ABSA
the pressure equipment safety authority

9410 - 20 Ave N.W.
Edmonton, Alberta, Canada T6N 0A4
Tel: (780) 437-9100 / Fax: (780) 437-7787

January 18, 2022

Attention: Hua Quanyong
JIAXING MT STAINLESS STEEL CO LTD
NO 18-10 BINHAI 9TH ROAD KONGGANG NEW DISTRICT
YONGXING STREET LONGWAN DISTRICT
WENZHOU CITY, ZHE 325000

The design submission, tracking number 2022-00108, originally received on January 06, 2022 was surveyed and accepted for registration as follows:

CRN : 0A22036.2 **Accepted on:** January 18, 2022

Reg Type: NEW DESIGN **Expiry Date:** January 18, 2032

Drawing No. : PIPE FITTINGS, PRODUCT CATALOGUE Rev 2021.11.06

Fitting type: ELBOWS, TEES, REDUCERS, CAPS - 3/4"-24"

The registration is conditional on your compliance with the following notes:

- This registration is based on the understanding that pipe fittings are in full compliance with ASME B16.9 including size, thickness and material.

As indicated on AB-41 Statutory Declaration form and submitted documentation, the code of construction are B16.9 and other engineering analysis.

- It is our understanding that the fitting(s), included as the scope of this submission, that is(are) subject to the Safety Codes Act shall comply with the requirements of the indicated Standard or Code of Construction on the AB-41 Statutory Declaration as supported by the attached data which identifies the dimensions, materials of construction, press./temp. ratings and the basis for such ratings, and the identification marking of the fittings.
- This registration is valid only for fittings fabricated at the location(s) covered by the QC certificate attached to the accepted AB-41 Statutory Declaration form.
- This registration is valid only until the indicated expiry date and only if the Manufacturer maintains a valid quality management system approved by an acceptable third-party agency until that date.
- Should the approval of the quality management system lapse before the expiry date indicated above, this registration shall become void.

An invoice covering survey and registration fees will be forwarded from our Revenue Accounts.

If you have any question don't hesitate to contact me by phone at (780) 433-0281 ext 3369 or fax (780) 437-7787 or e-mail Radisavljevic@absa.ca.

Sincerely,

Zana Radisavljevic

RADISAVLJEVIC, ZANA, P. Tech. (Eng.)
DOP Cert. No. D00003136

Alberta Municipal Affairs

ABSA
the provincial regulatory safety authority

AB-41 2019-08

STATUTORY DECLARATION
Registration of Fittings
Single or Multiple Fitting Designs within one Fitting Category

In this space, show facsimile of manufacturer's logo or trademark as it will appear on the fitting.

Mtsco

I, Hua Ruan Yong, General manger
(name of applicant) (position title) (must be in a position of authority)

of Jiaxing MT Stainless Steel Co., Ltd.
(name of manufacturer)

located at No.18-10, Binhai 9th Road, Konggang New District, Yongding Street, Longwan District, Wenzhou City, Zhejiang Province, 325000, P.R.China
(plant address)

do solemnly declare that the fittings listed hereunder, which are subject to the Safety Codes Act (select only one)

☑ comply with the requirements of ASME B16.9-2018 which specifies the dimensions,
(title of recognized North American Standard)
materials of construction, pressure/temperature ratings and identification marking of the fittings, or

☐ are not covered by the provisions of a recognized North American standard and are therefore manufactured to comply with _____ as supported by the
(title of code of construction or other applicable document)
attached data which identifies the dimensions, materials of construction, pressure/temperature ratings and the basis for such ratings, and the identification marking of the fittings.

I further declare that the manufacture of these fittings is controlled by a quality control program which has been verified as described in the below Table as being suitable for the manufacturing of these fittings to the stated standard, regulation, code, guideline or other applicable document. The fittings covered by the declaration for which I seek registration are as provided in the Supplementary Sheet(s) attached.

Quality Program Verification and Manufacturing Sites

A copy of the Quality Certificate from each manufacturing site must be included

Item #	Product Description, Model or Series	Quality Program	Scope of Certification	Expiry Date	Verifying Organization	Location(s) Plant Name and address
1.	Pipe fittings, including tees, elbows, pipe caps, and reducers	ISO 9001:2015	Production and processing of stainless steel pipe, pipe fittings and flanges	Sep.5, 2022	Lloyds Industrial Register	as same as mentioned on above. ISO 9001 Certificate No. ISA/HK/210902
2.						

Tracking #: _____

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In support of this application, the following information, calculations and/or test data are attached:

1. ISO 9001 Certificate; 2. Product Catalog; 3. Product List; 4. Design Proof Test Plan; 5. Mechanical Test Reports

6. Design Proof Test Report; 7. Notary Certificate

(Signature of the Declarer) 2021. 11. 10 (Date)

DECLARED before me at Wenzhou. (city) in the Zhejiang. (province, territory, or state) of P.R.China.

this 10 day of 11 (Month), 2021 (Year)

(print) _____ (a Commissioner of Oaths or Notary Public)

(sign) _____ (a Commissioner of Oaths or Notary Public)

(expiry date (mm/dd/yy))

Commissioner of Oaths / Notary Public in and for: _____ (province, territory, or state)

For ABSA Office Use Only:

NOTES: _____

To the best of my knowledge and belief, the application meets the requirements of the Safety Codes Act and CSA Standard B51, Part 1, Clause 4.2, and is accepted for registration in Category _____.

CRN: _____

Registered Date: _____

Expiry Date: _____

Signature: _____
(Signature of the Administrator/SCO)

The information you provide is necessary only for the administration of the programs as required by the Alberta Safety Codes Act and Regulations in the Pressure Equipment Discipline

Tracking #: _____

Table 1 Scope of Fitting Designs**

Item #	Primary Pressure Bearing / Retaining Component	Material of Construction	Port Connections and Size Range	MDMT	Rated Pressure		Pressure Class(es) / Schedule(s)	Design Code(s) of Construction	Reference Catalogue (pages) or Drawing(s)
					At Ambient Temperature	At Maximum Temperature			
1	Long Radius Elbow (90°)	ASTM A403 Gr.WP304/WP304L Gr.WP316/WP316L ASTM A790/A790M S31803	Butt weld ends NPS 3/4" to 24"	The STD Does not address low-temp service	Per system code of construction	Per system code of construction	Sch. 5 - 80	ASME B16.9	MS-LR202104-01 &MW-LR202104-01
1	Short Radius Elbow (90°)		Butt weld ends NPS 3/4" to 24"		Per system code of construction	Per system code of construction	Sch. 5 - 80	ASME B16.9	MS-SR202104-02 &MW-SR202104-02
1	Reducing & Straight Tee,		Butt weld ends NPS 3/4" to 24"		Per system code of construction	Per system code of construction	Sch. 5 - 80	ASME B16.9	MS-CON202104-03 &MW-COM202104-03
1	Concentric & Eccentric Reducer		Butt weld ends NPS 3/4" to 24"		Per system code of construction	Per system code of construction	Sch. 5 - 80	ASME B16.9	MS-TE202104-04 &MW-TE202104-04
1	Cap		Butt weld ends NPS 3/4" to 24"		Per system code of construction	Per system code of construction	Sch. 5 - 80	ASME B16.9	MS-CAP202104-05 &MW-CAP202104-05

Table 2 Additional Scope Information

List/Attach Additional Detail and References (Product Configurations, Options, Illustrations, etc.)
Example: Series X Options

** For additional alternatives of Table 1, refer to Form AB-41a, Guide for Completing Form AB-41

Tracking #:_____

PART 2 Design Proof Test Plan 爆破试验计划

2.1 Test Scope

This part gives a prototype test instruction for design proof test by ABS according to ASME B16.9.

The proof test shall be based on the computed burst pressure of the fitting and its connecting piping.

2.2 Test material

2.2.1 Representative Components.

As per ASME B16.9 2018 Ed. section 9, representative products covered in this type approval are selected and tested as table 2-2. Representative products were selected according to 2.2.1.1, 2.2.1.2, 2.2.1.3.

A factory-made segmented elbow that has a proof test on a geometrically similar 90-deg elbow need not be tested separately. Lap joint stub ends are exempt from proof testing because they are used in a flange assembly.

2.2.1.1 Size Range. One test fitting may be used to qualify similarly proportioned fittings with a size range from one-half to twice that for the tested fitting. The test of a non reducing fitting qualifies reducing fittings of the same pattern. The test of a reducing fitting qualifies reductions to smaller sizes.

2.2.1.2 Thickness Range. One test fitting may be used to qualify similarly proportioned fittings with *T/D* ranges from one-half to three times that for the tested fitting.

2.2.1.3 Material Grades. The pressure retaining capacity of a geometrically identical fitting made of various grades of steel as listed in table 0-2-1 will be directly proportional to the tensile properties of the materials. Therefore, it is necessary to test only a single material in a representative fitting to prove the design of the fitting.

2.2.2 Other Components

Straight seamless or welded pipe whose calculated bursting strength is at least as great as the proof test pressure as calculated in para. 9.3 shall be welded to each end of the fitting to be tested. Pipe sections may have the nominal wall greater than the thickness indicated by the fitting markings. That greater thickness shall not exceed 1.5 times the fitting markings wall. Any internal misalignment greater than 1.5 mm (0.06 in.) shall be reduced by taper boring at a slope not over 1:3. Any other unequal wall welding preparation shall be in accordance with ASME B16.25. Length of pipe sections for closures shall be as follows:

(a) Minimum length of pipe shall be one pipe O.D. for NPS 14 (DN 350) and smaller.

(b) Minimum length of pipe shall be one-half pipe O.D. for NPS greater than 14 (DN 350).

2.3 Test Procedure

The test fluid shall be water or other liquid. Hydrostatic pressure shall be applied to the assembly. At least three specimen tests for each fitting, joint size, or configuration are recommended. The testing factor, f, based on the number of specimen tests performed in the table below is used in the computed test equations.

Number of Tests	Testing Factor, f
1	1.10
2	1.05
3	1.00

NOTE: Tests of geometrically identical fittings that meet the requirements specified in para. 9.4 may be combined to establish the test factor applied to a set of fittings.

The test shall be taken to rupture or held at or above the computed minimum proof pressure for a period of at least 3 min. The test is successful if for each of the tests, the fitting withstands without rupture a proof test pressure at least equal to the computed minimum.

$$P_T = \frac{2St}{D} f$$

where

D-specified outside diameter of pipe

f - testing factor from in-text table listed above

P_T-computed minimum proof test pressure for fitting

S- actual tensile strength of the test fitting, determined on a specimen representative of the test fitting, which shall meet the tensile strength requirements of the applicable material

t - nominal pipe wall thickness of the pipe that the fitting marking identifies

NOTE: Any dimensionally consistent system of units may be used.

Part 1 Design Calculation 设计计算

This section gives the instruction to calculate the internal design gage pressure(allowable working pressure) for seamless and welded pipe fittings.

1.1 Nominal Wall Thickness

The nominal wall thickness of straight section of steel pipe fitting shall be equal to or greater than t_m determined in accordance with the following equation. (see ASME B31.3 edition 2012 para.304.1.1)

$\Rightarrow$ $T=t+c$ $t=T-c$

Where:

T = nominal wall thickness satisfying requirements for pressure and allowances,. in.(mm);

c= sum of the mechanical allowances (thread or groove depth) plus corrosion and erosion allowances. For threaded components, the nominal thread depth (dimension h of ASME B1.20.1, or equivalent) shall apply. For machined surfaces or grooves where the tolerance is not specified, the tolerance shall be assumed to be 0.5 mm (0.02 in.) in addition to the specified depth of the cut.

t =pressure design thickness, as calculated in accordance with para. 304.1.2 for internal pressure or as determined in accordance with para.304.1.3 for external pressure. For pipe fittings manufactured according to ASME B16.9, t shall be $\geq 87.5\% t_m$ (see ASME B16.9 Table 13 Tolerances Notes (2).

1.2 Straight Pipe Under Internal Pressure (As per ASME B31.3 para 304.1.2)

(a) For t < D/6, the internal pressure design thickness for straight pipe shall be not less than that calculated in accordance with either eq. (3a) :

$\Rightarrow$ $t=\dfrac{P\times D}{2(SEW+PY)}$ $P=\dfrac{2SEWt}{(D-2Yt)}$

Where:

D = outside diameter of pipe as listed in tables of standards or specifications or as measured

d= inside diameter of pipe. For pressure design calculation, the inside diameter of the pipe is the maximum value allowable under the purchase specification.

E= quality factor from ASME B31.3, Table A-1B, E=1.0

P= internal design gage pressure

S= stress value for material from ASME B31.3, Table A-1

t = pressure design thickness, as calculated in accordance with para. 304.1.2 for internal pressure

T = minimum required thickness, including mechanical, corrosion, and erosion allowances, please refer to Annex A for specified T of each size.

W = weld joint strength reduction factor per para.302.3.5(e) W=1.0 at temperature of 510℃ and below.

Y = coefficient from Table 304.1.1, valid for t < D/6 for materials shown. The value of Y may interpolated for intermediate temperatures, Y=0.4. For t ≥ D/6,

$$Y = \frac{d + 2c}{D + d + 2c}$$

1.3 Basic Allowable Stresses

Table 1-3-4-1 Basic Allowable Stresses in Tension for Metals (As per ASME B31.3, Table A-1)

Material	Product Form	Spec. No.	Type/ Grade	UNS No.	Class/ Condition/ Temper	Size, in.	P-No. (5)	Notes	Min. Temp., °F (6)	Specified Min. Strength, ksi Tensile	Yield	Min. Temp. to 100	200	300	400
Forgings and Fittings (2)															
18Cr-13Ni-3Mo	...	A182	F317L	S31703	...	≤ 5 thk.	8	(9)(21a)	-325	70	25	16.7	16.7	16.7	15.7
18Cr-8Ni	...	A182	F304L	S30403	...	...	8	(9)(21a)	-425	70	25	16.7	16.7	16.7	15.8
18Cr-8Ni	...	A403	WP304L	S30403	...	...	8	(32)(37)	-425	70	25	16.7	16.7	16.7	15.8
16Cr-12Ni-2Mo	...	A182	F316L	S31603	...	...	8	(9)(21a)	-425	70	25	16.7	16.7	16.7	15.7
16Cr-12Ni-2Mo	...	A403	WP316L	S31603	...	...	8	(32)(37)	-425	70	25	16.7	16.7	16.7	15.7
22Cr-5Ni-3Mo	...	A790	...	S31803	...	...	10H	(25)	-60	90	65	30.0	30.0	28.9	27.8

Basic Allowable Stress, S, ksi (1), at Metal Temperature, °F																			Type/ Grade	Spec. No.
500	600	650	700	750	800	850	900	950	1,000	1,050	1,100	1,150	1,200	1,250	1,300	1,350	1,400	1,450	1,500	

																				Forgings and Fittings (2)		
14.8	14.0	13.7	13.5	13.2	12.9	12.7	...	...	...	...	...	...	...	...	...	...	...	...	...	F317L	A182
14.7	14.0	13.7	13.5	13.3	13.0	12.8	12.6	12.3	12.0	6.3	5.1	4.0	3.2	2.6	2.1	1.7	1.1	1.0	0.9	F304L	A182
14.7	14.0	13.7	13.5	13.3	13.0	12.8	12.6	12.3	12.0	6.3	5.1	4.0	3.2	2.6	2.1	1.7	1.1	1.0	0.9	WP304L	A403
14.8	14.0	13.7	13.5	13.2	12.9	12.7	12.4	12.1	11.8	10.8	10.2	8.8	6.4	4.7	3.5	2.5	1.8	1.3	1.0	F316L	A182
14.8	14.0	13.7	13.5	13.2	12.9	12.7	12.4	12.1	11.8	10.8	10.2	8.8	6.4	4.7	3.5	2.5	1.8	1.3	1.0	WP316L	A403
27.2	26.9	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	A790

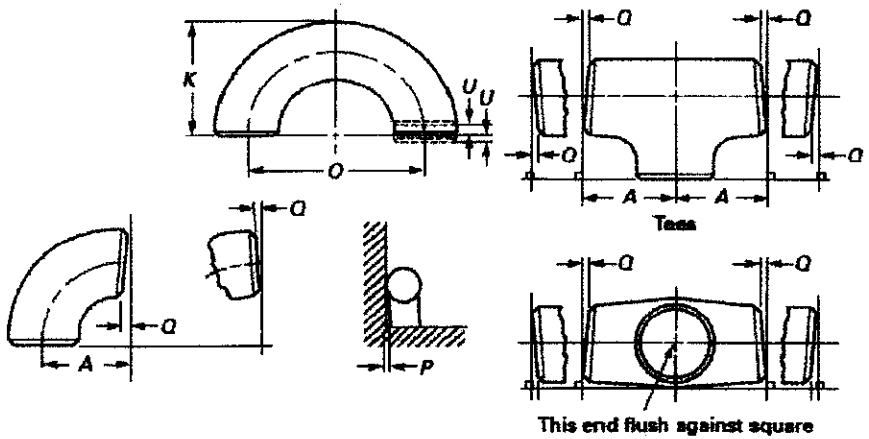
Table 1-3-4-2 Basic allowable stresses at specified working temperature

Item	Material	Basic Allowable stress,S,(Ksi), at Metal Temperature			
		-18℃～100℃(212℉)	100℃～200℃(392℉)	200℃～300℃(572℉)	300℃～400℃(751℉)
			allowable stress S（Ksi）	allowable stress S（Ksi）	allowable stress S（Ksi）
1	304L	16.7	15.8	14	13.0
2	316L	16.7	15.7	14	12.9
3	S32205	28.9	27.8	26.9	-
4	S31803	28.9	27.8	26.9	-

1.4 Calculation of design pressure P

The maximum design pressure P is not greater than 100 Mpa at working temperature range -196℃～400℃ according to above pressure ratings calculating. Please refer to Annex B for specific P of each size for different grade and working temperature.

Table 1-5-13 Tolerances



All Fittings [Notes (1) and (2)]				Center-to-End Dimensions		Overall Length of Reducers and Lap Joint Stub Ends, *F, H*	Overall Length of Caps, *E*	180-deg Returns		
Nominal Pipe Size (NPS)	DN	Outside Diameter at Bevel, *D* [Notes (3) and (4)]	Inside Diameter at End [Notes (3) and (5)]	90-deg and 45-deg Long and Short Radius Elbows and Tees, *A, B, C, M*	3D Radius Elbows, *A, B*			Center-to-Center Dimension, *O*	Back-to-Face Dimension, *K*	Alignment of Ends, *U*
½ to 2½	15–65	+1.6, −0.8	0.8	2	3	2	3	6	6	1
3 to 3½	80–90	1.6	1.6	2	3	2	3	6	6	1
4	100	1.6	1.6	2	3	2	3	6	6	1
5 to 8	125–200	+2.4, −1.6	1.6	2	3	2	6	6	6	1
10 to 18	250–450	+4.0, −3.2	3.2	2	3	2	6	10	6	2
20 to 24	500–600	+6.4, −4.8	4.8	2	3	2	6	10	6	2
26 to 30	650–750	+6.4, −4.8	4.8	3	6	5	10	...	...	...
32 to 48	800–1 200	+6.4, −4.8	4.8	5	6	5	10	...	...	...

Nominal Pipe Size (NPS)	DN	Lap Joint Stub Ends [Note (6)] Outside Diameter of Lap, G	Fillet Radius of Lap, R	Lap Thickness	Nominal Pipe Size (NPS)	DN	Angularity Tolerances Off Angle, Q	Off Plane, P
½ to 2½	15–65	+0, –1	+0, –1	+1.6, –0	½ to 4	15–100	1	2
3 to 3½	80–90	+0, –1	+0, –1	+1.6, –0	5 to 8	125–200	2	4
4	100	+0, –1	+0, –2	+1.6, –0	10 to 12	250–300	3	5
5 to 8	125–200	+0, –1	+0, –2	+1.6, –0	14 to 16	350–400	3	6
10 to 18	250–450	+0, –2	+0, –2	+3.2, –0	18 to 24	450–600	4	10
20 to 24	500–600	+0, –2	+0, –2	+3.2, –0	26 to 30	650–750	5	10
26 to 30	650–750	...	...	...	32 to 42	800–1 050	5	13
32 to 48	800–1 200	...	...	...	44 to 48	1 100–1 200	5	19

GENERAL NOTES:

(a) All dimensions are in millimeters.

(b) Tolerances are equal plus and minus except as noted.

NOTES:

(1) The inside diameter and the nominal wall thicknesses at ends are to be specified by the purchaser.

(2) A minimum wall thickness of 87.5% applies unless the purchaser specifies a different wall thickness tolerance. See Fig. 1-5-1, Note (1)(a).

(3) Out-of-round is the sum of absolute values of plus and minus tolerances.

(4) This tolerance may not apply in localized areas of formed fittings where increased wall thickness is required to meet design requirements.

(5) Unless otherwise specified by the purchaser, these tolerances apply to the nominal inside diameter, which equals the difference between the nominal outside diameter and twice the nominal wall thickness.

Annex A: The dimensions table

Table A.1(refer to ASME36.19M)

26.7	20	2.11	0.079	3.91	0.146		
33.4	25	2.77	0.083	4.55	0.136		
42.2	32	2.77	0.066	4.85	0.115		
48.3	40	2.77	0.057	5.08	0.105		
60.3	50	2.77	0.046	5.54	0.092		
73.0	65	3.05	0.042	7.01	0.096		
88.9	80	3.05	0.034	7.62	0.086		
101.6	90	3.05	0.030	8.08	0.080		
114.3	100	3.05	0.027	8.56	0.075		
141.3	125	3.40	0.024	9.53	0.067		
168.3	150	3.40	0.020	10.97	0.065		
219.1	200	3.76	0.017	12.70	0.058		
273.0	250	4.19	0.015	12.70	0.047		
323.8	300	4.57	0.014	12.70	0.039		
355.6	350	4.78	0.013	12.70	0.036		
406.4	400	4.78	0.012	12.70	0.031		
457	450	4.78	0.010	12.70	0.028		
508	500	5.54	0.011	12.70	0.025		
559	550	5.54	0.010	/	/		
610	600	6.35	0.010	12.70	0.021		

Table A.2(refer to ASME36.10M)

26.7	20	1.65	0.06		/	/		2.87	0.11		3.91	0.146		3.91	0.146		/	/		5.58	0.208
33.4	25	1.65	0.05		/	/		3.38	0.10		4.55	0.136		4.55	0.136		/	/		6.35	0.190
42.2	32	1.65	0.04		/	/		3.56	0.08		4.85	0.115		4.85	0.115		/	/		6.35	0.150
48.3	40	1.65	0.03		/	/		3.68	0.08		5.08	0.105		5.08	0.105		/	/		7.14	0.148
60.3	50	1.65	0.03		/	/		3.91	0.06		5.54	0.092		5.54	0.092		/	/		8.74	0.145
73.0	65	2.11	0.03		/	/		5.16	0.07		7.01	0.096		7.01	0.096		/	/		9.53	0.131
88.9	80	2.11	0.02		/	/		5.49	0.06		7.62	0.086		7.62	0.086		/	/		11.13	0.125
101.6	90	2.11	0.02		/	/		5.74	0.06		8.08	0.080		8.08	0.080		/	/		/	/
114.3	100	2.11	0.02		/	/		6.02	0.05		8.56	0.075		8.56	0.075		11.13	0.097		13.49	0.118
141.3	125	2.77	0.02		/	/		6.55	0.05		9.53	0.067		9.53	0.067		12.70	0.090		15.88	0.112
168.3	150	2.77	0.02		/	/		7.11	0.04		10.97	0.065		10.97	0.065		14.27	0.085		/	/
219.1	200	2.77	0.01		6.35	0.029		8.18	0.04		12.70	0.058		12.70	0.058		/	/		/	/
273.0	250	3.40	0.01		6.35	0.023		9.27	0.03		12.70	0.047		15.09	0.055		/	/		/	/
323.8	300	3.96	0.01		6.35	0.020		9.53	0.03		12.70	0.039		17.48	0.054		/	/		/	/
355.6	350	3.96	0.01		7.92	0.022		9.53	0.03		12.70	0.036		19.05	0.054		/	/		/	/
406.4	400	4.19	0.01		7.92	0.019		9.53	0.02		12.70	0.031		21.44	0.053		/	/		/	/
457	450	4.19	0.01		7.92	0.017		9.53	0.02		12.70	0.028		23.83	0.052		/	/		/	/
508	500	4.78	0.01		9.53	0.019		9.53	0.02		12.70	0.025		26.19	0.052		/	/		/	/
559	550	5.54	0.01		9.53	0.017		9.53	0.02		12.70	0.023		28.58	0.051		/	/		/	/
610	600	6.35	0.01		9.53	0.016		9.53	0.02		12.70	0.021		30.96	0.051		/	/		/	/