

# ULTIMATE PLUMBING SOLUTIONS THAT LAST A LIFETIME

HOTO不锈钢喉管系统。您终生的最佳管喉方案。

- HYGIENIC
- DURABLE
- EASY INSTALLATION
- VALUE FOR MONEY



# A STEELY COMMITMENT TO QUALITY

Established in January 1994, HOTO Stainless Steel Industries Sdn. Bhd. is Malaysia's foremost manufacturer of stainless steel ornamental tubes and water pipes. A name that stands for quality and excellence, HOTO is an abbreviation for the Japanese word "Hosho Tokyuhin" which means "assurance of excellent quality". This is a reflection of our company's commitment in producing quality stainless steel tubes and pipes that meet international standards and specifications.

At HOTO, we believe in working closely with our clients to provide them with products and services of unsurpassed quality. It is this high level of commitment that has earned us the MS ISO 9001:2008 Certification for Quality Assurance in Production, Installation and Servicing, and has also helped us stand in good stead in keeping our customers' trust and loyalty, both domestic and international.



## WHY CHOOSE HOTO STAINLESS STEEL PLUMBING?

When it comes to potable water supplies, particularly in large institutional, commercial and residential buildings, there are many good reasons to consider stainless steel plumbing.

The many advantages of stainless steel plumbing include:

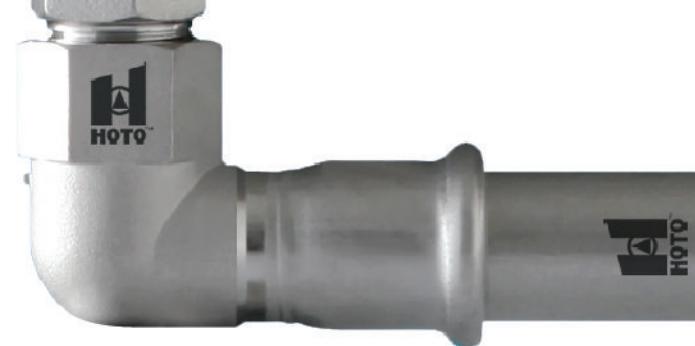
- Low maintenance costs and other life-cycle costing advantages
- Does not demand water treatment chemicals, except for bacterial control
- Pipe work is unaffected by high water flow rates
- Able to sustain the full range of potable waters, including soft waters, a feature that is viable in large buildings
- Very good corrosion resistance, hence there is no danger of contamination of drinking water supplies
- Strong yet ductile
- Non-toxic
- Manufactured from a high proportion of recycled material and is 100% recyclable
- Suitable for hot water usage
- Looks good after installation

At HOTO, we provide a full range of joining methods and fittings, where the stainless steel tubing can be manipulated to suit the requirements of our clients.



# KOMITMEN TEGUH TERHADAP KUALITI

HOTO Stainless Steel Industries Sdn. Bhd. yang ditubuhkan pada bulan Januari 1994 adalah pengeluar tiub hiasan dan paip air keluli tahan karat yang terulung di Malaysia. Namanya yang melambangkan kualiti dan kecemerlangan, HOTO merupakan singkatan perkataan Jepun "Hosho Tokyuhin" yang bermaksud "jaminan kualiti yang cemerlang". Inilah lambang komitmen syarikat kami dalam mengeluarkan tiub keluli tahan karat dan paip berkualiti yang memenuhi piawaian dan spesifikasi antarabangsa.



Di HOTO, kami sentiasa berpegang kepada falsafah bekerja seiring dengan pelanggan bagi menyediakan produk dan perkhidmatan yang berkualiti yang tiada tara kepada mereka. Tahap komitmen yang tinggi inilah yang telah membolehkan kami mencapai Piawaian MS ISO 9001:2008 untuk Jaminan Kualiti dalam Pengeluaran, Pemasangan dan Servis, serta telah berjaya mengukuhkan kedudukan kami dalam mengekalkan kepercayaan dan kesetiaan para pelanggan kami, baik di peringkat tempatan maupun antarabangsa.

## MENGAPA MEMILIH SISTEM PAIP KELULI TAHAN KARAT HOTO?

Paip keluli tahan karat harus mendapat pertimbangan wajar terutamanya jika ia melibatkan bekalan air boleh diminum, terutamanya bagi bangunan-bangunan besar institusi, komersil dan kediaman.

Kelebihan-kelebihan sistem paip keluli tahan karat Hoto termasuk:

- Kos penyelenggaraan rendah serta pelbagai kelebihan kitaran hidup yang lain
- Tidak memerlukan bahan kimia rawatan air, kecuali untuk kawalan bakteria
- Kerja-kerja paip lain tidak tergugat oleh kadar aliran air yang tinggi
- Berupaya menahan pelbagai jenis air boleh diminum, termasuk air lembut, suatu ciri yang berdaya maju dalam bangunan-bangunan besar
- Ketahanan pengakisan yang amat baik, oleh itu tiada bahaya pencemaran daripada bekalan air minuman
- Teguh namun tetap mulur
- Tiada toksik
- Dihasilkan daripada kandungan bahan kitar semula yang tinggi dan 100% boleh dikitar semula
- Sesuai untuk kegunaan air panas
- Kelihatan menarik selepas pemasangan

Di HOTO, kami menyediakan rangkaian penuh kaedah penyambungan dan pemasangan, di mana tiub keluli tahan karat tersebut boleh dibentuk mengikut keperluan para pelanggan kami.

## 钢铁般的品质承诺

HOTO Stainless Steel Industries Sdn.Bhd.于1994年1月成立,是马来西亚首屈一指的不锈钢管和水管制造商。HOTO源自于日文“Hosho Tokyuhin”,寓意“超卓品质的保证”,反映我们公司产品符合国际标准规格,也代表我们出产优质不锈钢管和水管的坚决承诺。本公司HOTO以顾客为优先,坚信与顾客保持紧密合作以提供无与伦比的产品和素质服务为企业理念。凭着这崇高的信念,我们已成功在制造,安装及服务领域荣获MS ISO 9001:2008认证证书,也获得了国内及海外顾客的信赖与支持。

## 为何选择HOTO不锈钢喉管?

在大型建筑物供应饮用水方面,尤其是机构,商业或住宅区,采用不锈钢管的好处可说是多不胜数。

不锈钢管众多好处包括:

- 维修费低、具备使用周期费用低的优势
- 细菌防治以外,无需使用化学物品处理水质
- 喉管不受水量高低影响
- 能负荷所有饮用水(包括轻水),也适用于大型建筑
- 良好的防锈材料,不会污染饮用水供
- 坚固,可塑性强
- 无毒
- 采用高成分可再循环材料制造,可再循环率100%
- 安装整齐美观
- 热水器适用

本公司提供完整的装置及接合方法,显得不锈钢容易处理,能据顾客需求改造。

## THE BASIC PRINCIPLE OF PRESS FITTING

The stainless steel press-fix fitting has a special profile which consists of ends with U-shaped grooves and O-shaped seal rings. During the process of connecting the pipes, the stainless steel water pipe that needs to be connected is inserted into the press-fix fitting and then sealed up by the compress-seizing method with a special pressing tool. Hence, the press-fitting and pipe end that is to be fitted are compressed together to form a hexagonal shape that gives the structure sufficient strength for fitting. As the sealing ring has been compressed, this structure also has excellent seal properties.

## PRINSIP ASAS PEMASANGAN JENIS TEKAN

Pemasangan jenis tekan untuk paip keluli tahan karat mempunyai profil khas yang terdiri daripada hujung dengan alur berbentuk-U dan gelang kedap berbentuk-O. Semasa proses penyambungan paip, paip air keluli tahan karat yang hendak disambung itu dimasukkan ke dalam pemasangan tekan. Kemudian dikedap dengan mengikat secara mampat dengan menggunakan bersama-sama peralatan pemasangan bagi membuat bentuk heksagon supaya dapat memberikan kekuatan yang mencukupi untuk pemasangan. Oleh sebab gelang kedap telah dimampatkan, struktur ini juga memiliki sifat kedapan yang cemerlang.

## PRODUCT SAMPLE - OUR TYPE OF STAINLESS STEEL PIPES

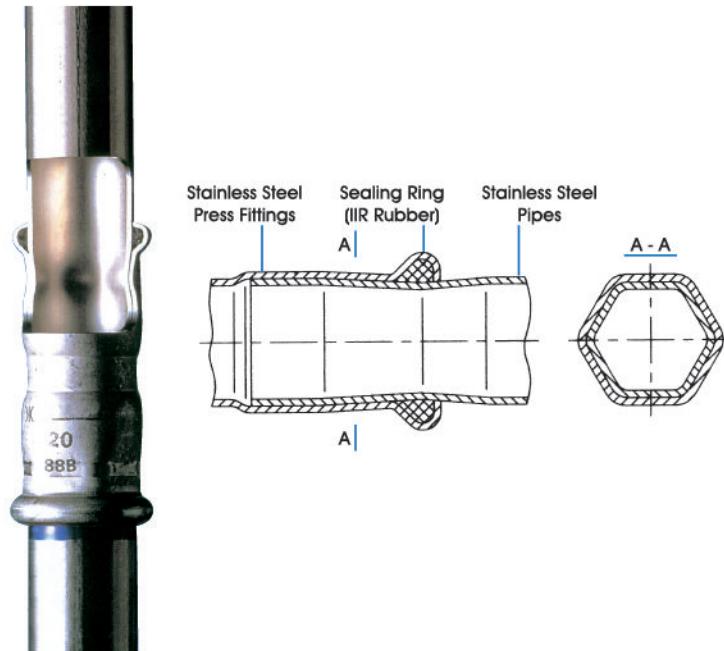
BSEN-10312 : 2002 and JIS G 3448 : 2012 Stainless Steel Water Pipes or equivalents are widely used in developed countries. The advantages, as mentioned, include better hygiene, durability, low maintenance and economical when taking into account the cost of its lifecycle. Installation costs can be rather competitive. Stainless steel pipe is compatible with both stainless steel and copper-based alloy fittings. It delivers the best results when used with stainless steel press-fit fittings, and is especially suitable when concealed in concrete or when used for underground laywork.

## CONTOH PRODUK - JENIS PAIP KELULI TAHAN KARAT KAMI

BSEN -10312 : 2002 dan JIS G 3448 : 2012 Paip Air Keluli Tahan Karat, atau yang bersamaan dengannya, digunakan secara meluas di negara-negara maju. Kelebihannya sepertimana yang dinyatakan, meliputi tahap kebersihan yang lebih baik, ketahanan, penyelenggaraan yang rendah serta faedah ekonomi jika mengambil kira kos kitaran hidupnya. Kos pemasangannya agak setanding. Tiub keluli tahan karat adalah serasi dengan pemasangan keluli tahan karat dan aloi yang berasaskan tembaga. Ia memberikan hasil terbaik apabila digunakan dengan pemasangan keluli tahan karat pasang-tekan, dan amat sesuai apabila tersembunyi di dalam konkrit atau apabila digunakan untuk kerja-kerja pemasangan bawah tanah.

## 压力装配的基本原理

不锈钢压力装配的特定组合涵盖了U形槽口及O形封环。连接喉管过程中,需要被接驳的不锈钢水管将被插入 压力装配接着其压缩捆扎将引用特别的压力工具来封密。这样一来,压力装配的部分和被装配的水管末端 将一起被压缩成六角形,这样不但能供应钢管良好的封密,也能确保结构在安装过程时所需的稳定性。



## 产品样本 - 本公司提供的不锈钢管系列

BSEN-10312:2002和JIS G3448:2012不锈钢水管或同等的水管在先进国家已获得广泛的采用。正如前所述,其优点包括卫生、耐用、维修费低和使用周期成本上更具经济效益。此外,其安装成本在市场上也非常具竞争性。不锈钢管不止能与不锈钢合装,也能和铜质合金装置使用。虽然如此,其产品配搭不锈钢压力固定装配相得益彰,用于隐藏在混凝土或地底铺设尤其合适。



## SIZE RANGE JENIS SAIZ 体积范围

### • Standard: BSEN-10312:2002 / MS 1988:2007

Size / Designation	Outside Diameter	Nominal Thickness	Approx No. of Metres per 1000 Kilos	Approx No. of Kilo Per Metre Run
15 mm	14.94 / 15.04 mm	0.6 mm	4478	0.223
22 mm	21.95 / 22.05 mm	0.7 mm	2630	0.380
28 mm	27.95 / 28.05 mm	0.8 mm	1816	0.551
35 mm	34.97 / 35.07 mm	1.0 mm	1167	0.857
42 mm	41.97 / 42.07 mm	1.1 mm	885	1.130
54 mm	53.84 / 54.07 mm	1.2 mm	631	1.585
76.1 mm	75.54 / 76.30 mm	1.5 mm	359	2.787

### • Standard: JIS G 3448:2012

Size / Designation	Outside Diameter	Nominal Thickness	Approx No. of Metres per 1000 Kilos	Approx No. of Kilo Per Metre Run
30	34.0 mm	1.2 mm	1020	0.980
40	42.7 mm	1.2 mm	806	1.241
50	48.6 mm	1.2 mm	706	1.417
60	60.5 mm	1.5 mm	453	2.205

## GENERAL GUIDE OF CHEMICAL COMPOSITION KOMPOSISI KIMIA 化学成分

The stainless steel from which domestic water tubing is manufactured is type 304/316L in EN 10088-2 having the following composition :  
*Kelulitan karat yang menghasilkan tiub air domestik adalah jenis 304/316L dalam EN 10088-2 mempunyai komposisi seperti berikut :*  
 国内水管采用的不锈钢管是以304/316L 的 EN 10088-2型制造,其第二组合成份如下:

Grade	C (% max)	Si (% max)	Mn (% max)	Ni (%)	Cr (%)	Mo (%)	S (% max)	P (% max)
1.4301 (304)	0.07	1.00	2.00	8.00 - 10.50	17.50 - 19.50	-	0.03	0.045
1.4401 (316)	0.07	1.00	2.00	10.00 - 13.00	16.50 - 18.50	2.00 - 2.50	0.03	0.045
1.4404 (316L)	0.03	1.00	2.00	10.00 - 13.00	16.50 - 18.50	2.00 - 2.50	0.03	0.045

## GENERAL GUIDANCE DATA FOR PHYSICAL & MECHANICAL PROPERTIES SIFAT FIZIKAL & MEKANIKAL 物理及机械性能

Material Grade	Specific Gravity Kg/dm <sup>3</sup>	Thermal Conductivity at 20°C (W/m.k)	Coefficient of Thermal Expansion between 20°C and 100°C X 10 <sup>-6</sup> K <sup>-1</sup>	Young's Modulus of Elasticity at 20°C GPa	Tensil Strength N/mm <sup>2</sup> (min)	Elongation on 50mm % (min)
1.4301/1.4401/1.4404 SUS304/SUS316	7.91	15	16	200	520	35%

## • Line marking

Put an insertion mark on the pipe using a marker. This is a very important step.

## • Menanda garisan

Buat tanda pemasukan pada paip dengan pen penanda. Ini adalah langkah yang amat penting.

## • 标线

用标示笔做出插入记号。这个步骤非常重要。

**1**



## • Pressing

Set the curled portion of the joint to the gutter of the jaw. Start pressing until both sides of the jaw touch and a slight shock of the motor is felt. Use only HOTO approved tools.

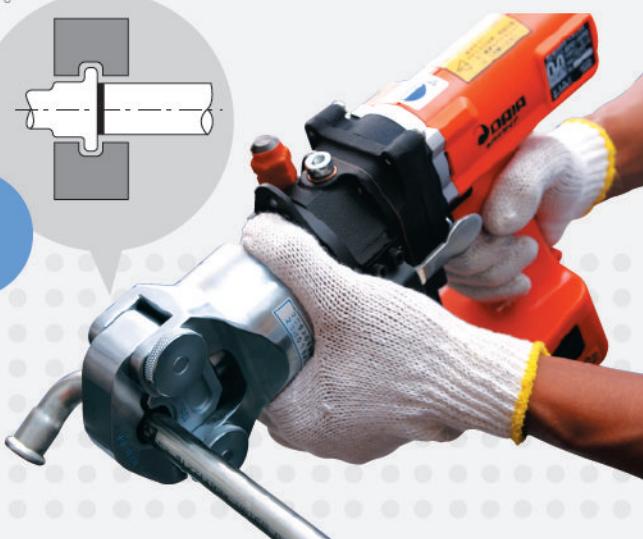
## • Menekan

Pasangkan bahagian ikal sambungan kepada talang rahang. Mula menekan hingga kedua-dua bahagian rahang bertemu dan sedikit kejutan dapat dirasai pada motor. Hanya gunakan peralatan HOTO yang diluluskan.

## • 施压

把接榫末端部位固定在钳的槽口,然后开始按压直到钳的两端已接触。这时你也应该感觉到马达稍微震动。请使用HOTO批准的工具。

**3**



## • Insert pipe until it stops

Insert the pipe into the joint to its full end, until the line mark reaches the joint end. The pipe shall not be inserted axially. Then, turn it slightly to prevent spiral extrusion. In case of insertion difficulty, check for remaining burrs or that the pipe is not oval shaped. Replace the pipe if the shape is deformed. Apply only water for lubrication and not oil nor grease.

## • Masukkan paip hingga ia berhenti

Masukkan paip ke dalam sambungan, sehingga tanda garisan menyentuh hujung sambungan. Paip tersebut tidak boleh dimasukkan tanpa diputar. Putaran ini akan mencegah penyempitan pilin. Sekiranya berlaku kesukaran memasukkannya, periksa gerigi yang mungkin masih ada ataupun kemungkinan paip tidak berbentuk bujur. Gantikan paip jika bentuknya cacat. Untuk tujuan pellinciran, gunakan air sahaja dan bukannya minyak atau gris.

## • 把喉管插入到底

把喉管完全插入接榫,直到标线到达接榫末端。注意:喉管不能顺轴向插入。插入时,稍微转动钢管以避免旋转时钢管被挤压。若难以插入,请检查钢管是否有毛口或喉管是否已变形。若已变形,请更换喉管。请只用水作润滑用途,而不是油或润滑油。

**2**



## • Checking

After pressing, apply the hexagonal gauge to the hexagonal portion of the joint and check if installation is done properly. If the gauge is not inserted properly, check tools and press again.

## • Memeriksa

Selepas menekan, pasangkan tolok heksagon pada bahagian heksagon sambungan dan periksa jika pemasangan dibuat dengan betul. Sekiranya tolok tidak dimasukkan dengan betul, periksa peralatan dan tekan sekali lagi.

## • 检查步骤

按压后,在接榫的六方形部位使用六方形量器以便检查安装过程是否正确。若量器插的不正确,请检查其工具,然后再按压一次。

**4**



The HOTO Press Fitting Tool is a handy clicking machine that is easy and convenient to use. This rechargeable tool is best used for various stainless steel pipework and installations.

Peralatan Pemasangan Penekan HOTO adalah mesin klik yang senang dan mudah digunakan. Peralatan cas semula ini amat sesuai digunakan untuk pelbagai kerja paip dan pemasangan keluli tahan karat.

充电式的HOTO压缩装置工具轻便易用,是进行各种不锈钢喉管安装工作的好帮手。



BPD-11 for size 30, 40, 50 & 60



BPD-15-R for size 15, 22, & 28

## ▲ QUALITY TEST UJIAN KUALITI 品质测试

### • Tensile Test

Drawing blocking power is measured using the Amsler universal testing machine. 0.2MPa (2.0kgf/cm<sup>2</sup>) of air pressure is applied into the enclosed pipe by a pump.

Penarikan kuasa sekatan diukur menggunakan mesin ujian semesta Amsler. Sebanyak 0.2MPa (2.0kgf/cm<sup>2</sup>) tekanan udara dimasukkan ke dalam paip yang disediakan dengan menggunakan sebuah pam.

采用Amsler测试机测量拉伸力。用泵把0.2MPa (2.0kgf/cm<sup>2</sup>)气压注入附备管内。



### • Bending Water Pressure Test

2.5 MPa of air pressure is injected and the maximum bending degree is measured using the Amsler universal bending machine.

Tekanan udara sebanyak 2.5MPa dimasukkan dan darjah lenturan maksimum diukur dengan menggunakan mesin lenturan semesta Amsler.

注入2.5MPa的气压,然后采用Amsler测试机测量其最高弯曲度。



### • Cyclic Internal Pressure Test

Cyclic pressure is applied 10,000 times. No leaks or problems were noted.

Tekanan berkitar dikenakan sebanyak 10,000 kali. Tiada kebocoran atau masalah dikesan.

注入10,000倍环状压力。没有发现任何泄漏或问题。



### • Vibration Test

A vibration flexion is repeated one million times using a vibration testing machine. No leaks or problems were noted.

Fleksi getaran diulang sebanyak sejuta kali menggunakan sebuah mesin ujian getaran. Tiada kebocoran atau masalah dikesan.

以震动测试机重复百万次的震动测试。没有发现任何泄漏或问题。



### • Corrosion Test

A testing solution consisting of 200+20mg/litre of Cl and distilled water is prepared according to JIS K8150 (sodium chloride reagent).

Larutan ujian yang terdiri daripada 200+20mg/liter Cl dan air suling disediakan mengikut kaedah JIS K8150 (reagen sodium klorida).

据JIS K8150 (氯化钠剂)的一项溶液测试准备包含了200+20毫克/公升的Cl及蒸馏水的溶液测试。



## APPLICATION IN GENERAL USAGE APLIKASI DALAM KEGUNAAN UMUM 一般用法

HOTO is an integral provider for many prestigious building, commercial, residential and community projects that demand the highest quality stainless steel tubes and pipes.

The quality of HOTO stainless steel pipe is proven and used across a wide spectrum of industry and community-based developments in many developed countries.

*HOTO merupakan pembekal penting kepada pelbagai bangunan yang berprestij, projek-projek komersil, kediaman dan komuniti yang memerlukan tiub keluli tahan karat berkualiti terbaik*

*Sesungguhnya kualiti paip keluli tahan karat HOTO telah terbukti dan digunakan secara meluas dalam pelbagai industri serta pembangunan yang berdasarkan komuniti di kebanyakan negara-negara maju.*

目前,HOTO是许多建筑工程的综合供应商,顾客包括了商业、住宅及社区建筑公司。HOTO不锈钢品质已获得验证,也已被广泛地使用于许多先进国家工业及社区发展计划内。



Communication Pipes  
Paip Komunikasi  
通信管道



Internal Plumbing (Pipes install at ceiling)  
Pemasangan Paip di Siling  
内部管道(管道安装在天花板)



Internal Plumbing (Hot and Cold Water)  
Internal Plumbing (Air Panas dan Sejuk)  
内部水管(冷和热水)



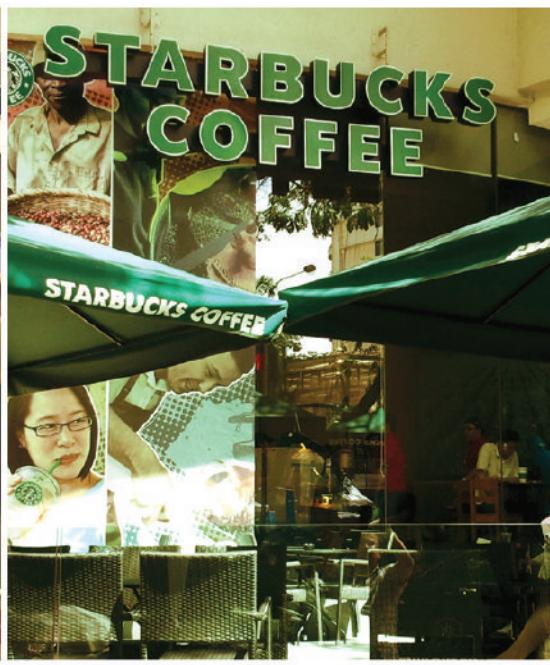
Pipes Connection From Booster Pump  
Paip Sambungan Daripada Pam Booster  
连接增压泵的管道



Pipes Connection at Water Filter Tank  
Sambungan Paip Pada Tangki Air Filter  
连接滤池的管道



Riser Pipes for High Building  
Paip Peningkat Untuk Bangunan Tinggi  
高层建筑管道胃口



- Commercial  
Komersil 商业



- Apartments & Condominiums  
Pangsapuri & Kondominium 公寓

- Landed Property  
Harta Bertanah 产地

- Hospital  
Hospital 医院

## CERTIFICATIONS AND APPROVAL PENSIJILAN DAN KELULUSAN 认证书和批准



SIRIM - Product Certification Licence for JIS G 3448 : 2012  
SIRIM - Product Certification Licence for BS EN 10312:2002

SIRIM - ISO 9001 : 2015

IKRAM QA CERTIFICATION - Product Certificate of Conformity

JSSA - Product Certification for SAS 322

NO. SIJIL PENDAFTARAN : SPAN/KP/A/00736-2010,  
SPAN/KP/A/00084-2008 & SPAN/KP/A/00085-2008

• Standard : SAS 322 : 2003



S



RS



LS



90E & 90CE



R90E



45E



R45E



S(M)



S(F)



90E(M)



90E(F)



ASF



AEF



T



R90T



T(F)



T(M)



E(F)



E(F)-WS



E(F)-WR



T(F)-WR



C



LS90



LS45



US



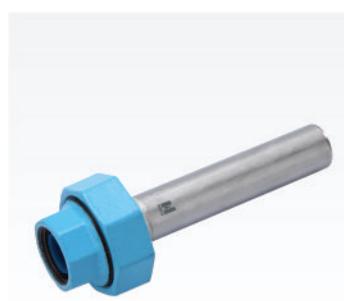
90U



UI



UIII



UH 40°C &amp; 85°C



IUG



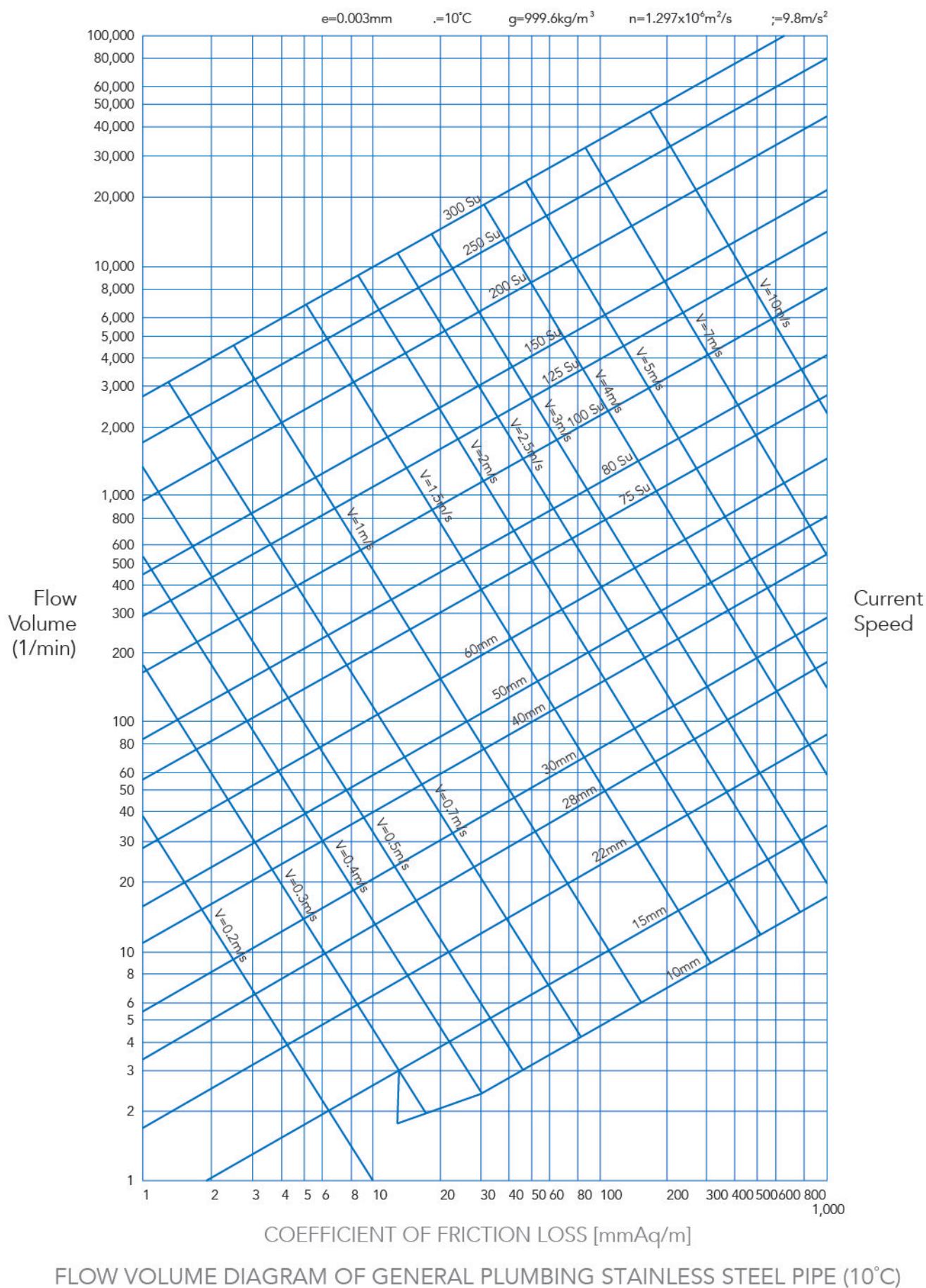
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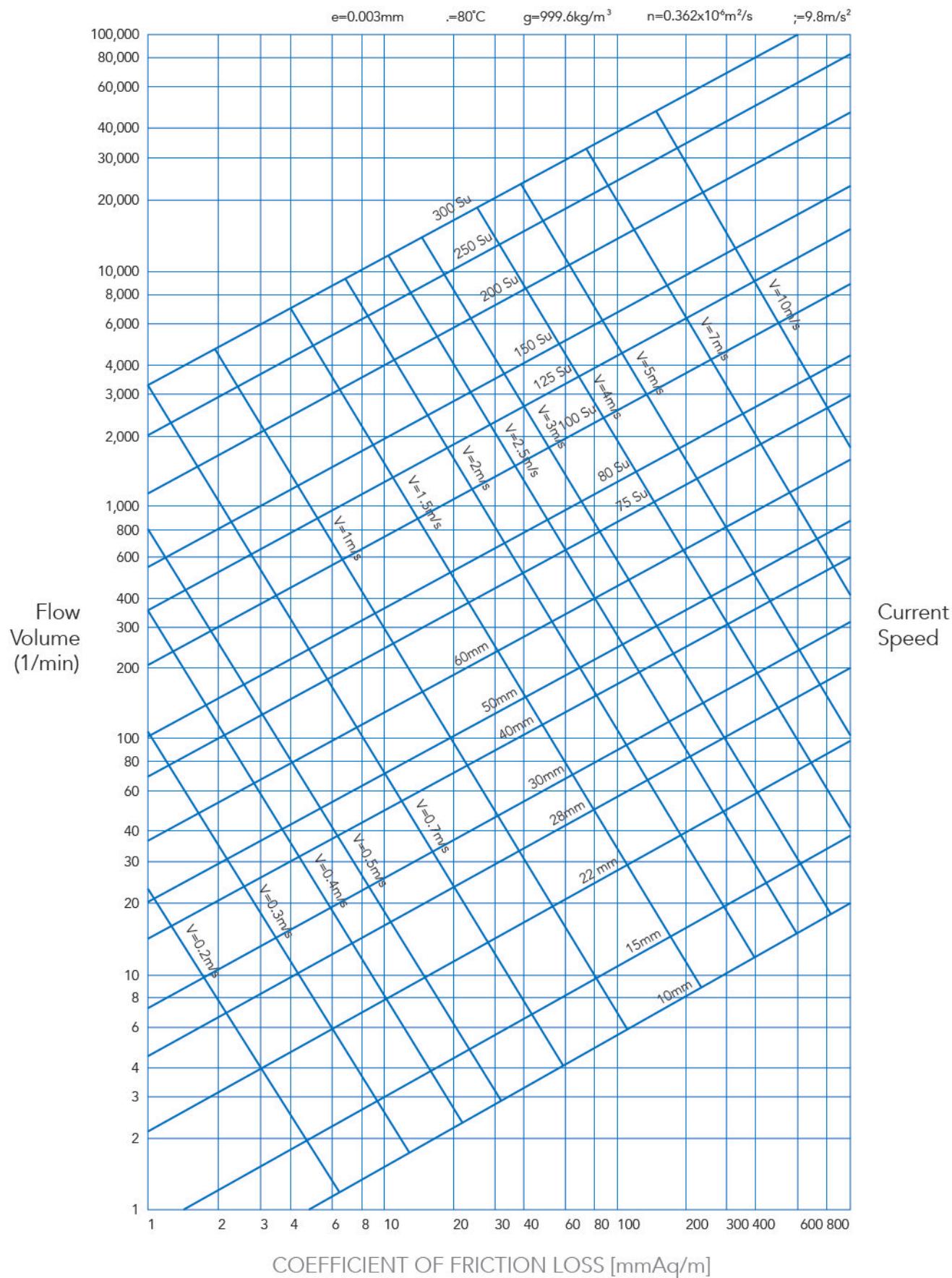
# FRICTION LOSS HEAD CARTA KEHILANGAN GESERAN 摩阻水头损失

## PIPING PIPE DIAMETER



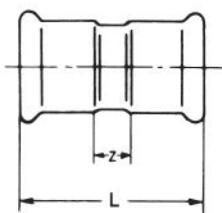
# FRICTION LOSS HEAD CARTA KEHILANGAN GESENAN 摩阻水头损失

## FOR ARCHITECTONICS



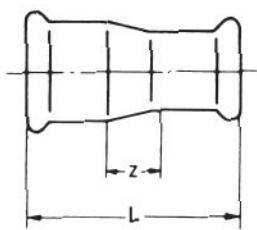
FLOW VOLUME DIAGRAM OF GENERAL PLUMBING STAINLESS STEEL PIPE ( $80^\circ\text{C}$ )

**S**



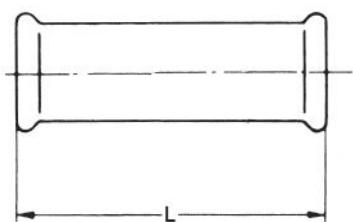
Code	Nominal diameter (mm)	L	z
011500	15	53	11
012200	22	60	12
012800	28	60	12
013000	30	100	22
014000	40	116	22
015000	50	126	22
016000	60	154	26

**RS**



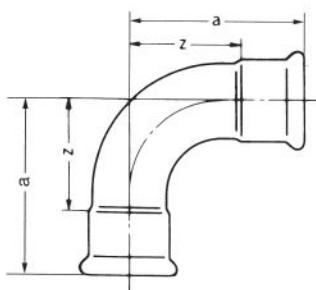
Code	Nominal diameter (mm)	L	z
022215	22 X 15	60	15
022813	28 X 15	75	30
022822	28 X 22	64	16
023028	30 X 28	90	27
023022	30 X 22	103	40
023015	30 X 15	105	45
024030	40 X 30	122	36
024028	40 X 28	121	50
024022	40 X 22	121	50
024015	40 X 15	123	55
025040	50 X 40	133	34
025030	50 X 30	146	55
025028	50 X 28	131	55
025022	50 X 22	131	55
025015	50 X 15	133	60
026050	60 X 50	157	41
026040	60 X 40	176	65
026030	60 X 30	168	65
026028	60 X 28	153	65
026022	60 X 22	153	65
026015	60 X 15	155	70

**LS**



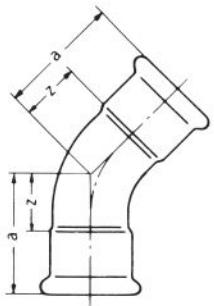
Code	Nominal diameter (mm)	L
161500	15	116
162200	22	129
162800	28	129
163000	30	100
164000	40	116
165000	50	126
166000	60	154

**90, 90CE & R90**



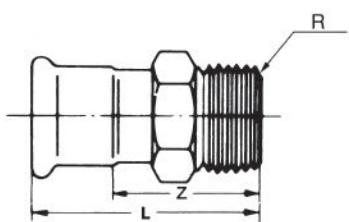
Code	Nominal diameter (mm)	L	z
351500	15	41	20
352200	22	150	26
352800	28	54	30
033000	30	91	52
034000	40	110	63
035000	50	122	70
036000	60	150	86
042215-1	22 X 15	22 15	59 48
			35 27

## 45E & R45E



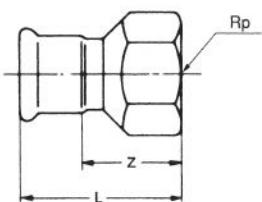
Code	Nominal diameter (mm)	a	z
071500	15	36	15
072200	22	42	18
072800	28	46	22
073000	30	66	27
074000	40	78	32
075000	50	87	35
076000	60	109	45
082215-1	22 X 15	22 15	48 36
		22	24
		15	15

## S(M)



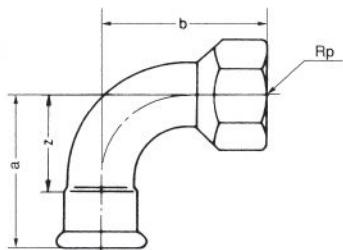
Code	Nominal diameter (mm)	L	z
101501	15 X 1/2	57	36
102201	22 X 1/2	61	37
102202	22 X 3/4	64	40
102803	28 X 1	68	44
103003	30 X 1	87	48
103004	30 X 1 1/4	104	65
104004	40 X 1 1/4	98	51
104005	40 X 1 1/2	112	65
105005	50 X 1 1/2	105	53
105006	50 X 2	128	76
106006	60 X 2	125	61
106007	60 X 2 1/2	202	138

## S(F)



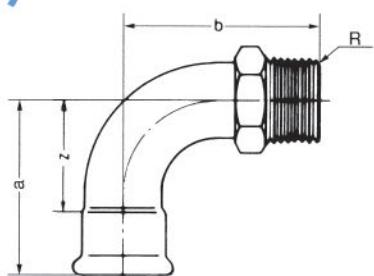
Code	Nominal diameter (mm)	L	z
091501	15 X 1/2	53	32
092202	22 X 3/4	59	35
092201	22 X 1/2	57	33
092803	28 X 1	62	38
092802	28 X 3/4	65	41
092801	28 X 1/2	63	39

## 90E(F)



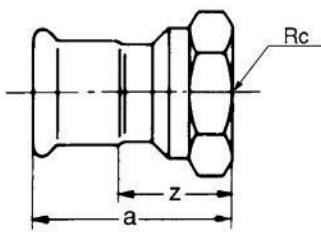
Code	Nominal diameter (mm)	a	b	z
111501	15 X 1/2	48	48	27
112202	22 X 3/4	58	57	34
112201	22 X 1/2	58	55	34
112803	28 X 1	66	67	42

## 90E(M)



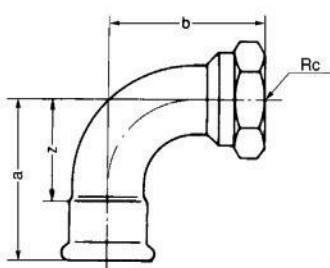
Code	Nominal diameter (mm)	a	b	z
121501	15 X 1/2	48	52	27
122202	22 X 3/4	58	62	34
122201	22 X 1/2	58	62	34
122803	28 X 1	66	73	42
123003	30 X 1	91	78	52
124004	40 X 1 1/4	110	92	63
125005	50 X 1 1/2	122	101	70
126006	60 X 2	150	121	86

ASF



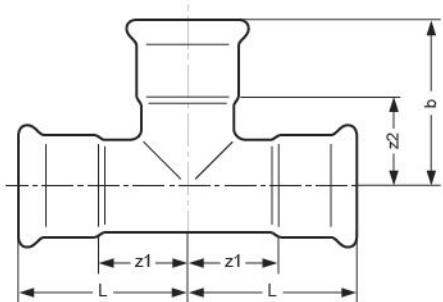
Code	Nominal diameter (mm)	a	z
303003	30 X 1	76	37
303004	30 X 1 1/4	92	53
304004	40 X 1 1/4	86	39
304005	40 X 1 1/2	98	51
305005	50 X 1 1/2	91	39
305006	50 X 2	112	60
306006	60 X 2	109	45

AEF



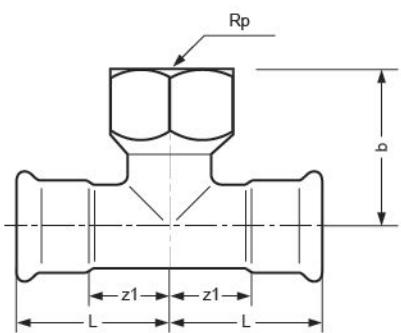
Code	Nominal diameter (mm)	a	b	z
293003	30 X 1	91	67	52
294004	40 X 1 1/4	110	80	63
295005	50 X 1 1/2	122	87	70
296006	60 X 2	150	105	86

T & R90T



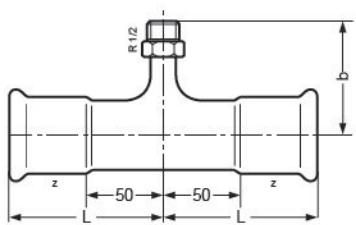
Code	Nominal dia. (mm)	L	b	z1	z2
051500	15	38	38	17	17
052200	22	46	46	22	22
062215	22 X 15	46	42	22	21
052800	28	51	51	27	27
062822	28 X 22	51	51	27	27
062815	28 X 15	51	53	27	32
053000	30	99	99	60	60
063028	30 X 28	99	70	60	46
063022	30 X 22	99	70	70	46
063015	30 X 15	99	67	60	46
054000	40	107	107	60	60
064030	40 x 30	107	99	60	60
064028	40 X 28	107	72	60	48
064022	40 x 22	107	72	60	48
064015	40 X 15	107	69	60	48
055000	50	102	102	50	50
065040	50 X 40	102	107	50	60
065030	50 X 30	102	109	50	70
065028	50 X 28	102	82	50	58
065022	50 X 22	102	76	50	52
065015	50 X 15	102	73	50	52
056000	60	127	127	63	63
066050	60 X 50	127	112	63	60
066040	60 X 40	127	117	63	70
066030	60 X 30	127	109	63	70
066028	60 X 28	117	84	53	60
066022	60 X 22	117	84	53	60
066015	60 X 15	117	81	53	60

## T(F)



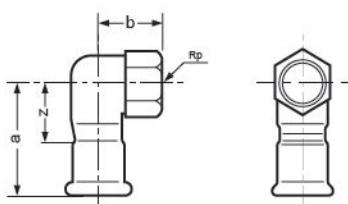
Code	Nominal diameter (mm)	L	b	z
131501	15 X 1/2	38	41	17
132202	22 X 3/4	46	47	22
132201	22 X 1/2	46	45	22
132803	28 X 1	51	54	27
132802	28 X 3/4	51	52	27
132801	28 X 1/2	51	50	27
133001	30 X 1/2	99	64	60
134001	40 X 1/2	107	66	60
135001	50 X 1/2	102	70	50
136001	60 X 1/2	117	78	53

## T(M)



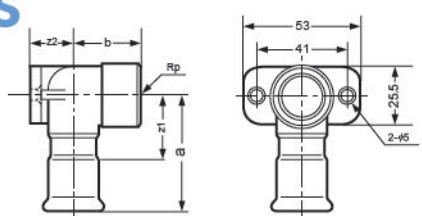
Code	Nominal diameter (mm)	L	b	z
365001	50 X 1/2	102	75	50

## E(F)



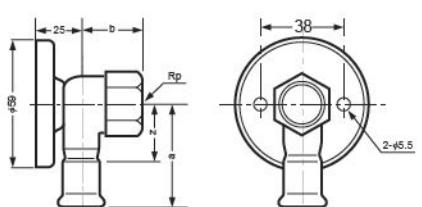
Code	Nominal diameter (mm)	a	b	z
141501	15 X 1/2	48	15	27
142202	22 X 3/4	57	35	33
142201	22 X 1/2	52	30	28

## E(F)-WS



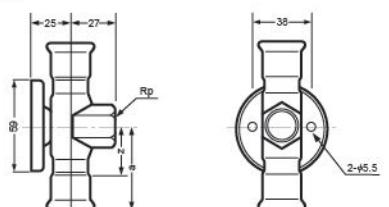
Code	Nominal dia. (mm)	a	b	z1	z2
201501	15 X 1/2	48	27	27	16
202201	22 X 1/2	52	30	28	20

## E(F)-WR



Code	Nominal diameter (mm)	a	b	z
211501	15 X 1/2	48	27	27
212202	22 X 3/4	57	35	33
212201	22 X 1/2	52	30	28

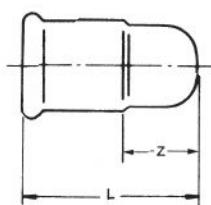
## T(F)-WR



Code	Nominal diameter (mm)	a	z
221501	15 X 1/2	57	36
222201	22 X 1/2	52	31

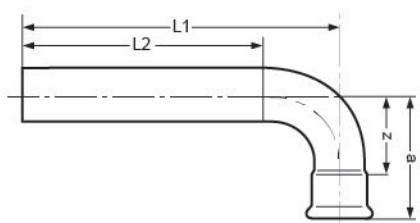
# SPECIFICATIONS SPEKSIFIKASI 规格

C



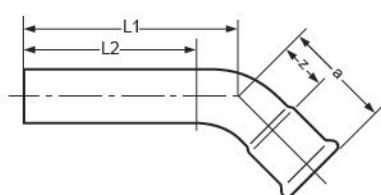
Code	Nominal diameter (mm)	a	L
151500	15	31	10
152200	22	42	18
152800	28	44	20
153000	30	66	27
154000	40	78	31
155000	50	86	34
156000	60	103	39

LS90



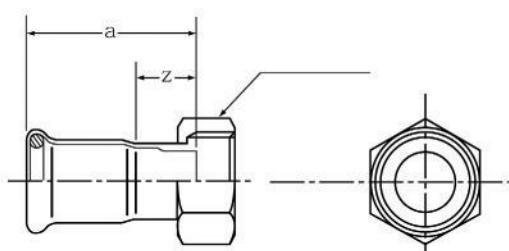
Code	Nominal dia. (mm)	a	b	L1	L2
171500	15	48	27	120	100
172200	22	58	34	127	100
172800	28	66	42	135	100
173000	30	91	52	241	200
174000	40	110	63	252	200
175000	50	122	70	259	200
176000	60	150	86	273	200

LS45



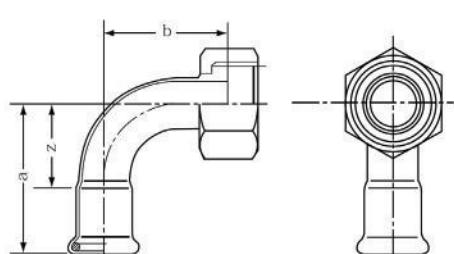
Code	Nominal dia. (mm)	a	b	L1	L2
181500	15	36	15	113	100
182200	22	42	18	116	100
182800	28	46	22	120	100
183000	30	66	27	216	200
184000	40	78	31	220	200
185000	50	87	35	224	200
186000	60	109	45	232	200

US



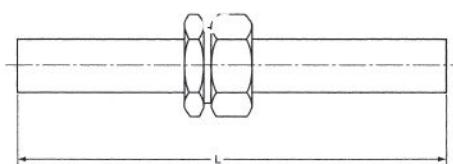
Code	Nominal diameter (mm)	a	z
311501	15 X 1/2	38	17
311502	15 X 3/4	40	19
312201	22 X 1/2	49	25
312202	22 X 3/4	51	27

90U



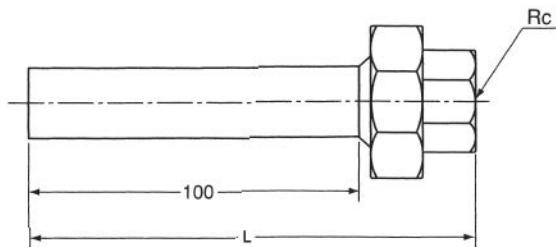
Code	Nominal diameter (mm)	a	b	z
321501	15 X 1/2	48	36	27
321502	22 X 3/4	48	38	27
322501	22 X 1/2	58	58	34
322502	22 X 3/4	58	60	34

UI



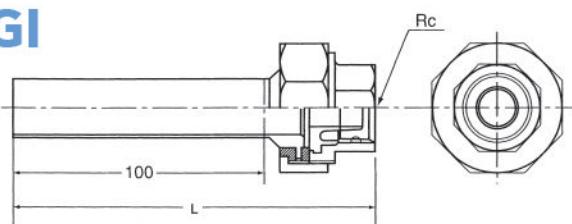
Code	Nominal diameter (mm)	L
271500	15	164
272200	22	184
272800	28	204

## UII



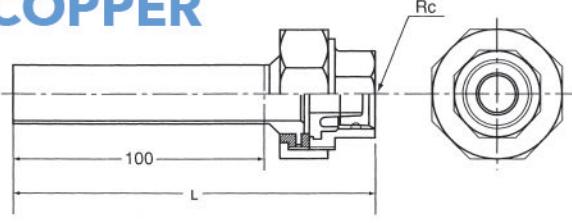
Code	Nominal diameter (mm)	L
251501	15 X 1/2	139
252202	22 X 3/4	143
252803	28 X 1	148

## UH40°C - CONNECTION to GI



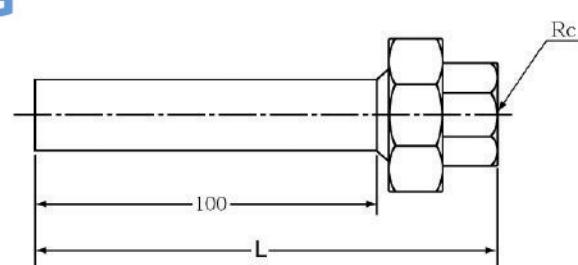
Code	Nominal diameter (mm)	L
261501	15 X 1/2	138
262202	22 X 3/4	142
262803	28 X 1	146

## UH85°C - CONNECTION to COPPER



Code	Nominal diameter (mm)	L
281501	15 X 1/2	138
282202	22 X 3/4	142
282803	28 X 1	146

## IUG



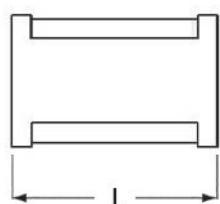
Code	Nominal diameter (mm)	L
251501	15 X 1/2	138
252202	22 X 3/4	142
252803	28 X 1	146

## SP

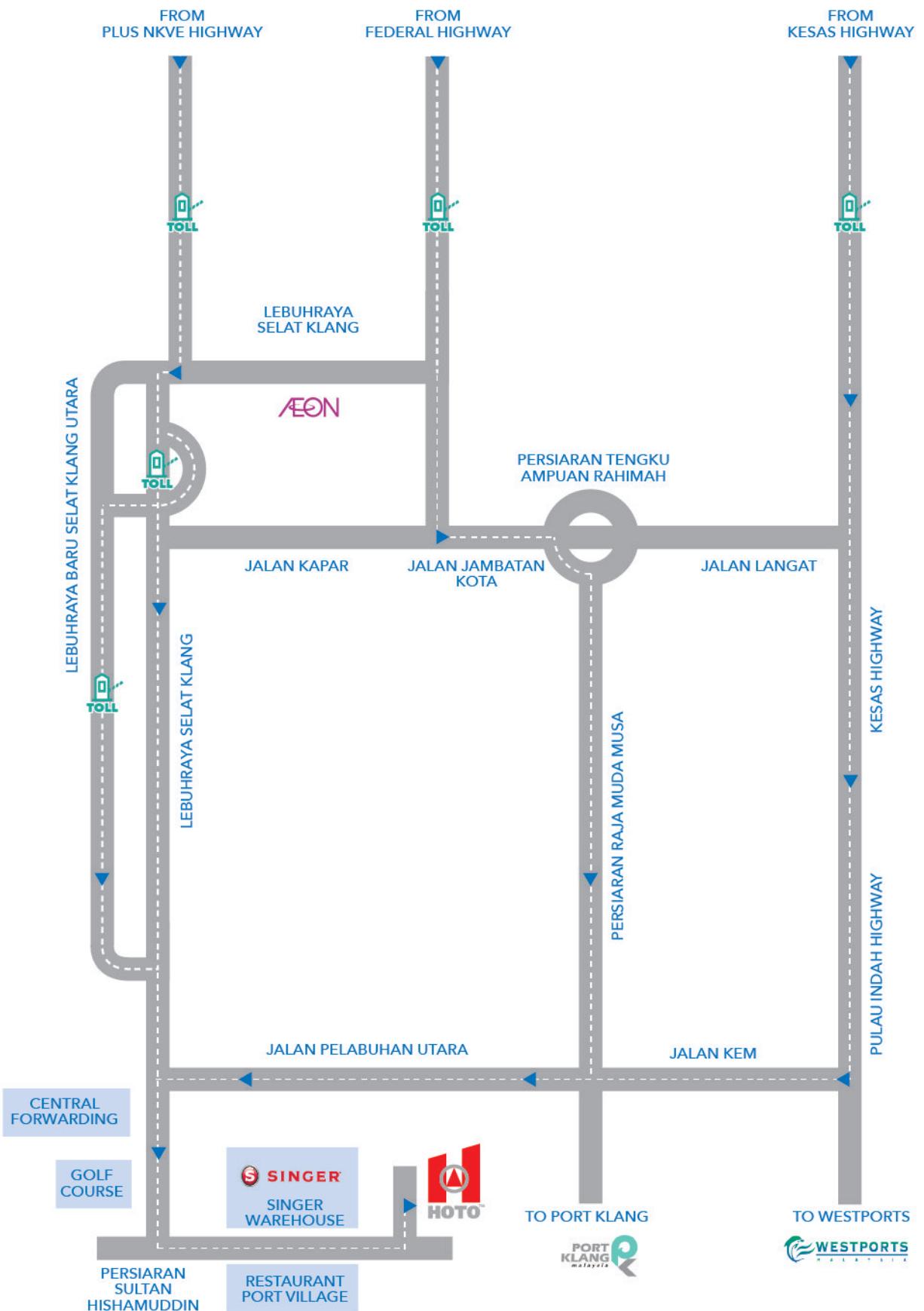


Code	Nominal diameter (mm)	L
371501	15	105
371502	15	127
371503	15	152

## SF(T)



Code	Nominal diameter (mm)	L
381500	15	32
382200	22	32
382800	28	32



### HOTO STAINLESS STEEL INDUSTRIES SDN. BHD. (285737-T)

Lot 3, Solok Sultan Hishamuddin 8, Kawasan Perusahaan Selat Kelang Utara,  
42000 Pelabuhan Kelang, Selangor Darul Ehsan, Malaysia.

+603 - 3176 1768 / 4 / 6 Malaysia.

+603 - 3176 4735 Malaysia.

david@hoto.com



[www.hoto.com](http://www.hoto.com)