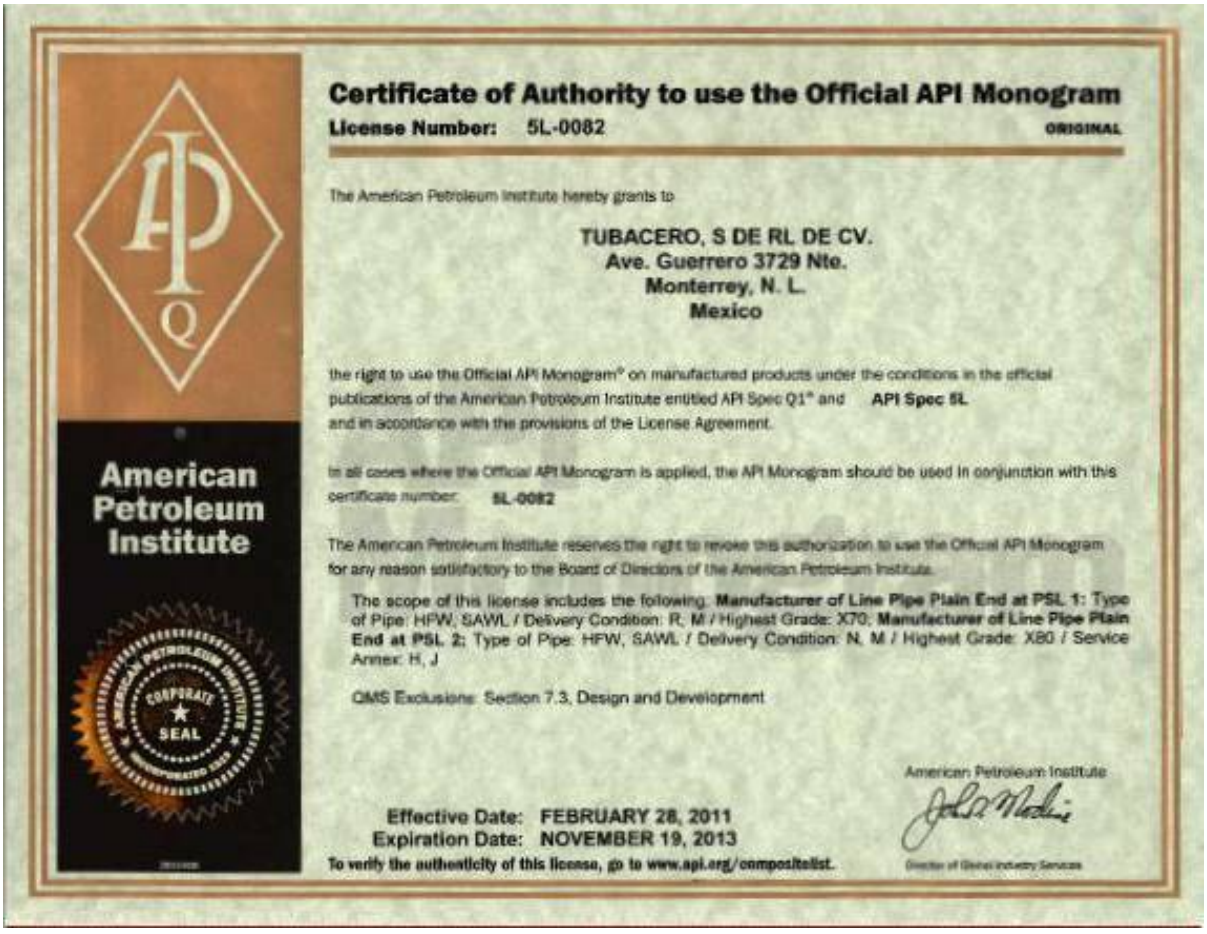
Section 7.3, Design and Development

Effective Date: February 28, 2011
Expiration Date: November 19, 2013
Registered Since: July 1, 2002

W. Dan Whittaker
Manager of Operations, APIQR

QUALITY REGISTRAR

2. API 5L



Certificate of Authority to use the Official API Monogram

License Number: 5L-0082 **ORIGINAL**

The American Petroleum Institute hereby grants to

TUBACERO, S DE RL DE CV.
Ave. Guerrero 3729 Nte.
Monterrey, N. L.
Mexico

the right to use the Official API Monogram® on manufactured products under the conditions in the official publications of the American Petroleum Institute entitled API Spec Q1® and **API Spec 5L** and in accordance with the provisions of the License Agreement.

In all cases where the Official API Monogram is applied, the API Monogram should be used in conjunction with this certificate number: **5L-0082**

The American Petroleum Institute reserves the right to revoke this authorization to use the Official API Monogram for any reason satisfactory to the Board of Directors of the American Petroleum Institute.

The scope of this license includes the following: **Manufacturer of Line Pipe Plain End at PSL 1:** Type of Pipe: HFW, SAWL / Delivery Condition: R, M / Highest Grade: X70; **Manufacturer of Line Pipe Plain End at PSL 2:** Type of Pipe: HFW, SAWL / Delivery Condition: N, M / Highest Grade: X80 / Service Annex: H, J

QMS Exclusions: Section 7.3, Design and Development

American Petroleum Institute

Effective Date: FEBRUARY 28, 2011
Expiration Date: NOVEMBER 19, 2013

To verify the authenticity of this license, go to www.api.org/compositelist.

Director of Global Industry Services

American Petroleum Institute

CORPORATE SEAL

III. LIST OF MAIN PROJECT

CLIENTE	PAÍS	DESCRIPCIÓN	GRADO	AÑO	METROS	TONS	PROCESO
Importadora Industrial Liang, S.A. de C.V. Ductos 2009 FYRE Poza Rica (PEMEX)	México	12”X0.375”	X52 PSL1	2011	40,000	2,950	ERW
PEMEX EXPLORACIÓN Y PRODUCCION Cont. 424011601 "Suministro de Tubería de Acero al carbono de diferentes diámetros, con o sin costura, para la construcción de Gasoductos y Lineas de descarga en el Activo Integral Burgos” L360 MB (Equivalente a X52) ISO 3183-2, NRF-001-PEMEX-2007 HNA	México	6.625”x0.250” 8.625”x0.322”	L360 MB L360 MB	2011-2012 Contrato Abierto	66,000 32,000	1,674 1,384	ERW ERW
HOC OFFSHORE, S. DE R.L. DE C.V. “Procura y construcción de un Oleogasoducto de 20"Ø x 3.05 KM de la Plataforma Kuil-A hacia la Plataforma Homol-A; a instalarse en el Golfo de México”. (PEMEX) L450 MCS (Equivalente a X65 GA) ISO 3183-3, NRF-001-PEMEX-2007 HA	México	20”x0.688	L360 MCS	2011	3,329	703	SAW
PEMEX EXPLORACIÓN Y PRODUCCION Cont. 425000651 “Adquisición de tuberías de diferentes diámetros para los Activos Integrales de la Región Sur, [Paquete RS-1]” L360 MCS (Equivalente a X52 GA) ISO 3183-3, NRF-001-PEMEX-2007 HA	México	10.750”x0.365” 12.750”x0.375”	L360 MCS L360 MCS	2011-2012 Contrato Abierto	24,440 13,688	1,472 1,010	ERW ERW
Servicios y Construcciones Terrestres, S.A. de C.V. “Construcción del Gasoducto de 36"Ø X 9.4 Batería Luna-Batería Pijije”. (PEMEX) L360 MCS (Equivalente a X52 GA) ISO 3183-3, NRF-001-PEMEX-2007 HA	México	36”x0.938”	L360 MCS	2010	9,871	5,160	SAW
COBRA INSTALACIONES MÉXICO, S.A. DE C.V. "Ducto de 10" x 148 Km para Gasolinoducto del Bloque Nejo a CPG del Km-19" Gasolinoducto de EDR Nejo 3 A EDR Nejo 1 y a EDR Nejo 2 Gasolinoducto de EDR Nejo 2 al CML	México	10.750”x0.250” 10.750”x0.250” 16”x0.250”	X52 M PSL2	2010	122,000 8,600 9,600	5,090 359 601	ERW
LM VAGA CONSTRUCCIONES S.A. DE C.V. LPG DE 20" D.N. PAJARITOS – PALOMAS (PEMEX) L360 MB ISO 3183-2, NRF-001-PEMEX-2007 HNA	México	20”x0.500” 20”x0312”	L360 MB L360 MB	2010	1,520 1,643	236 163	SAW

CLIENTE	PAÍS	DESCRIPCIÓN	GRADO	AÑO	METROS	TONS	PROCESO
PERMADUCTO, S.A. DE C.V. Gasoducto de 24"Ø x 16 km de la Plataforma Homol-A hacia la Plataforma Chuc-A. (PEMEX) L360 MCS (Equivalente a X52 GA) ISO 3183-3, NRF-001-PEMEX-2007 HA	México	24”x0.688”	L360 MCS	2010	17,447	4,448	SAW
GLOBAL OFFSHORE MÉXICO S. DE R.L. DE C.V. Gasoducto de BN de 24” Ǿ X 8.4 Km , de la interconexión submarina de la línea L-156 (salida) hacia la plataforma E-KU-A2 (llegada) Campo Ku-Maloob-Zaap,. (PEMEX) L360 MB ISO 3183-2, NRF-001-PEMEX-2007 HNA	México	24”x0.688” 24”x0.812”	L360 MB L360 MB	2010	8,274 378	2,130 113	SAW
Corpac 11225	Colombia	12.750”x0.375	X65 PSL	2010	45,000	3,319	ERW
GLOBAL OFFSHORE MÉXICO Gasoducto de 36" Ø X 23.5 KM aprox., de la plataforma E-KU-A2 hacia AKAL-C6 en el campo Ku-Maloob-Zaap. (PEMEX) L360 MCS (Equivalente a X52 GA) ISO 3183-3, NRF-001-PEMEX-2007 HA	México	36”x0.875” 36”x1”	L360 MCS L360 MCS	2010	27,014 524	13,189 292	SAW
Corpac 11218	Colombia	12.750”x0.375”	X42	2010	10,000	737	ERW
JD Fields 50117	USA	16”x0.500”	X52 PSL2 GA	2010	4,465	550	ERW
Corpac 11106	Colombia	16x0.375	X42	2010	6,932	645	ERW
ICACSA Construcciones, S. de R.L. de C.V. "LINEA DE 8” Ø x 14.765 km. JUJO-PAREDÓN" L360 MB (Equivalente a X52) ISO 3183-2, NRF-001-PEMEX-2007 HNA	México	8.625”x0.344”	L360 MB	2010	14,720	667	ERW
Corpac 10568	Colombia	16x0.375	X42	2010	17,513	1,631	ERW
Energia Occidente de México, de R.L. de C.V. “Gasoducto a Guadalajara, Jalisco” (CFE)	México	30”x0.335” 24”x0.322” 24”x0.386”	X70 PSL2 X70 PSL2 X70 PSL2	2009-2010	102,480 2,884 3,386	16,194 351 491	SAW
Gandy Technologies 9020	Canada	24”x0.410”	A1053	2009	3,353	515	ERW/SAW
Corpac 10315	México	16x0.375	L360 MCS	2009	16,752	1,560	ERW
Corpac 10452	Colombia	16x0.375	5LB/X42	2009	6,000	522	ERW
CONDUX S.A. DE C.V. "Gasoducto de 20” Ø x 3.4 km. aprox. de la Plataforma PP-KU-I hacia la Plataforma PP-KU-S (KMZ-55), en el campo Ku-Maloob-Zaap" (PEMEX) L360 HA (Equivalente a X52) ISO 3183-3, NRF-001-PEMEX-2007	México	20”x0. 500”	L360 HA	2009	2,954	458	SAW

CLIENTE	PAÍS	DESCRIPCIÓN	GRADO	AÑO	METROS	TONS	PROCESO
CONAMSA Urbanizadora, S.A. de C.V., Construcciones GV de Monterrey, S.A. de C.V., Pavimentaciones y Excavaciones, S.A. de C.V. Proy. Integral de Infraestructura de Agua Potable y Saneamiento Monterrey V Tanque Alianza Real al Tanque Fraile I Tramo I y II en García, N.L. y Tanque Fraile II al Tanque García en García, N.L.	México	24”x0.375”	5L B	2009	9,966	1,403	SAW
Cobra Instalaciones México, S.A. de C.V. “Tubería de 8" de diámetro para Gas Crudo y Gas Procesado” L360 HNA (Equivalente a X52) ISO 3183-2, NRF-001-PEMEX-2007	México	8.625”x0.344”	L360 HNA	2009	14,600	661	ERW
GPA Energy S.A. de C.V. “Gasoducto 30” x 67 Kms. Granjeno-Sta. Elena” L485 MB (Equivalente a X70) ISO 3183-2, NRF-001-PEMEX-2007 HNA	México	30”x0.469”	L485 MB	2009	67,400	14,836	SAW
Hoc Offshore S.A. de C.V. “Ducto de 20" diam x 15 kms de la plataforma Xanab-1 a la plataforma Yaxche-B” (PEMEX) L450 MCS (Equivalente a X65) ISO 3183-3, NRF-001-PEMEX-2007 HNA	México	20”x0.750”	L450 MCS	2009	15,211	3,490	SAW
PEMEX EXPLORACIÓN Y PRODUCCION “Suministro de tubería de acero al carbono de diferentes diámetros para líneas de conducción del Activo Integral Veracruz” L360 MB (Equivalente a X52) ISO 3183-2, NRF-001-PEMEX-2007 HNA	México	10.750”x0.365”	L360 MB	2009 Contrato abierto	18,700	1,126	ERW
PEMEX EXPLORACIÓN Y PRODUCCION “Adq. de Tubería Servicio no Amargo de 6” Ø x 0.250, 8” Ø x .250, 10” Ø x 0.250, y 12” Ø x 0.280” de espesor de pared para el Proyecto Aceite Terciario del Golfo, incluye protección mecánica y puesta en sitio” L360 MB (Equivalente a X52) ISO 3183-2, NRF-001-PEMEX-2007 HNA	México	6.625”x0.250” 8.625”x0.250” 10.750”x0.250” 12.750”x0.281”	L360 MB L360 MB L360 MB L360 MB	2009	72,000 168,000 4,000 4,000	1,824 5,590 167 222	ERW ERW ERW ERW
PEMEX EXPLORACIÓN Y PRODUCCION “Suministro de tuberías conductoras de 20” incluyendo la asistencia técnica en la instalación”	México	20”x0.625” Servicios 20”x0.625” +Zapata Flot.	X52 189 Piezas	2009-2012 Contrato abierto	150,847 12,633	29,031 454	SAW SAW
PEMEX EXPLORACIÓN Y PRODUCCION "Adquisición de tubería de línea, diferentes diámetros para los Activos de la Región Sur" L360 MB (Equivalente a X52) ISO 3183-2, NRF-001-PEMEX-2007 HNA	México	16”x0.500”	L360 MB	2008-2009 Contrato abierto	28,544	3,515	ERW

CLIENTE	PAÍS	DESCRIPCIÓN	GRADO	AÑO	METROS	TONS	PROCESO
GLOBAL OFFSHORE MÉXICO Oleogasoducto de 24" x 2.1 km aprox. de longitud de PP-Maloob-C hacia PP-Ku-H. (PEMEX) L360 MCS (Equivalente a X52 GA) ISO 3183-3, NRF-001-PEMEX-2007 HA	México	24”x0.688” 24”x0.750”	L360 MCS L360 MCS	2008-2009	1,878 537	478 149	SAW
Corpac 8493	Colombia	18”x0.344” 14”x0.375”	X65 PSL2 X65 PSL2	2008	18,000 37,000	1,738 3,005	ERW ERW
Corpac 8499	USA	16”x0.375” 16”x0.250” 16”x0.219”	X56 PSL2 X56 PSL2 X56 PSL2	2008-2009	3,048 4,828 75,810	284 302 4,164	ERW
Copac 8467	Colombia	16”x0.375”	5LB/X42 PSL1	2008	6,000	559	ERW
Corpac 8438	USA	16”x0.250”	X60 PSL2	2008	45,720	2,861	ERW
National Gas Company of Trinidad and Tobago (NGC) Union Pipeline Project	Trinidad & Tobago	24”x0.562” 16”x0.375”	X70 PSL2 X65 PSL2	2008	8,703 1,964	1,822 183	SAW ERW
PEMEX EXPLORACIÓN Y PRODUCCION “Suministro de tuberías conductoras de 30” incluyendo la asistencia técnica en la instalación”	México	30”x1.000” Servicios 30”x1.000” +Zapata Flot.	X52 30 Piezas	2008-2011 Contrato abierto	15,500 1,270	7,143 357	SAW SAW
CONDUX, S.A. DE C.V. Ayin A (PEMEX) L450 MCS (Equivalente a 65 GA) ISO 3183-3, NRF-001-PEMEX-2007 HA	México	20”x0.750”	L450 MCS	2008-2009	22,385	5,136	SAW
CONDUX, S.A. DE C.V. Tumut-Chuc-A (PEMEX) L360MCS (Equivalente a 52 GA) ISO 3183-3, NRF-001-PEMEX-2007 HA	México	20”x0.438” 20”x0.625”	L360 MCS	2008-2009	9,628 213	1,311 41	SAW
OCEANOGRAFIA, S.A DE C.V. Gasoducto Plataforma Ixtal-A a la Plataforma Abkatun-A (PEMEX) L415 MCS (Equivalente a 60 GA) ISO 3183-3, NRF-001-PEMEX-2007 HA	México	30”x0.750”	L415 MCS	2008	21,775	7,592	SAW
Tractebel Digaqro S.A. de C.V. Gasoducto Querétaro.	México	10.750”x0.312”	X52	2008	19,500	1,009	ERW
GLOBAL OFFSHORE MÉXICO Oleogasoducto de 24” Ø X 12 Km de Longitud para el Oleogasoducto clave 252 del km. 6+100 a la plataforma Abkatun D (PEMEX) L360 MCS (Equivalente a X52 GA) ISO 3183-3, NRF-001-PEMEX-2007 HA	México	24”x0.688” 24”x0.750”	L360 MCS L360 MCS	2008	12,383 275	3,157 76	SAW
CORPAC 8311	ESTADOS UNIDOS	16”x0.250” 16”x0.375” 16”x0.250”	X52 PSL2 X65 PSL2 X60 PSL2	2008	42,672 48,768 15,240	2,671 4,542 954	ERW

CLIENTE	PAÍS	DESCRIPCIÓN	GRADO	AÑO	METROS	TONS	PROCESO
Dowell Schlumberger de México, S.A. De C.V. Ejecución de obras de perforación e infraestructura en la Cuenca de Burgos (PEMEX) L360 MB (Equivalente a X52) ISO 3183-2, NRF-001-PEMEX-2007	México	24”x0.750” 24”x0.875”	L360 MB L360 MB	2008	40,400 1,000	11,197 322	SAW
OCEANOGRAFIA, S.A DE C.V. Oleogasoducto Plataforma Sea Pony Che-1 a la Plataforma Homol-A (PEMEX) L415 MCS (Equivalente a 60 GA) ISO 3183-3, NRF-001-PEMEX-2007 HA	México	16”x0.500”	L415 MCS	2008	2,659	328	ERW
PEMEX EXPLORACIÓN Y PRODUCCION “Suministro de tuberías conductoras de 20” incluyendo la asistencia técnica en la instalación”	México	20”x0.625” Servicios 20”x0.625” +Zapata Flot.	X52 34 Piezas	2006-2008	69,140 3,113	13,341 82	SAW SAW
Heisco (KOC-Kuwait Oil Company)	Kuwait	20”x0.625”	X52 psl 2	2008	4,284	825	SAW
Corpac 8213	Estados Unidos	12.750”x0.375”	X52 psl2	2008	22,464	1,557	ERW
Corpac 7866	Colombia	14”x0.375”	X42	2008	2,570	209	ERW
Kentech ME & I / Corpac	México	48”x0.562”	ASTM A134	2008	1,967	834	SAW
CONSTRUCTORA MONROG, S.A. DE C.V. “Gasoducto de 36” del área de trampas separación Oxiacaque a trampas compresoras Cunducan." (PEMEX) L360 MCS (Equivalente a X52 GA) ISO 3183-3, NRF-001-PEMEX-2007 HA	México	36”x0.500” 24”x0.500” 20”x0.500” 42”x0.500”	L360 MCS L360 MCS L360 MCS 5L B	2008	6,417 268 12 27	1,815 50 2 58	SAW
OCEANOGRAFÍA, S.A. DE C.V. Oleogasoducto Atun-D – Bagre-A 12” (PEMEX) L360 MCS (Equivalente a X52 GA) ISO 3183-3, NRF-001-PEMEX-2007 HA	México	12.750”x0.375” 12.750”x0.406” 6.625”x0.250” 6.625”x0.312” 8.625”x0.344”	L360 MCS L360 MCS L360 MCS L360 MCS L360 MCS	2007-2008	12,577 278 435 172 25	928 22 11 6 1	ERW
SOCIEDAD IND. DE CONSTRUCC. ELECTRICAS, S.A. DE C.V. / MARUSA, S.A. DE C.V. Oleogasoducto Tizón a Batería Luna (PEMEX) L360 MCS (Equivalente a X52 GA) ISO 3183-3, NRF-001-PEMEX-2007 HA	México	20”x0.625”	L360 MCS	2007	10,552	2,031	SAW

CLIENTE	PAÍS	DESCRIPCIÓN	GRADO	AÑO	METROS	TONS	PROCESO
PROVEEDORES Y ASESORES DE COMERCIO EXTERIOR, S. A. DE C.V. Rehabilitación y Construcción de Ductos en el área de San Andrés Activo Integral Poza Rica – Altamira. (PEMEX) L360 MCS (Equivalente a X52 GA) ISO 3183-3, NRF-001-PEMEX-2007 HA	México	12.750"x0.375"	L360 MCS	2007	20,000	1,475	ERW
GLOBAL OFFSHORE MÉXICO Linea 252 de 24" IxtalA/Abkatun D Perforación. (PEMEX)	México	24"x0.750" 24"x0.625"	X52 G.A. X52 G.A.	2007	3,276 3,049	907 708	SAW
PEMEX PLORACIÓN Y PRODUCCION Ducto Entronque Arcabuz 5 a Planta Culebra Norte	México	24"x0.625" 24"x0.750"	X52 X52	2007	30,456 1,744	7,071 484	SAW SAW
DEMAR INSTALADORA Y CONSTRUCTORA, S.A. DE C.V. Gasoducto Marsopa a Punta de Piedra	México	20"x0.438" 20"x0.625"	X52 G.A. X52 G.A.	2007	36,745 1,300	5,004 250	SAW SAW
PEMEX GAS Y PETROQUIMICA BASICA Gasoducto Jalapa	México	48"x0.875"	X65	2007	22,476	14,730	SAW
PEMEX PLORACIÓN Y PRODUCCION Gasoducto Cuervito-Sierrita	México	24"x0.875"	X52	2006	34,349	11,046	SAW
OCEANOGRAFÍA, S.A. DE C.V. Líneas 48, 50 y Takin (PEMEX)	México	24"x0.750" 24"x0.812" 16"x0.375"	X52 G.A. X60 X52 G.A.	2006	7,602 5,559 9,389	2,107 1,664 874	SAW SAW ERW
OCEANOGRAFÍA, S.A. DE C.V. Líneas Marinas Sihil 3, 4, , TQ1 y TQ3 (PEMEX)	México	20"x0.438" 24"x0.562" 12.750"x0.344" 12.750"x0.500" 16"x0.375" 8.625"x0.344"	X52 G.A. X52 G.A. X52 G.A. X52 G.A. X52 G.A. X52 G.A	2006	622 586 1,756 109 3,440 427	85 123 119 11 320 19	SAW SAW ERW ERW ERW ERW
OCEANOGRAFÍA, S.A. DE C.V. Líneas Marinas Paquete Bolontiku (PEMEX)	México	16"x0.469" 16"x0.500" 10.750"x0.365"	X60 G.A. X60 G.A. X52 G.A.	2006	2,090 900 6,300	241 111 379	ERW
CONDUX, S.A. DE C.V. Líneas Marinas Paquete H (PEMEX)	México	20"x0.625" 20"x0.562" 30"x0.812"	X52 X52 X52 G.A.	2006	145 4,788 6,100	28 831 2,298	SAW
PEMEX PLORACIÓN Y PRODUCCION Tubería para Dos Bocas, Tbs.	México	30"x1.000"	API 2B	2006	2,004	924	SAW
GLOBAL OFFSHORE MÉXICO Linea 47 (PEMEX)	México	24"x0.750"	X52 G.A.	2006	8,528	2,363	SAW

CLIENTE	PAÍS	DESCRIPCIÓN	GRADO	AÑO	METROS	TONS	PROCESO
GLOBAL OFFSHORE MÉXICO Gasoducto Akal Gr a Akal-C/6 y Nitrogenoducto 36" (PEMEX)	México	36”x0.812” 36”x0.875” 36”x0.688”	X60 X60 X52 G.A.	2006	17,458 305 2,537	7,928 149 980	SAW
GLOBAL OFFSHORE MÉXICO Líneas Marinas 38, 39, 40 y 41 (PEMEX)	México	30”x0.812” 30”x0.875” 24”x0.688”	X52 G.A. X52 G.A. X52 G.A.	2006	10,955 9,162 8,150	4,127 3,711 2,071	SAW
HOC OFFHORE, S. DE R.L. DE C.V. Cinco ductos marinos y dos Nitrogenoductos de 24” (PEMEX)	México	24”x0.562” 24”x0.625” 20”x0.500” 24”x0.750” 24”x0.938” 20”x0.562” 20”x0.625”	X52 G.A. X52 G.A. X52 G.A. X60 X60 X52 X52	2006	180 108 4,256 17,663 700 3,500 288	38 25 659 4,895 240 608 55	SAW
GREEN ENERGY LIBRAMIENTO, S. DE R.L. Gasoducto Querétaro (PEMEX)	México	24”x0.406”	X65	2005-2006	65,935	10,038	SAW
GLOBAL OFFSHORE MÉXICO Líneas Marinas 16 (PEMEX)	México	36”x0.875” 36”x0.938”	X52 G.A X52 G.A.	2005-2006	24,161 268	11,802 140	SAW
PEMEX PLORACIÓN Y PRODUCCION Gasoducto Sierrita –Cuervitos	México	24”x0.875	X52	2005-2006	13,050	4,197	SAW
GLOBAL OFFSHORE MÉXICO Líneas Marinas 13 y 27 (PEMEX)	México	12.750”x0.375” 12.750”x0.500” 24”x0.562” 24”x0.625”	X52 X52 X52 G.A X52 G.A.	2005	1,411 73 2,256 110	104 7 466 25	ERW ERW SAW SAW
TRANSPORTADORA DE GAS NATURAL DE LA HUASTECA / TRANSCANADA Gasoducto Tamazunchale (Comisión Federal de Electricidad)	México	36”x0.375” 36”X0.449” 36”X0.539”	X65 PSL2 X65 PSL2 X65 PSL2	2005	55,029 6,000 2,556	11,685 1,522 776	SAW
OCEANOGRAFÍA, S.A. DE C.V. Gasoducto de Enlace a Pol A (PEMEX)	México	36”x0.750” 36”x1.000”	X52 GA X52 GA	2005	56,600 305	23,783 171	SAW
CONDUX, S.A. DE C.V. Oleogasoducto Líneas 3, 7, 8 y 30 (PEMEX)	México	30”x0.812” 24”x0.688” 24”x0.625” 12.750”x0.375” 12.750”x0.500”	X52 G.A. X52 G.A. X52 G.A. X52 X52	2005	7,560 4,119 2,476 677 64	2,847 1,050 575 50 6	SAW SAW SAW ERW ERW

CLIENTE	PAÍS	DESCRIPCIÓN	GRADO	AÑO	METROS	TONS	PROCESO
HOC OFFHORE, S. DE R.L. DE C.V.	México	24”x0.688”	X52 G.A.	2005	1,905	486	SAW
Oleogasoducto Líneas 4, 6, 31 y 32		24”x0.625”	X52 G.A.		2,025	470	SAW
(PEMEX)		12.750”x0.375”	X52		6,724	496	ERW
		12.750”x0.500”	X52.		134	13	ERW
CONDUX, S.A. DE C.V.	México	20”x0.812”	X60 G.A.	2005	506	126	SAW
Oleogasoductos SINAN de 16” y 20”		16”x0.500”	X60 G.A.		3,453.6	425	ERW
(PEMEX)		16”x0.500”	X52 G.A.		1,502	185	ERW
PEMEX EXPLORACIÓN Y PRODUCCION Gasoducto Planta Cuervitos a Planta Culebra Sur.	México	24”x0.875”	X52	2005	20,157	6,482	SAW
PEMEX EXPLORACIÓN Y PRODUCCION Oleogasoducto Arroyo Prieto 17-Bateria Ogarrio 5	México	8.625” x 0.312“ 8.625” x 0.375“	X-52	2005	19,550 2,050	805 100	ERW
GLOBAL OFFSHORE MÉXICO	México	24”x0.688”	X52 S.G	2005	2,512	640	SAW
Oleoducto PP-MALOB-B		12.750”x0.375”	X52		3,445	254	ERW
(PEMEX)		20”x0.562”	X52		3,865	671	SAW
		12.75”x0.500”	X52		153	15	ERW
		20”x0.625”	X52.		247	48	SAW
GLOBAL OFFSHORE MÉXICO Oleoducto Lobina-Carpa (PEMEX)	México	16”x0.500” 12.750”x0.500”	X52 S.G. X52 S.G.	2005	36,126 15,094	4,450 1,470	ERW
CONDUX, S. A. DE C.V.	México	24”x0.750”	X52 S.G.	2004-2005	45,284	12,550	SAW
Oleogasoducto Yaxche-A-Bateria		24”x1.000”	X52 S.G.		1,651	603	SAW
(PEMEX)		16”x0.500”	X52 S.G.		10,321	1,270	ERW
Oceanografía	México	20”x0.500”	X52	2004	20,899	3,238	SAW
Líneas 19, 20 y 24		20”x0.562”	X52		7,188	1,248	
(PEMEX)		20”x0.625”	X52		597	115	
LIPSA Gasoducto 36 », Dos Bocas la Trinidad (PEMEX)	México	36”x0.812”	X60 S.G.	2004	14,688	6,670	SAW
CONDUX	México	30”x0.688”	X52 S.G.	2004	2,579	827	SAW
Dos Líneas KU		30”x0.750”	X52 S.G.		4,190	1,461	
(PEMEX)							
CORPAC (ECOPETROL)	Colombia	16”x0.344”	X60	2004	10,000	856	ERW
SIGMA Rehabilitación Oleoducto de 24 » Madero-Caderyta (PEMEX)	México	24”x0.375”	X52	2004	10,000	1,408	SAW

CLIENTE	PAÍS	DESCRIPCIÓN	GRADO	AÑO	METROS	TONS	PROCESO
HOC OFFHORE, S. DE R.L. DE C.V. Oleogasoducto May-Costero (PEMEX)	México	24”x0.688” 24”x0.875” 20”x0.625” 20”x0.812”	X52 S. G. X52 S.G. X52 S.G. X52 S.G.	2004	17,058 163.2 2,962.60 213.30	4,348 52 570 53	SAW
GLOBAL OFFSHORE MÉXICO Oleogasoducto Pol A-Rebombeo (PEMEX)	México	36”x0.750” 36”x0.875”	X52 S. G. X52 S. G.	2004	50,606 256	21,263 125	SAW
CONSTRUCCIONES MARITIMAS MEXICANAS (CMM) Oleogasoducto Ixtal-Manik (PEMEX)	México	24”x0.562” 24”x0.812” 24”x0.625”	X52 S. G. X52 S. G. X52 S. G.	2004	18,095 81 4,430	3,788 24 1,029	SAW
GLOBAL OFFSHORE MÉXICO Ductos Akal (PEMEX)	México	24”x0.562” 12.750”x0.375” 12.750”x0.500”	X52 S. G. X52 S. G. X52 S. G.	2004	4,529 427 148	948 32 14	SAW ERW ERW
GLOBAL OFFSHORE MÉXICO Ductos Anillo de Media Luna (PEMEX)	México	20”x0.438” 20”x0.625”	X52 S. G. X52 S. G	2004	24,952 769	3,398 148	SAW
ICA FLUOR DANIEL (OIL PLATFORMS: MAY-A AND MAY-B)	México	30”x1.000”	API 2B	2003	2,228	1,027	SAW
SIEMENS / CBAY (OIL PLATFORM: IXTAL)	México	58.5”, 30”,54” y 48”	API 2B	2003	2,464	1,312	SAW
CMM	México	20”x 0.750”	X-52 S.G.	2003	8,254	2,298	SAW
CMM	México	20”x 0.750”	X-52 S.G.	2003	9,174	2,105	SAW
FYRESA	México	24” x 0625”	X-52	2002-2003	23,000	5,340	SAW
PEMEX	México	36” x 0.750”	X-52 S.G.	2002-2003	6,251	2,656	SAW
ELECTRICITE DE FRANCE	México	30” 20” 16”	X-70 X-70 X-70	2002	26,450 22,561 6,377	4,092 1,827 413	SAW ERW ERW
KINDER MORGAN Gasoducto Roma – Mier – Mty Project	México	30” X 0.344” 30” X 0.375” 30”	X-70 X-70 X-70	2002	27,993 38,393 9,300	5,000 6,225 2,050	SAW
TECHINT EL PASO ENERGY Gasoducto San Fdo Tamps,– Est. 19	México	36” x 0.469” 36”	X-65 X-65	2002	67,875 1,422	17,977 469	SAW
PEMEX	México	6.625” x 0.250” 6.625 x 0.250“	X-52 S.G. X-52	2002	8,000 4,000	200 110	ERW
GLOBAL OFFSHORE MÉXICO	México	36” X 0.875”	X-52 S.G.	2001-2002	24,233	11,030	SAW

CLIENTE	PAÍS	DESCRIPCIÓN	GRADO	AÑO	METROS	TONS	PROCESO
FABRIGAS	Guatemala	120” X 0.562”	A-139-E	2001	210	227	SAW
		108” X 0.688”	A-139-E		160	191	
		100” X 0.818”	A-139-E		100	131	
		100” X 1.250”	A-139-E		240	483	
		60” X 0.812”	A-139-E		75	59	
CONSTRUCTORA LIMPEZ	México	16” X 0.438”	X-52 S.G.	2001	10,650	1,154	ERW
FYRESA	México	30” X 0.344”	X-52	2001	7,000	1,134	SAW
COBSA	México	20” X 0.312”	X-52	2001	7,658	748	ERW
CONSTRUCCIONES Y DISEÑOS ROHER	México	6.625” X 0.280”	X-42	2001	28,940	817	ERW
		8.625” X 0.344”	X-42		20,580	874	
		10.750” X 0.344”	X-52		6,800	387	
TRACOTAMSA	México	10.750” X 0.344”	X-52	2001	26,000	1,566	ERW
GLOBAL OFFSHORE MÉXICO	México	24” X 0.625”	X-52 S.G.	2001	3,416	793	SAW
		24” X 0.562”	X-52 S.G.		6,246	1,308	
CONSTRUCTORA AGUILAR SILVA	México	10.750” X 0.365”	X-52	2001	10,000	602	ERW
GAS NATURAL MÉXICO	México	24” X 0.500”	X-65	2001	6,500	1,214	SAW
CMM	México	24” X 0.625”	X-52 S.G.	2001	7,248	1,683	SAW
		24” X 0.688”	X-52 S.G.		3,600	836	
PEMEX	México	6.625” X 0.280”	X-52	2001	14,000	395	ERW
PEMEX	México	12.750” X 0.330”	X-52	2001	15,150	987	ERW
OPC-BN MÉXICO	México	138” X 1.125”	A-134	2000	304	756	SAW
PEMEX	México	24” X 0.688”	X-60	2000	4,920	1,255	SAW
PEMEX	México	30” X 0.500”	X-65	2000	4,550	1,068	SAW
SERVICIOS DE AGUA Y DRENAJE DE MONTERREY Tramo comprendido en Santiago, N. L.	México	60”x0500”	5LB	2000	1,600	757	SAW
GAS NATURAL	México	6.625” X 0.322”	5LB	2000	10,000	323	ERW
PEMEX	México	8.625” X 0.312”	X-52	2000	22,800	940	ERW
PEMEX	México	8.625” X 0.322”	5LB	2000	5,000	212	ERW
		48” X 0.625”	X-65		962	436	SAW
MEXIGAS	México	14” X 0.210”	X-65	2000	5,000	230	ERW
		12.750” X 0.203”	X-65		7,632	309	ERW
		10.750” X 0.203”	X-65		3,200	109	ERW

CLIENTE	PAÍS	DESCRIPCIÓN	GRADO	AÑO	METROS	TONS	PROCESO
SK ENGINEERING AND CONSTRUCTION	México	42” X 0.406”	A55 CL13	1999	335	90	SAW
		42” X 0.406”	B55 CL12		174	47	
		36” X 0.375”	B55 CL12		360	77	
		36” X 0.500”	B55 CL12		672	190	
		36” X 0.375”	C55 CL12		2,508	533	
		48” X 0.500”	B55 CL12		1,524	575	
		48” X 0.406”	B55 CL12		24	7	
		42” X 0.406”	A55 CL13		247	66	
		30” X 0.375”	B55 CL12		1,942	343	
		30” X 0.375”	C55 CL12		2,460	434	
		30” X 0.375”	A55 CL13		288	51	
		30” X 0.500”	B55 CL12		492	115	
		30” X 0.500”	B55 CL12		408	96	
		30” X 0.625”	B55 CL12		24	7	
		30” X 0.375”	C55 CL12		192	34	
		30” X 0.375”	X-60		444	78	
		30” X 0.375”	A55 CL13		474	84	
		30” X 0.500”	X-60		120	28	
		30” X 0.500”	B55 CL12		54	13	
		36” X 0.312”	B55 CL12		96	17	
CORPAC STEEL	Colombia	20” X 0.375”	X-60	1999	3,000	350	ERW
		20” X 0.500”	X-60		1,000	155	
BUFETE INDUSTRIAL	México	36” X 0.875”	X-65	1999	1,262	660	SAW
TEXAS GAS (SHELL OIL)	México	16” X 0.250”	X-65	1999	22,141	1,386	ERW
		16” X 0.281”	X-65		27,061	1,900	
EVANS INTERNATIONAL ASSOCIATES, INC.	Jamaica	18” X 0.500”	A252-2	1999	3,146	437	SAW
PEMEX	México	24” X 0.312”	X-60	1999	18,150	2,129	ERW
TECNOGAS	México	24” X 0.250”	X-52	1999	9,500	897	ERW
PEMEX	México	10.750” x 0.250”	X-52	1999	7,975	333	ERW
		16”x 0.500”	X-52		610	75	
GAS NATURAL DE JUAREZ	México	12.750” x 0.375”	X-42	1999	4,080	300	ERW
		8.625” x 0.322”	A 53 B		2,976	127	
		6.625” x 0.280”	A 53 B		1,178	33	
ICA FLOUR DANIEL	México	12.750” X 0.500”	X-52	1998	15,168	1,477	ERW
BUFETE INDUSTRIAL	México	20” X 0.625”	X-52 S.G.	1998	19,714	3,794	SAW
		20” X 0.688”	X-52 S.G.		223	47	
		24” X 0.750”	X-52 S.G.		1,383	383	
		24” X 0.688”	X-52 S.G.		26,364	6,720	
PEMEX	México	10.750” x 0.279”	X-52	1998	17,238	1,865	ERW

CLIENTE	PAÍS	DESCRIPCIÓN	GRADO	AÑO	METROS	TONS	PROCESO
CCC PEMEX	México	24” x 0.625”	X-65 S.G.	1998	7,826	1,804	SAW
		36” x 0.875”	X-65 S.G.		5,205	2,541	SAW
		36” x 0.900”	X-65 S.G.		17,238	8,944	SAW
		36” x 0.875”	X-65 S.G.		15,738	7,691	SAW
		36” X 1.125”	X-65 S.G.		126	79	SAW
		16” X 0.475”	X-65 S.G.		2,123	249	ERW
		20” x 0.562”	X-65 S.G.		256	45	SAW
SK ENGINEERING	México	24” x 0.312”	X-60	1998	224,952	26,425	SAW
		24” x 0.375”	X-60		36,468	5,135	SAW
		24” x 0.500”	X-60		2,184	407	SAW
		12.750” X 0.250”	X-60		246,490	12,242	ERW
		12.750” X 0.281”	X-60		25,596	1,425	ERW
		12.750” X 0.406”	X-60		1,500	120	ERW
PEMEX	México	30” x 0.500”	A 36	1998	17,238	4,045	SAW
		30” x 0.625”	A 36		398	116	
		30” x 0.750”	A 36		38	13	
		30” x 0.875”	A 36		27	10	
		30” x 1.000”	A 36		15,738	6,818	
PETROZUATA	Venezuela	36” x 0.438”	X-52	1998	20,000	4,943	SAW
		36” x 0.500”	X-52		1,153	325	
PROMIGAS	Colombia	24” x 0.375”	X-60	1997	23,500	3,323	SAW
		24” x 0.500”	X-60		2,850	534	
PEMEX	México	36” x 0.875”	X-52 S.G.	1997	7,417	3,893	SAW
PEMEX	México	24” x 0.406”	X-52 S.G.	1997	14,700	1,880	SAW
BECHTEL	India	24” x 0.688”	A 671	1997	25,300	7,685	SAW
		20” x 0.594”	A 671		3,920	895	
		18” x 0.500”	A 671		28,950	4,091	
VAN LEEUWEN PIPE & TUBE	Venezuela	24” X 0.375”	X-52	1997	10,099	1,847	ERW
		30” X 0.375”	X-52		2,406	441	
NOVA GAS	E.U.A.	48” X 0.500”	X-60	1997	4,800	1,800	SAW
PROTEXA PEMEX	México	36” x 0.875”	X-52 S.G.	1997	45,100	22,027	SAW
ARCOS-ARCABUS PEMEX	México	24” x 0.625”	X-52	1997	46,000	10,686	SAW
TITAS GAS	Bangladesh	20” x 0.469”	X-52	1997	41,000	5,968	SAW
		28” x 0.438”	X-52		298	57	
CEGSA PEMEX	México	24” x 0.469”	X-52 S.G.	1997	48,300	8,936	SAW
		24” x 0.562”	X-52 S.G.		5,410	1,521	
CMM PEMEX	México	24” x 0.750”	X-52 S.G.	1997	48,300	681	SAW
PEMEX	México	Pipe with WT up to 1.5”		1997	48,300 5,410	3,945	SAW
PEMEX	México	20" x 0.312"	X-52	1997	12,330	1,201	ERW

CLIENTE	PAÍS	DESCRIPCIÓN	GRADO	AÑO	METROS	TONS	PROCESO
EMPRESAS PÚBLICAS DE MEDELLIN	Colombia	20" x 0.250"	X-42	1997	49,400	3,910	ERW
		16" x 0.250"	X-42		12,520	790	
		8.625" x 0.188"	X-42		9,950	252	
		66.625" x 0.188"	X-42		579	115	
		4" x 0.188"	X-42		20,031	258	
		3" x 0.188"	X-42		19,615	194	
TENNECO GAS & TRANSMISSION	Australia	30" X 0.281"	X-70	1997	4,572	660	SAW
		30" X 0.375"	X-70		1,097	210	
		30" X 0.500"	X-70		427	110	
INDUSTRIAS DEL HIERRO	México	30" X 1.000"	A36 2B	1997	4,902	2,259	SAW
CCC PEMEX	México	30" x 0.750"	X-52 S.G.	1996	16,483	5,986	SAW
DICA PEMEX	México	24" x 0.625"	X-52	1996	16,483	2,492	SAW
AGUILAR SILVA PEMEX	México	36" x 0.812"	X-60	1996	16,483	4,793	SAW
ICA PEMEX	México	24" x 0.562"	X-52 S.G.	1996	16,483	7,282	SAW
COMMISA PEMEX	México	36" x 0.750"	X-52 S.G.	1996	16,483	17,707	SAW
JOSE CARTELLONE CONSTRUCC. CIVILES	Costa Rica	47" x 0.750"	X-52	1996	16,483	1,214	SAW
PEMEX GAS Y PETROQUIMICA BASICA	México	20" X 0.312"	X-52	1996	12,300	1,200	ERW
CONST. ESPECIALIZADAS DEL GOLFO PEMEX	México	24" X 0.469"	X-52 S.G.	1996	23,000	4,000	SAW
ENTUBAMIENTO Y CONST. S.A.	México	30" X 0.312"	X-65	1996	6,200	1,000	SAW
PETROECUADOR	Ecuador	20" X 0.500"	X-42	1996	5,000	775	SAW
McCONNELL DOWELL	Bangladesh	30" x 0.562"	X-52	1995	54,900	14,476	SAW
		30" x 0.688"	X-52		3,620	1,163	
		24" x 0.562"	X-52		100	21	
TENNECO GAS & TRANSMISSION	Australia	16" x 0.375"	X-65	1995	125,000	29,518	ERW
SOC. CONTRACTUAL EL ALBA	Chile	22" x 0.250"	5LB	1995	125,000	804	ERW
CONSTRUCTORA BELFI	Chile	30" x 0.469"	A 252 3	1995	125,000	2,244	SAW
PEMEX	México	24" x 0.562"	X-52	1995	53,328	2,220	SAW
PEMEX	México	24" x 0.688"	X-52	1995	53,328	3,432	SAW
PEMEX	México	16" x 0.312"	X-52	1995	53,328	4,140	ERW
DICA PEMEX	México	12.750" X 0.750"	X-52	1995	30,500	1,799	ERW
INDIAN OIL CORPORATION LTD.	India	22" x 0.250"	X-65	1994	686,000	60,000	SAW
		22" x 0.469"	X-65		350	59	
PEMEX	México	36" x 0.812"	X-52	1994	40,104	18,499	SAW
SERVICIOS CARRETEROS MEXICANOS	México	48" x 0.500"	A 36	1994	11,500	4,276	SAW

CLIENTE	PAÍS	DESCRIPCIÓN	GRADO	AÑO	METROS	TONS	PROCESO
ECOPETROL	Colombia	14" x 0.344"	X-60	1994	79,833	5,941	ERW
		20" x 0.250"	X-65		40,980	3,243	
		20" x 0.500"	X-65		12,020	1,554	
		16" x 0.375"	X-65		9,590	891	
		20" x 0.375"	X-65		1,110	129	
PEMEX	México	16" x 0.469"	X-52	1993	40,104	4,643	ERW
TENNECO	E.U.A.	36" x 0.375"	X-65	1993	10,272	2,181	SAW
		36" x 0.406"	X-65		5,335	1,225	
		36" x 0.500"	X-65		1,646	464	
TENNECO	E.U.A.	30" x 0.429"	X-70	1992	9,989	2,015	SAW
		30" x 0.515"	X-70		5,305	1,280	
		30" x 0.625"	X-70		7,285	2,126	
YACIMIENTOS PETROLIFEROS FISCALES BOLIVIANOS	Bolivia	16" x 0.250"	X-52	1992	108,749	6,865	ERW
PEMEX	México	16" x 0.375"	X-52	1991	219,898	20,446	ERW
PEMEX	México	16" x 0.344"	X-52	1991	78,935	6,735	ERW
TENNECO	E.U.A.	30" x 0.358"	X-70	1991	9,235	1,558	SAW
		30" x 0.429"	X-70		375	77	
		30" x 0.515"	X-70		1,006	243	
PETRO ECUADOR	Ecuador	16" x 0.375"	X-52	1991	167,000	15,528	ERW
BARIVEN	Venezuela	20"	5LB/X42/ X52	1991	77,820	9,825	SAW
PEMEX	México	36" x 0.812"	X-60	1988	85,000	38,576	SAW
YACIMIENTOS PETROLIFEROS FISCALES BOLIVIANOS.	Bolivia	10.750" x 0.250"	X-52	1986	479,053	20,163	ERW
PEMEX	México	36" x 0.812"	X-60	1984	121,603	55,188	SAW

IV. PRODUCTION CAPACITY

MILL	DIMENTIONS			STEEL GRADE	PROCESS	CAPACITY/MONTH		CAPACITY/YEAR	
	DIAMETER In.	LENGTH Ft.	THICKNESS In.			M. TONS.	METERS	M. TONS.	METERS
# 1	36"	40 - 51	0.500"	UP TO X-80	SAW	13,333	47,500	160,000	570,000
# 2	24"	40 - 51	0.375"	UP TO X-80	ERW/SAW	11,667	82,500	140,000	990,000
# 3	12 3/4"	30 - 60	0.312"	UP TO X-80	ERW	4,167	83,333	50,000	1,000,000
						29,167	213,333	350,000	2,560,000

NOTES:

1.- 3 shifts per day

2.- 6 days per week

3.- 25 days per month

4.- 12 months per year

5.- The production capacity calculation was done considering a representative product and the result is an approximated value of the nominal capacity.

V. MILL PRODUCTION CAPABILITIES

MILL. NO. 1
SAW PROCESS

JUNE, 2008

DIAM.	GRADE API	B	42	46	52	60	65	70	80
20"	MIN.	0.250"	0.250"	0.250"	0.250"	0.250"	0.250"	0.250"	0.250"
	MAX.	0.750"	0.750"	0.750"	0.750"	0.625"	0.625"	0.625"	0.625"
24"	MIN.	0.250"	0.250"	0.250"	0.250"	0.250"	0.250"	0.250"	0.250"
	MAX.	0.875"	0.875"	0.875"	0.875"	0.750"	0.750"	0.750"	0.750"
30"	MIN.	0.250"	0.250"	0.250"	0.250"	0.250"	0.250"	0.250"	0.250"
	MAX.	1.000"	1.000"	1.000"	1.000"	0.875"	0.875"	0.875"	0.875"
36"	MIN.	0.281"	0.281"	0.281"	0.281"	0.281"	0.281"	0.281"	0.281"
	MAX.	1.000"	1.000"	1.000"	1.000"	0.938"	0.938"	0.900"	0.875"
42"	MIN.	0.344"	0.344"	0.344"	0.344"	0.344"	0.344"	0.344"	0.344"
	MAX.	1.000"	1.000"	1.000"	1.000"	0.938"	0.938"	0.900"	0.875"
48"	MIN.	0.406"	0.406"	0.406"	0.406"	0.406"	0.406"	0.406"	0.406"
	MAX.	1.000"	1.000"	1.000"	1.000"	0.938"	0.938"	0.900"	0.875"

MILL NO. 2
DSAW / ERW PROCESS

JUNE, 2008

DIAM.	GRADE API	B	42	46	52	H-40 J-55	60	65	70	80
18"	MIN.	0.219"	0.219"	0.219"	0.219"	0.219"	0.219"	0.219"	0.219"	0.219"
	MAX.	0.500"	0.500"	0.500"	0.500"	0.500"	0.500"	0.500"	0.438"	0.438"
20"	MIN.	0.219"	0.219"	0.219"	0.219"	0.219"	0.219"	0.219"	0.219"	0.219"
	MAX.	0.625"	0.625"	0.625"	0.625"	0.562"	0.500"	0.500"	0.500"	0.500"
22"	MIN.	0.219"	0.219"	0.219"	0.219"	0.219"	0.219"	0.219"	0.219"	0.219"
	MAX.	0.625"	0.625"	0.625"	0.625"	0.562"	0.500"	0.500"	0.500"	0.500"
24"	MIN.	0.250"	0.250"	0.250"	0.250"	0.250"	0.250"	0.250"	0.250"	0.250"
	MAX.	0.625"	0.625"	0.625"	0.625"	0.625"	0.562"	0.562"	0.562"	0.562"
30"	MIN.	0.250"	0.250"	0.250"	0.250"	0.250"	0.250"	0.250"	0.250"	0.250"
	MAX.	0.625"	0.625"	0.625"	0.625"	0.625"	0.562"	0.562"	0.562"	0.562"
36"	MIN.	0.281"	0.281"	0.281"	0.281"	0.281"	0.281"	0.281"	0.281"	0.281"
	MAX.	0.625"	0.625"	0.625"	0.625"	0.625"	0.562"	0.562"	0.562"	0.562"

MILL NO. 3
ERW PROCESS

JUNE, 2008

DIAM.	GRADE API	B	42	46	52	H-40 J-55	60	65	70	80
6 5/8"	MIN.	0.156"	0.156"	0.156"	0.156"	0.156"	0.156"	0.156"	0.156"	0.156"
	MAX.	0.312"	0.312"	0.312"	0.312"	0.312"	0.312"	0.312"	0.281"	0.281"
8 5/8"	MIN.	0.188"	0.188"	0.188"	0.188"	0.188"	0.188"	0.188"	0.188"	0.188"
	MAX.	0.375"	0.375"	0.375"	0.375"	0.375"	0.375"	0.375"	0.375"	0.375"
9 5/8"	MIN.	0.188"	0.188"	0.188"	0.188"	0.188"	0.188"	0.188"	0.188"	0.188"
	MAX.	0.438"	0.438"	0.438"	0.438"	0.438"	0.438"	0.406"	0.375"	0.375"
10 3/4"	MIN.	0.188"	0.188"	0.188"	0.188"	0.188"	0.188"	0.188"	0.188"	0.188"
	MAX.	0.438"	0.438"	0.438"	0.438"	0.438"	0.438"	0.406"	0.406"	0.406"
12 3/4"	MIN.	0.188"	0.188"	0.188"	0.188"	0.188"	0.188"	0.188"	0.188"	0.188"
	MAX.	0.500"	0.500"	0.500"	0.500"	0.438"	0.438"	0.438"	0.406"	0.406"
13 3/8"	MIN.	0.188"	0.188"	0.188"	0.188"	0.188"	0.188"	0.188"	0.188"	0.188"
	MAX.	0.500"	0.500"	0.500"	0.500"	0.438"	0.438"	0.438"	0.406"	0.406"
14"	MIN.	0.188"	0.188"	0.188"	0.188"	0.188"	0.188"	0.188"	0.188"	0.188"
	MAX.	0.500"	0.500"	0.500"	0.500"	0.500"	0.469"	0.469"	0.438"	0.438"
16"	MIN.	0.188"	0.188"	0.188"	0.188"	0.188"	0.188"	0.188"	0.188"	0.188"
	MAX.	0.500"	0.500"	0.500"	0.500"	0.500"	0.500"	0.500"	0.500"	0.500"

CAPABILITIES PER PLANT

PLANT	PROCESS	MATERIAL	OUTSIDE DIAMETER (O.D.)	THICKNESS (W.T.)
1	SAW	PLATE	20" - 48"	0.250" - 1.000"
2	SAW	PLATE	18" - 36"	0.219" - 0.625"
2	ERW / SAW	COIL	18" - 30"	0.219" - 0.625"
3	ERW	COIL	6" - 16"	0.156" - 0.500"
5	SAW	PLATE	20” – 150”	0.250” – 2.500”

NOTES:

- In each plant, the maximum manufacturing grade is X-80.
- Maximum pipe length in plant 1 & 2 is 50 feet.
- Maximum pipe length in plant 3 is 60 feet.

VI. MANUFACTURING PROCESS

Following is a general description of Tubacero Manufacturing Process. Our main objective is to provide an idea of the pipe manufacturing process. Additionally, there is a Quality Manual, which was elaborated according to API Q1 and ISO 9001:2000 specifications.

CONTENTS

1.0 MATERIALS FLOW AND OPERATIONS

1. Raw Material Warehouse
2. Raw Material Inspection
3. Visual Inspection of plate and identification
4. Edge trimming
5. Electric Resistance Welding
6. Mill exit Ultrasonic Inspection
7. Pipe identification
8. Inside washing
9. Ends trimming
10. Grinding Area
11. Run on-off Tabs for SAW
12. Outside Identification and marking of SAW line
13. Inside welding
14. Outside welding
15. Welding tabs removal and inside cleaning
16. Visual Inspection
17. Ends grinding
18. Rounding and straightening press
19. Inside cleaning
20. Mechanical expansion
21. Hydrostatic test
22. X-Ray Inspection at the ends
23. Weld Ultrasonic Longitudinal Inspection
24. Ends Mechanical Beveling
25. End cropping and grinding Repairs
26. Final Visual Inspection
27. Weight, dimensions and identification
28. Shipment and Warehouse

2.0 DEFINITION

Tubacero has two main types of process for pipe manufacture, which are defined as Electric Resistance Welding (ERW) and Double Submerged Arc Welding. The following processes are included in each one:

ELECTRIC RESISTANCE	DOUBLE SUBMERGED ARC
- Continuous Forming	- Continuous Forming
- Finishing	- Double Submerged Arc
- Coating (Optional)	- Finishing
	- Coating (Optional)

3.0 CONTINUOUS FORMING

The continuous forming process includes from the moment of edge trimming of the plate and/or coil until this one is welded by high frequency electric resistance.

3.1.- Process Descriptions

The Continuous Forming is dived in the following operations:

Plates or Coils Inspection.- Before forming the material, a visual and dimensional inspection is performed in order to confirm that the steel meets the requirements demanded to the supplier regarding thickness, width and length, as well as to visually inspect the plate or coil surface in order to assure that it is free of marks or any other defects. In case the plate or coil is accepted, the inspector introduces the coil information and the number of the supplier into the system to verify that the material is certified.

Edge Trimming.- If required, the material edges are trimmed with 4 circular blades (2 on each end) in order to adjust width for the forming process. In the case of coil, before trimming the edges it passes through leveling equipment where the material is uncoiled and leveled as a preparation for edge trimming.

Pre-forming.- There are four motorized steps in cold pre-forming and each one has a superior role and inferior role, besides, between each step there are three trains with small rollers where the material goes through its first stage of forming until the plate progressively acquires the "U" shape.

Fin Passes.- This section has 3 stands with four rolls each, and the purpose is taking the pre-forming "U" plate to guide the edges to progressively form the "O" as a preparation for the electric resistance welding.

Electric Resistance Welding.- This section, which could be considered the most important, has 5 or 6 rolls depending on the diameters to be processed, where 2 pressure rollers are included; the equipment is Thermatool with a capacity of 600 KW where the power flows through 2 copper contacts. Electric resistance welding basic principle is melting to plastic level approximately 0.125" of the plate's edges in order to join them by pressure immediately afterwards. Within the same welding section, is the equipment for inside and outside trimming to eliminate all the exceeding material that is produce when welding pressure is applied.

Normalizing.- Immediately after the electric resistance welding is performed, the pipe goes in the same line through the normalizing section where there are 3 inductors of 400 KW and 3 Khz .Here, a 100% of the thickness is normalized in the welding line where the objective is that the structure of the normalized zone gets free of untemperede martensite.

Cooling.- All pipe goes through the cooling zone which has 2 sections: the first is an open area and immediately afterwards is the section where soluble water is applied to lower the pipe temperature before entering the sizer section.

Sizer .- Before the pipe exits the forming section, it goes through 3 stands of 4 rolls each with the objective of acquiring the final diameter and straightness dimensions of the mill process. The diameter varies if it is an expanded process.

Inside Washing.- All piping is washed inside with a pressure water stream to eliminate the metallic dust inside which is detached from steel when forming the pipe.

Flying Cut Off process .- This operation is performed when the process is made starting with coil, and the cutting is performed by means of 4 circular revolving blades that travel at the same speed of the mill; the pipe is held by jaws in order to keep the pipe fixed during the cutting, and automatically, the length of the pipes is defined to meet the requests of the client.

Stenciling.- Stenciling is performed manually painting on the pipe 3-4 times the information of the pipe consecutive number, the mill that has processed it and the internal work order.

3.2 Manufacturing Procedure

Before initiating any productive process, the Manufacturing Procedure is made defining the range of the parameters of operation and the general information of the manufacturing order; this document is kept during the process in the working area as a base and reference of the requests of the client.

3.3 Procedure Qualification

Having initiated a diameter, thickness or different grade, the procedure will be qualified by means of three of the first twenty processed pipes. In order to do this, samples of the pipes will be cut to evaluate:

3.2.1 Parallelism
3.2.2 Flow Lines
3.2.3 Normalizing

The samples are evaluated by the laboratory and the results will be reported to the plants

3.4 Control

The next aspects are considered as critical and will be controlled by shift, following the Mill Process Control Instructions.

3.4.1 Edge Trimming
- Blades separation adjustment

3.4.2 Welding
- Voltage
- Amperage
- Speed

3.4.3. Normalizing
- Temperature
- Penetration percentage

3.4.4 Ends Cutting
- Blades adjustment

4.0 DOUBLE SUBMERGED ARC

The Double Submerged Arc process is one of two processes that the company uses to supplies welded pipes. It works with 3 arcs at DC-AC-AC, with 5/32” and 3/16” wires , with capacity up to 1500 amp. The welding process is made with the fixed equipment and moving the pipe at controlled speed.

4.1.- Process description

The Submerged Arc Process is divided into the following operations:

Ends Preparation.- In this zone, if required, the pipes that have zones with imperfections are ground; a 6"x10" run on off tab is welded by the inside and outside using MIG process. Tabs are approximately same diameter and thickness. The intention of these plates is to start and finish the submerged arc welding process.

Outside weld line identification.- This operation initiates grinding approx. 10 points along the pipes, immediately afterwards an Inspector marks with a punch the references of the center of the O.D. welding line of ERW so that finally, with a drawstring and chalk, a line is applied joining every point marked to trace the O.D. weld center line along the pipe.

Interior Submerged Arc.- There are 4 interior machines of 3 arcs, each one with current DC-AC-AC, and capacity of up to 1500 amp. The equipment consists of a boom with a capacity of 51 feet of pipe length and a carriage where the pipe is settled and moved in order to introduce the boom for I.D. welding. The operator traces the welding line using a closed circuit TV system. He can guide the centering for the application of the interior welding along the pipes. The equipment consists of Lincoln controls and transformers where, as soon as the welding procedure is qualified, the operation parameters remain constant between every welded pipe.

Exterior Submerged Arc.- Just as in the case of interiors, it has 4 exterior machines of 3 arcs, each one with power DC-AC-AC and capacity of 1500 amp. The equipment is located in a fixed platform where the welding heads are located and the pipe is place for outside welding moving it with a carrige at controlled speed. The operator can visually guide the centering to apply the welding along the pipe following the chalk line previously marked. The equipment consists of Lincoln controls and transformers where, once the welding procedure is qualified, the operation parameters remain constant between every welded pipe.

Visual Inspection.- After performing the submerged arc welding, the pipe goes through a visual inspection station where two qualified inspectors revise the inside and outside in accordance with the established procedures and the applicable norm

Ends grinding.- All the pipe are ground 12 inches inside and outside by means of manual grinding , taking care not to exceed the pipe's original circumference. In

this same area grinding repairs are done based on indications marked by the Inspectors during the visual examination.

4.2 Manufacturing Procedure

Before initiating any production process, the Manufacturing Procedure is prepared, defining the range of the operation parameters as well as the general information of the manufacture order. This document remains in the working area during the process as a base for operators and reference of the clients. The Welding Procedure Specifications (WPS) is also prepared in accordance with the ASME code. It is made by the chief of the Submerged Arc department and it is checked by the Production Management.

The Manufacturing Instructions of the Submerged Arc Department consider the following as process control areas:

- Ends Preparation
- Inside Automatic Welding
- Outside Automatic Welding
- Repairs

4.3 Procedure qualification

4.3.1 The WPS are classified in accordance with sections IX and VIII, division 1 of the ASME code.

4.3.2 These will be performed in a section of the pipe and qualified by the Laboratory.

4.3.3 The preparation and tests of the samples is done in accordance with section IX of the ASME code. The preparation, test and evaluation of the results is responsibility of the Laboratory that will issue in turn, the PQR (Procedure Quality Record)

4.3.4 No Double Submerged Arc process will be initiated without previous qualification and approval of the Laboratory.

4.4 Procedure Control

The next parameters are considered critical and should be controlled by shift following the Instructions of the Automatic Welding Processes Control:

4.3.1 Both heads voltage
4.3.2 Both heads amperage
4.3.3 Both heads angle
4.3.4 Welding speeds
4.3.5 Stick out
4.3.6 Welding wires separation

4.5 Manual Welding

The procedure elaboration, qualification and control is done based on the Manufacturing Procedure of the Submerged Arc Department

The next parameters are considered critical and are controlled by shift following the Instructions of the Manual Welding Processes Control:

4.5.1 Room temperature
4.5.2 Voltage
4.5.3 Amperage
4.5.4 Welding speed

4.6 Welders Qualification

4.6.1 All the welders will be qualified according to the section IX of the ASME code, under the evaluation and approval of the Laboratory. The samples are tested and the results are registered in the PQR.

4.6.2 The welders that have not approved all tests, will not be allowed to weld.

4.7 Welders Re-qualification

4.7.1 The welders will be qualified again, based on point 4.6 when:

- There is a change in a variable that is essential for execution
- They have not welded during three months according to the specified process, unless they have been welding according to another process and in that case the period is extended to six months
- When the quality department observes circumstances to doubt about the welder skills to obtain good welding
- Once a year, based on the Operations Direction policy

4.7.2 The Production Management and the Laboratory will have a welders qualification list where they will record the qualification date and monthly, the processes where the welder has participated. This record will permit to determine the certification expiring date allowing to program the re-qualification based on the point 4.7

5.0 FINISHING

The finishing process includes the activities from the moment the pipes are accepted by the Mill and/or Submerged Arc department until the pipe is accepted, weighed and measured by the Final Inspection department. It is in this stage of the process that the final non-destructive tests are carried out in order to accept the pipe.

5.1.- Process descriptions

The Finishing Process is divided into the following operations:

Mechanical Expansion.- There are three Mechanical Expansion machines for diameters from 18" to 48" and thickness up to 1.000" with a maximum length of 51 ft. Before the expansion, the pipe has a diameter that is smaller than the nominal estimated according to the percentage of expansion; regularly it expands between 0.8 and 1.0%. The operation is performed expanding sections of approximately 20" (this varies in accordance with the thickness and grade of the pipe) with an overlapped section along the pipe. In order to have control of the expansion, the operator is constantly measuring during the shift the diameters before and after the expansion

Some objectives of the expansion operation are:

- Test the quality of welding and steel. The material and the welding are taken above the Elastic Limit in order to permanently expand the pipe and measure its final diameter allowing confirming and guaranteeing the good quality of the product and ensuring that there will not be problems in subsequent tests of process and field use.
- Reduce the residual stress of pipe. It has already been demonstrated that as the expansion percentage increases, the residual efforts decrease and it is due principally to the fact that the efforts to which the welding and steel are submitted, exceed the product's nominal elastic limit.
- Achieve constant dimensions along the pipe The mandrel that expands the pipes acts inside along the pipe keeping constant the final interior diameter.
- To correct the ovality and straightness provoked during submerged arc welding.

Hydrostatic Test.- The equipment Kaiser and Tubacero design is provided with two cones that seal the pipe to fill it with water. Once the air of the system is released, the pressure is applied by means of a hydraulic pumps system with capacity for 4000 psi. In accordance with the norm, all pipes are hydrostatically tested and the pressure is held during a minimum time of 10 seconds or according to the client requests.

X Rays.- The equipment with a Kaiser design is provided with two transformers of 225 Kv to take radiographies simultaneously in both ends of the pipe in a length of maximum 10". The films of the radiographies taken by qualified inspectors are immediately developed in a room located aside the equipment, then, the evaluation is performed in accordance with the applicable norm.

Ultrasonic Inspection.- There is a Krautkramer equipment with capacity for up to eight 4 Mhz transducers and is provided with a chart recorder, an audible alarm, a visual alarm and is able to paint a mark on location with an out of tolerance indication. During the test, the pipe is fixed and the ultrasonic equipment moves in a car. The operator is a Level II qualified Inspector.
The equipment is calibrated in accordance with the requests of the client and/or the applicable specifications.

Mechanical Bevellers.- The equipment with a Kaiser and Tubacero design, mechanically bevels the angle and face simultaneously on both ends with the dimensions and tolerances according to the applicable Norm or adding the client requests.

Final Inspection.- This inspection area is located at the end of the manufacturing process and is operated by a group of four qualified Inspectors tat perform the task of accepting or rejecting the pipe. Before accepting a pipe, the Inspector confirms that the pipe complies with the tolerances specified in the client's order, mainly: ovality, straightness, squareness, bevel angle, thickness and length; he visually checks that the pipe is free of out of tolerance surface imperfections and verifies in the system that it has completed all the process tests.

5.2 Manufacturing Procedure

Before starting any Work Order, a Finishing Department Manufacturing Procedure is elaborated specifying the operation tolerances and parameters for the main equipments.

The Finishing Department Manufacturing Instructions include as control areas:

- MECHANICAL EXPANSION
- HYDROSTATIC TEST
- BEVELING

5.3 Procedure Qualification

Operation procedures for different diameter, thickness or grade, the are qualified in three pipes used to qualify the Continuous Forming Manufacturing Procedure, with the purpose of determining the dimensional tolerances and the physical properties behavior.

To verify dimensional tolerances, diameter and straightness measures will be taken in the following stages:

5.3.1 Before the expansion
5.3.2 After the expansion
5.3.3 After the hydrostatic test

The results will be evaluated by both the Operations Direction and the Quality Management to decide the release of the process or look for new adjustments.

5.4 Control

The following processes are consider as critical and shall be controlled by shift following the Instructions of the Finishing Department Process Control.

5.4.1 Mechanical Expansion
- Expansion percentage

5.4.3 Hydrostatic test
- Test pressure
- Test timing

5.4.4 Beveling
- Revolutions per minute of the operation plate
- Advance speed of the cutting tools

6.0 COATING

Tubacero has inside its facilities two types of coatings that are offered to the clients. The inside coating process is located in the main plant complying with the requirements of the epoxy coatings Norms on anticorrosive protection and conduction of gas pipelines, as well as with the requirements of the Aqueducts coating. The second type is the FBE and 3LP that is processed in the Bredero Shaw plant which is installed within Tubacero's Plant IV.

6.1.- Inside Coating.

The coating process has two main stages described below:

6.1.1.- Inside Cleaning.- The cleaning process is performed with steel brushes that are installed in a revolving mandrel that is put inside the pipe in such a way that when the mandrel revolves, a pressure force is exerted inside between the brushes and the pipe, at the same time, warm water with detergent is applied and

immediately after the brushing, there is a rinsing zone where the pipe is turned and water is applied inside introducing a device along the pipe with a multiple lancet to eliminate the detergent and residuals of the dust removed.

6.1.2.- Inside Coating.- The equipment is operated using "Airless" system where the first thing to do in the process is mixing the paint in the containers controlling the coating viscosity, then, by means of pumps, the coating passes to the system line maintaining the work pressure. The coating is applied by a car that is introduced into the pipe while the pipe is fixed, the application car has a multiple lancet with nozzles designed to give the required thickness in accordance with the speed and pressure of the system.
The inspection to certify the quality of the tubes is performed in accordance with the Norms or specifications requested by the client.

6.2.- FBE and 3LP Outside Coating

Tubacero holds with Bredero Shaw an agreement of preference on having subcontracted their services to coat its pipes, and in order to maintain that closeness and communication, the coating plant is installed inside the areas of our company; this guarantees the commitments of time of delivery offered by Tubacero to its clients.

It is worth to mention that Bredero Shaw has a world recognition due to its quality and professionalism as well as the fulfillment of the Quality norms requested by our clients. For that reason, Tubacero does not hesitate to guarantee the quality of the products coated by the company Bredero Shaw.

VII. QUALITY CONTROL PROCEDURE

The following information is just an extract of the procedures carried out in order to meet the requirements of our Quality Manual in accordance with the API Q1. Norm and ISO 9001:2000.

INDEX

I.- RAW MATERIAL PROCEDURE (PLATE AND COIL)

All job orders to be processed are evaluated with their certificate of quality issued by the supplier and by the following tests:

1. Tensile Tests
2. Impact Test
3. Chemical Analysis
4. Metallographic Analysis

1. Tensile Tests

Objective:

The objective of this test is to determine the physical properties of the raw material such as: tensile strength, yield strength, elongation, etc. in order to check if they fulfill with the specifications indicated in the Purchase Order.

Frequency:

One plate per heat, evaluating in total 3 heats per purchase order and/or according with the requested specifications.

Equipment and Instruments of Measurement:

a) Micrometer from 0" to 1"
b) Micrometer from 1" to 2"
c) 2" calibrated length gage. Tinius-Olsen brand
d) Gage to measure the percentage of elongation. Tinius-Olsen brand
e) Tinius-Olsen Machine, 60 tons capacity.

2. Charpy Impact Tests:

Objective:

To determine the toughness and ductility properties of the raw materials in order to verify if they fulfill with the specification requested in the Purchase Order.

Frequency:

According with the requested specifications.

Equipment and Instruments of Measurement:

a) Thermometer
b) Pliers
c) Tinius-Olsen Machine
d) Capacity: 300 ft-lb

e) The test temperatures that have been applied vary from environmental temperature to -80°C.

3. Chemical Analysis

Objective:

To determine the % of content of each chemical element in the raw material in order to verify if they accomplish with the minimum and maximum values specified in the Purchase Order.

Frequency:

According with the specification requested in the Purchase Order.

Equipment and Instruments of Measurement:

a) Bench drill
b) Electronic scale with 0.01 g. precision and maximum capacity of 310gr.
c) Atomic Emission spectrophotometer, with analysis capacity of 19 items.

4. Metallographic Analysis

Objective:

To determine the type of inclusions, evaluation of structures, determine the grain size as well as its microhardness section in order to verify if the raw material accomplish with the established in the Purchase Order.

Frequency:

According to the Purchase Order's requirements.

Equipment and Instruments of Measurement:

a) Optical microscope Nikon, with maximum amplification of 2000x.
b) Microhardness tester Vickers, scale from 0.1kg up to 1kg.
c) Hardness tester Vickers-Future Tech, scale from 0.3kg up to 30kg.
d) Hardness tester Rockwell, scale A, B and C.

II.- MECHANICAL PROPERTIES EVALUATION PROCEDURES

Once the pipe has been already accepted in everyone of the plant's inspection areas, the mechanical properties shall be evaluated by the following tests.

1. Tensile Test

Objective:

To determine the mechanical properties on pipe such as: yield strength, and elongation %. In order to determine if the customer's requirements are meet.

Frequency:

One per heat or according with the customer's requirements.

Equipment and Instruments of Measurement:

a) Micrometer from 0" to 1"
b) Micrometer from 1" to 2"
c) 2" calibrated length gage, Tinius-Olsen brand.
d) Gage to measure the elongation percentage, Tinius-Olsen brand.
e) Extensometer Tinius-Olsen Machine.
f) 60 tons. capacity Tinius-Olsen Machine.

2 Impact Tests

Objective:

To evaluate the toughness and ductility properties on weld, heat affected zone, fusion line and/or base metal, in order to verify if they accomplish with the ones specified in the Purchase Order.

Frequency:

One per heat or according with the specification of the purchase order, or according with the specification requested by the customer.

Equipment and Instruments of Measurement:

a) Thermometer
b) Pilers
c) Tinius-Olsen machine

3 Bend Tests

Objective :

To evaluate the ductility and submerged Arc weld properties in order to verify if they fulfill with the specification's requirements.

Frequency :

One of every 50 joints or according with the customer's requirements.

Equipment and Instruments of Measurement :

a) 60 tons. capacity Tinius-Olsen Machine.
b) The diverse combinations of tools used for the guided bend (dies).

III.- INSPECTION PROCEDURES

Before to the beginning of a fabrication run a particular procedure is elaborated in which the dependent variables of the dimensions or special requirements of the customer are specified, and then are feed to our computational system. The inspectors could consult this procedure on any moment in all of the computer terminals distributed in the inspection areas.

Our inspection areas are listed as follows:

1. Plate and Coil Visual and Dimensional Inspection

Objective:

a) To inspect visually the materials quality according with the requested specifications.
b) To detect the possible imperfections and dimensions out of specification of the materials to avoid their process in the mills.
c) To carry on an statistic control on the quality of raw materials.

Frequency:

Plate by plate or coil by coil.

Equipment or Instruments of Measurement:

a) Micrometer from 0" to 1" (Scale 1 inch/1000)
b) Measuring tape
c) Micrometer to measure the mark's depth (Scale 1 inch/1000)
d) Straight edge for length measurement.
e) Others

2. Visual Inspection at Mills Output

Objective:

a) To evaluate the pipe's quality
b) To detect and evaluate possible deviations on the dimensional qualities of the pipe.
c) Define the treatment and/or repairs in case of deviations.

d) To advise opportunely to the Production Department about the frequency and magnitude of the deviations in order to make the necessary adjustments.
e) To carry on a statistic control on the quality of the pipe
f) Verify continuously the normalized temperature for ERW welding method.

Frequency:

a) Dimensionally is checked 3 times per shift.
b) The visual inspection is carried out on each pipe.

Equipment or Instruments of Measurement :

a) Gage or Micrometer for checking the imperfections depths.
b) Measuring Tape
c) Other gages

3. Ultrasonic Inspection at Mill's Output

Objective:

a) To evaluate the electric weld quality
b) Detect the possible imperfections and to evaluate them according with the requested specification by and angular beam technique.
c) To evaluate the body's pipe by the straight beam technique when it is requested by the customer or when the pipe shall be processed by the Submerged Arc Welding Method. When this evaluation is not requested, a sample inspection will be carried out in order to carry an internal control. (Not applied on O.D. below 18").
d) To carry on a statistic control on the weld's quality as well as on the pipe material.

Frequency:

a) All the joints
b) If the specification does not request it a sample inspection will be carried out for internal control.

Equipment or Instruments of Measurement:

a) Ultrasonic equipment Krautkramer brand, USIP 11, USD 15 and EPOC III models with all their auxiliary installations.
b) Transducers according to the frequency and characteristics requested in the specification.
c) Calibration plates according with the specification requested by the customer.
d) Auxiliary Tools.

4. Flattening Tests

Objective:

a) To evaluate and qualify the quality of the electric resistance weld as well as the base material.
b) To advise opportunely to the production department the frequency and magnitude of the imperfections in order to apply the necessary adjustments.
c) To carry on a statistic control on the electric resistance weld and on the base material's quality.

Frequency:

It is performed according with the specification requested by the customer.

Equipment or Instruments of Measurement:

a) A press with an inches scale
b) Measuring Tape
c) Gage to fix the weld at 90°

5. Visual Inspection of Submerged Arc Welding

Objective:

a) To evaluate visually the weld quality.
b) To detect possible imperfections on the inside and outside of the weld, such as: gas pocket, undercut, excessive reinforcement, slag inclusions, out of line, weld bed, etc.
c) Visual re-inspection of pipe body.
d) To advise on time to the production area the quantity, the magnitude and location of the imperfections in order that the necessary adjustments be done.
e) To keep a statistic control of the Submerged Arc Weld quality.

Frequency:

All pipe that is Submerged Arc Welded.

Equipment or Instruments of Measurement:

a) Gages
b) Measuring Tape
c) 20 meters measuring tape

6. Intermediate "X" Ray (For DSAW process)

Objective:

a) To sample through a non-destructive inspection the Submerged Arc Welded quality principally at the beginning and after adjustments.
b) To verify imperceptible defects, such as, covered gas pockets.
c) To verify the quality of the repairs evaluating according to the required specification.

Frequency:

Sampling at the beginning of the process and after adjustments or when the repair index is high.

Equipment or Instruments of Measurement:

a) 3 Phillips equipment with a capacity of 225 Kv
b) 2 Pantak equipment with a capacity of 225 Kv.
c) 1 Phillips equipment with a capacity of 300 Kv.
d) Penetometer
e) Measuring Tape
f) Negatoscope
g) Automatic developing equipment.

7. Visual Inspection after Mechanical Expansion (For DSAW process)

Objective:

a) To verify dimensions, mostly diameters, out of roundness and straighteness.
b) To inspect the surface of the pipe and weld searching for imperfections provoked by the expansion, such as: marks, cracks, etc.
c) To advise opportunately to the operators on imperfections provoked during the expansion.
d) To assure that the percentage of expansion is according to the manufacture procedure specification.
e) To have a statistic control of the pipe quality.

Frequency:

This step of the process is performed when required by the customer and/or in pipes with DSAW process and grades API 5L X-52 and higher. When this inspection is performed, it is done on each pipe.

Equipment or Instruments of Measurement:

a) Diameter tape
b) Measuring tape
c) Depth marks gage
d) Others

8. Inspection after Hydrostatic Testing

Objective:

a) Verify that the pressure test is according to the specification requirements.
b) Verify possible failures or imperfections on the pipe during the test.
c) Keep a statistic control.

Frequency:

According to the customer's specification.

Equipment or Instruments of Measurement:

a) Diameter tape
b) Measuring tape
c) Pressure graphic machine, chart pressure recorder.
d) Manometer of pressure

9. Radiographic Inspection on Ends After the Hydrostatic Test (For DSAW process)

Objective:

a) To evaluate the Submerged Arc weld on the pipe ends (8" from the pipe end.
b) To detect and evaluate possible imperfections on the Submerged Arc Weld.
c) To inform to the Submerged Arc Department the quantity, magnitude and location of the imperfections, so that, the necessary adjustments take place.
d) To keep a statistic control of the weld quality on the pipe ends.

Frequency:

a) According to the customer's specification.
b) In case that the specification does not require, this test samples take place in order to carry on a quality control of the weld on the pipe ends.

Equipment or Instruments of Measurement :

a) 3 Phillips equipment with a capacity of 225 Kv
b) 2 Pantak equipment with a capacity of 225 Kv.
c) 1 Phillips equipment with a capacity of 300 Kv.

d) Penetometer
e) Measuring Tape
f) Negatoscope
g) Automatic developing equipment.

10. Ultrasonic Inspection After the Hydrostatic Test

Objective:

a) To inspect the quality of the Submerged Arc or the electric resistance weld all the way through the pipe length with angular beam.
b) To inspect the body quality using the technique of straight beam.
c) To inform to the Submerged Arc Department the characteristics of the imperfections found so the necessary adjustment take place.
d) To carry on a statistic control of the weld quality.

Frequency:

a) According to the customer requirements.
b) In case that the specification does not require this type of test a sampling is performed for internal control.

Equipment or Instruments of Measurement:

a) Multiplex ultrasonic equipment, "Krautkramer model KSE-28, equipped to work with six transducers, on pipe below 18" O.D. a Krautkramer equipment is used model KSE-14 with four transducers.
b) Transducers according to the frequency and characteristics required by the specification.
c) Calibration plates according to the specification.

11. Final Inspection

Objective:

a) To perform one last visual and dimensional inspection collecting data such as, O.D., out of roundness, straightness, pipe on., etc.
b) If the pipe was not required with inside coating, it is marked and sent to the yard.
c) If the pipe was required with inside coating, it is marked on the exterior surface and sent to the Paint area.

Frequency:

On all pipes

Equipment or Instruments of Measurement:

a) Diameter tape
b) Length measuring tape
c) External surface micrometer from 0" to 1"
d) Various gages
e) Scale protractor to verify the angles of the bevels

12. Coat Inspection

Objective:

a) To evaluate the quality of the coating applied according to the customer requirements.
b) To detect possible failures during the process of preparation and application of the coating in order to advise the coating Department, so the necessary adjustments take place.
c) To carry on a statistic control of application quality of the coat.

Frequency:

On all pipes when required with I.D. coating.

Equipment or Instruments of Measurement:

a) Hygrometer for the measurement of relative humidity.
b) Thermometer
c) Gage for the measurement of the dry coat thickness
d) Micro test to check the dry coat thickness
e) Gage for the measurement of the wet thickness
f) Micrometer
g) Weigh machine

IV.- PIPE CERTIFICATION

Once the manufacture of the work order has been performed a quality certificate for the customer is issued in which the results of the Item II are included as well as the chemical composition obtained in the raw material metallurgical evaluation.

V.- CORRECTIVE ACTIONS

Our management quality program establish that when deviations to the quality of materials and/or products in any of their production steps, such deviations shall be identified, informed and immediately corrections shall be taken in order to correct them according to the manufacture, inspection, and test procedures.

VI.-INSPECTION AND TEST CONTROL

1.0 Policy:

In order to avoid that the raw material, the product during process and the finished product, mixes up, lacks of tests and/or inspection that could affect its quality, control systems and procedures are established in such way that when a joint of pipe is accepted it could be guaranteed that meets all the requirements and also the inspection program and procedures along with the tests applied.

This procedures and systems are defined and referenced in the following way:

1.1.-Sicop

Controls and indicates, instantaneously, the material or product status in each inspection zone, also, avoids that a test or inspection is omitted by sending a signal to the inspector when this happens.

The system is computerized and operated with a special equipment exclusive for the production control (see process and inspection diagram on Chapter IV).

1.2.- Identification Procedures

The raw material, process product and finished product identification, is established in the “Inspection’s Manual Procedures", in which is clearly indicated the physical identification method which specifies the status of the raw material or product.

1.3.- Manual Records

Also, there is a Manual Record System where are reported the inspection and tests performed during the process.

VII.- MEASURING AND TEST EQUIPMENT CONTROL

1.0 Policy

All instruments and equipment used in the inspection, tests, and special process control shall be controlled, calibrated, adjusted and/or verified through preventive maintenance according to the time intervals defined in the Quality Manual.

2.0 Control, Calibration and Adjustment

The base for the Control, Calibration and Adjustment, shall be according to the domestic standards and/or products specification, in case, there is no base, it will be done according to the established procedure for each instrument or equipment of measure.

The calibration and/or maintenance program for the instruments or equipment of measure, will be performed based on our Quality Assurance Manual.

3.0 Maintenance

On the corrective maintenance as on the preventive, they will be performed at TUBACERO by a specialized department (Electric, Mechanic, or Electronic Department); or by the supplier of the equipment in those cases in which TUBACERO is unable to perform such maintenance.

4.0 Replacement

The instrument or equipment of measure and test that brakes down, which can not be fixed immediately, will be substituted by a similar one at the assigned area or any other available in order that the product is verified and measured according to the specifications and procedures established.