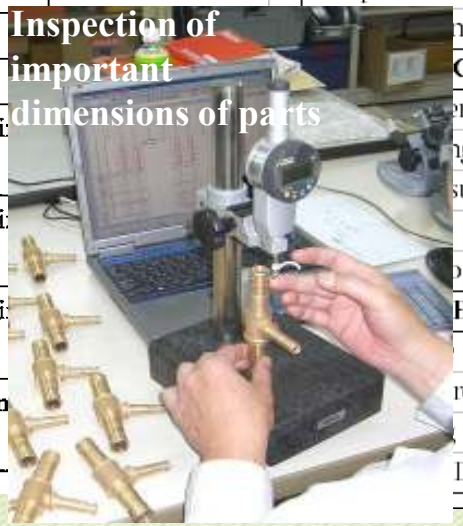
Evaluation Test Result of MECHFit

SNAP-E Joint Properties Evaluation Results

	CRITERIA
Hydrau	kage
Tensile	xial strength
	or above
Tensile	m abnormality
Tensile	m abnormality
Hot Int	m abnormality
Norma	m abnormality
Raised	m abnormality
Hot an	m abnormality
Abnor	m abnormality
Continuous Hot Water Flow	To be free from abnormality
Slant	ty includi
Slant	ty includi
No	ty includi
Inser	
Leak	h both en
Joint	

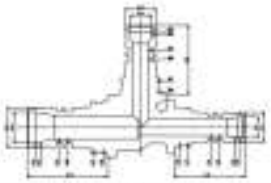


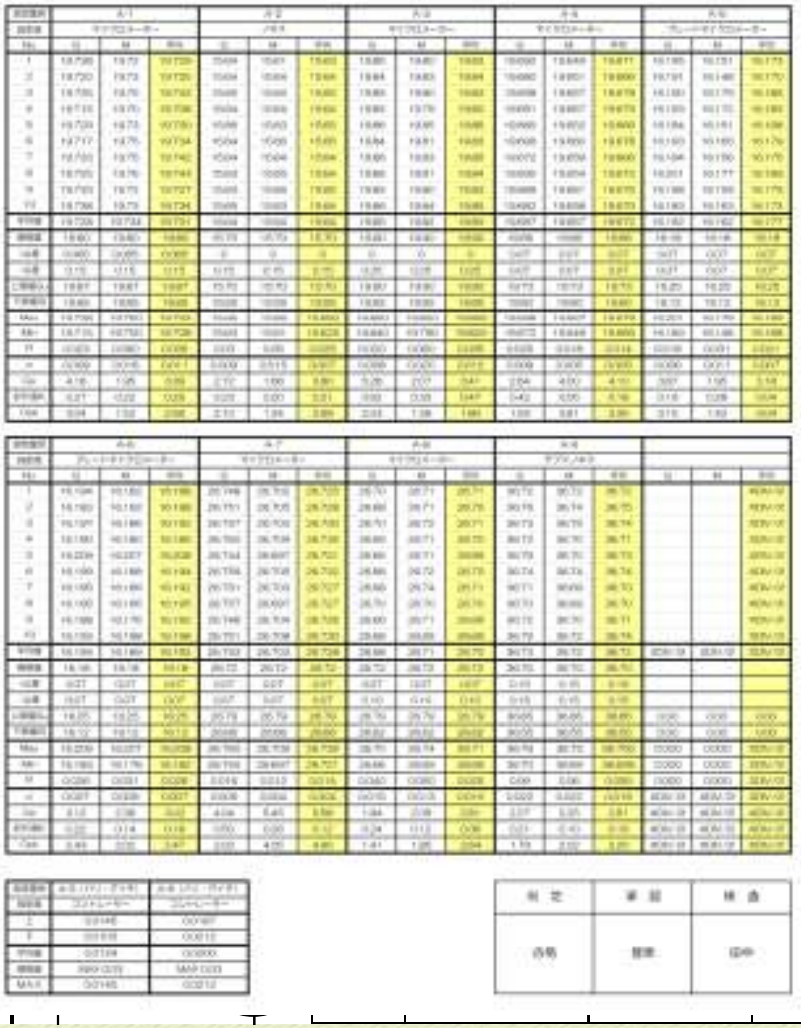
ndition for ASTM F877		
(1/2')		
re Rating		
160psi)		
100psi)		
80psi)		
E TEST		6-pcs
	23C (73F) : 3.31Mpa (480psi)	
re	82C (180F) : 1.48Mpa(215psi)	
	60-70 sec. Test	
(B) HYDROSTSTIC SUSTAINED PRESSURE		6-pcs
Testing Coondition	82C (180F)	
Temperature-Pressure	1.34Mpa (195psi)	
n	1,000 Hour	
CYCLE		6-pcs
er Immersion)	16C x 2min. 82C x 2min.	
ng-time	2min. Each /Total: 8min	
sure	0.69Mpa(100psi) Air or N2	
	1,000 Thermal Cycle	
o Test/ Burst Test		
E TEMPERATURE-PRESSURE CAPABILITY		
	99C digree	
ronment	Air	
	99C, 0.207Mpa Water x 2 h	
Duration	1.304Mpa x 30days (720h)	

QC Flow Sheet

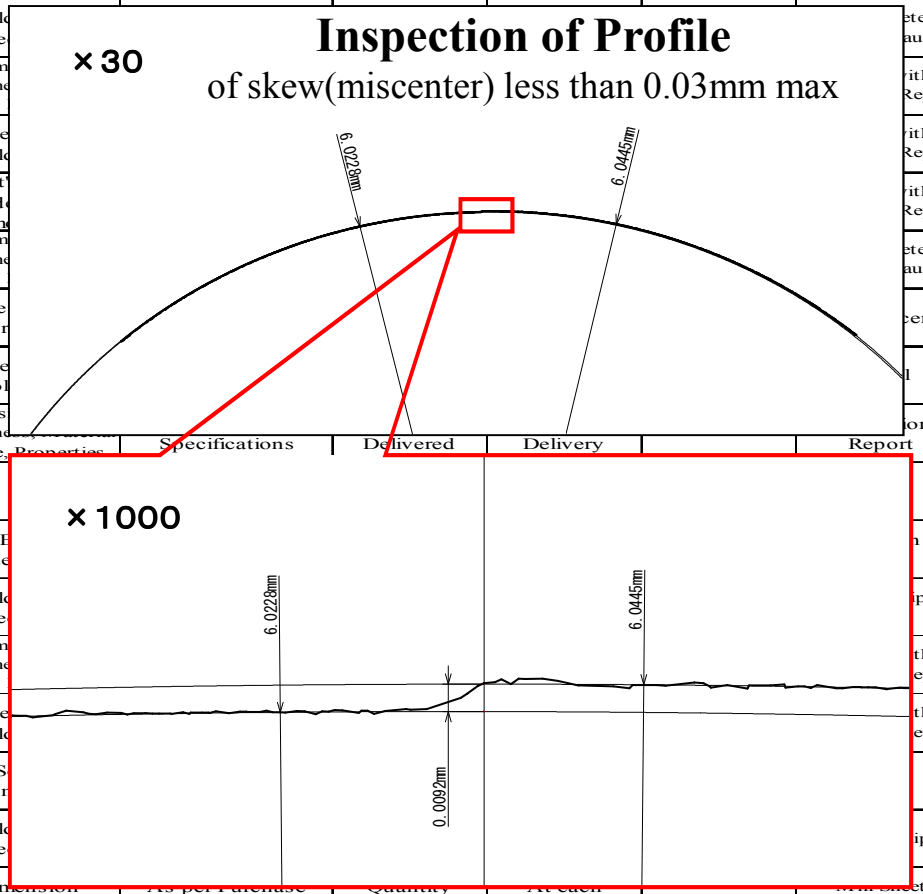
Fitting Common QC Flow Chart (Draft)

Applicable Facility	Made
Higashio Mech Inoue Sudare	Revision （Version ）

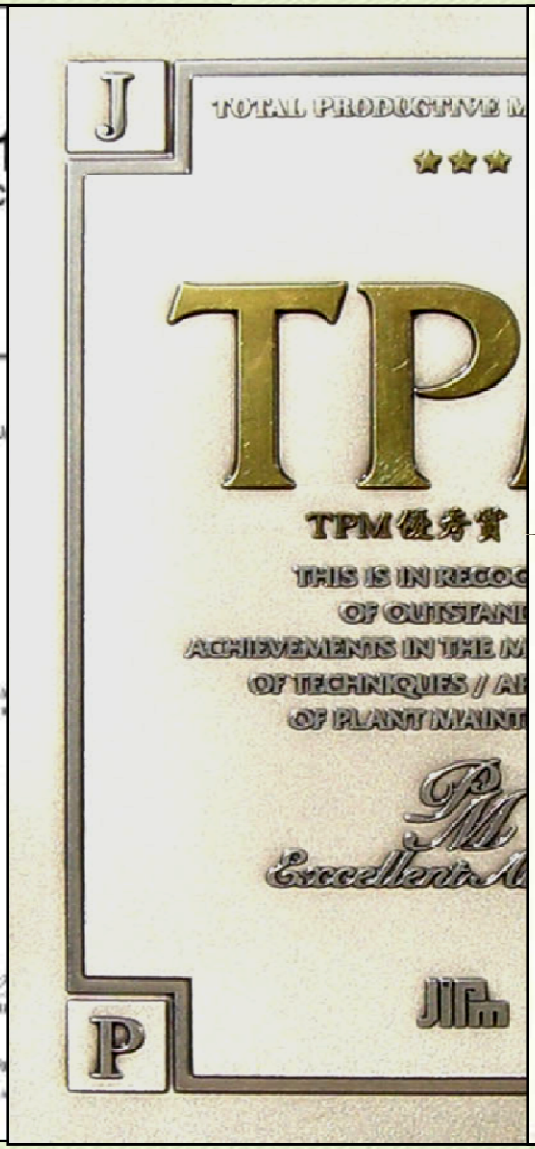




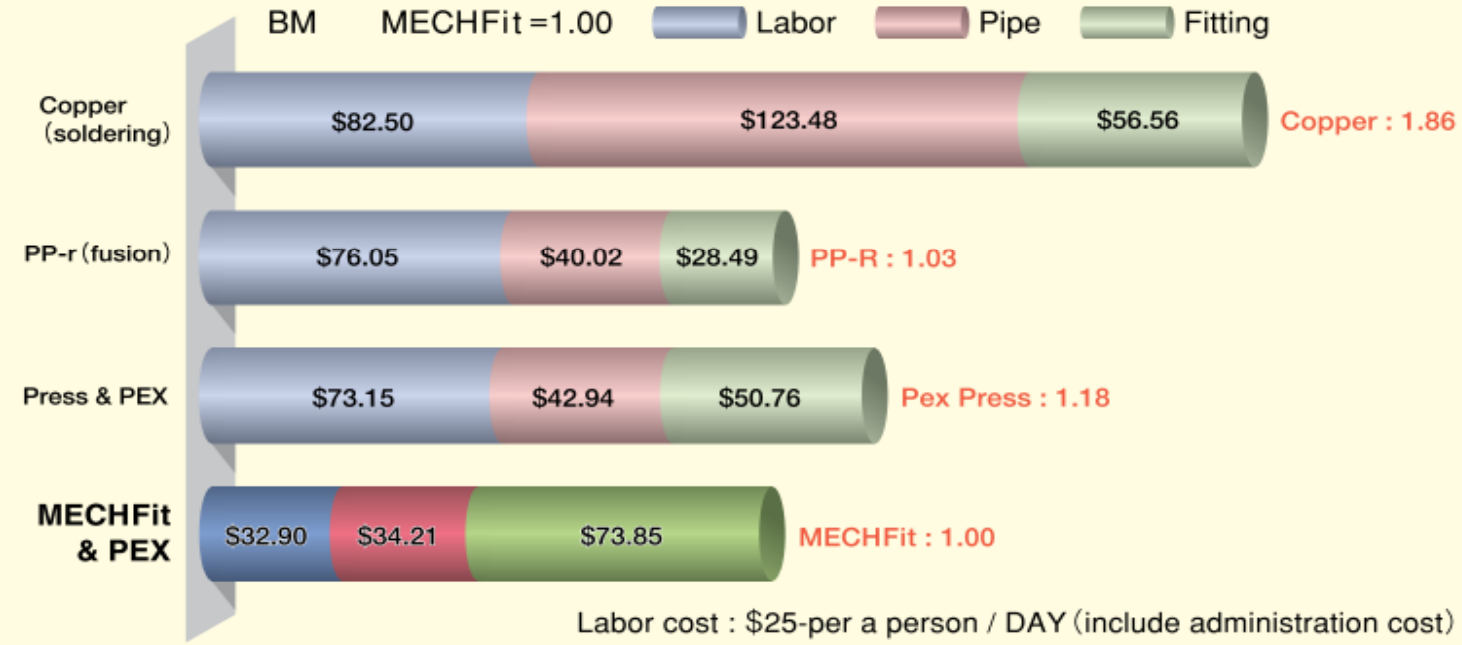
ntrol Item	Inspection Item	Criteria	Lot Size	Inspection Frequency	Number of Measurement	M'mnt Method & Tools
l of Polymer	Brand Item No.	Nippon Polypro Novatec MA3H	Purchased Lot	At each Delivery	—	Check with Inspection Report
ppearance mensions	Mold Inspe					eter auges
olded Parts imensional Accuracy	Im Dime					ith Report
ppearance	Appe Mold					ith Report
Weight of olded Parts	Part immed m					ith Report
mension of olded Parts	Im Dime					eter auges
Shape of olded Parts	Shape for					cer
ppearance	Appe Mol					l
mensions Material	Ins Thickne Name, Properties	Specifications	Delivered	Delivery		on Report
—						
l of Polymer	I Ite					n on
ppearance imension	Mold Inspe					iper,
olded Parts imensional Accuracy	Im Dime					th eport
ppearance	Appe Mold					th eport
Setting onditions	S Con					
ppearance imension	Mold Inspe					iper
imension Material	Dimension Material	As per Purchase Specifications	Quantity Delivered	At each Delivery	—	Inspection Report
Setting onditions	Setting Conditions	As per Purchase Specifications	—	—	Every piece	Visual



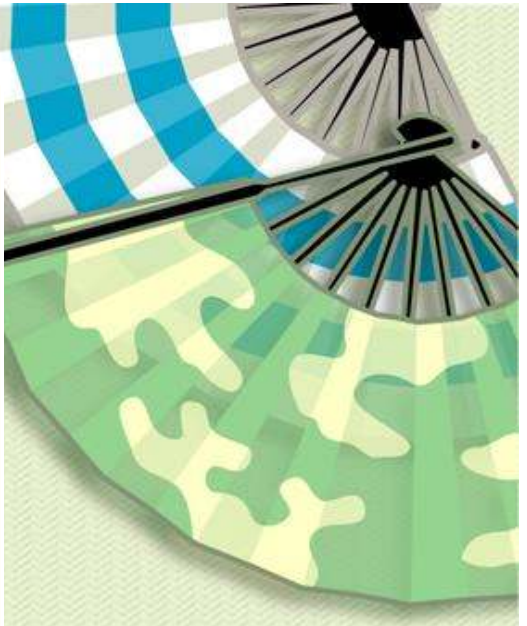
Quality Control

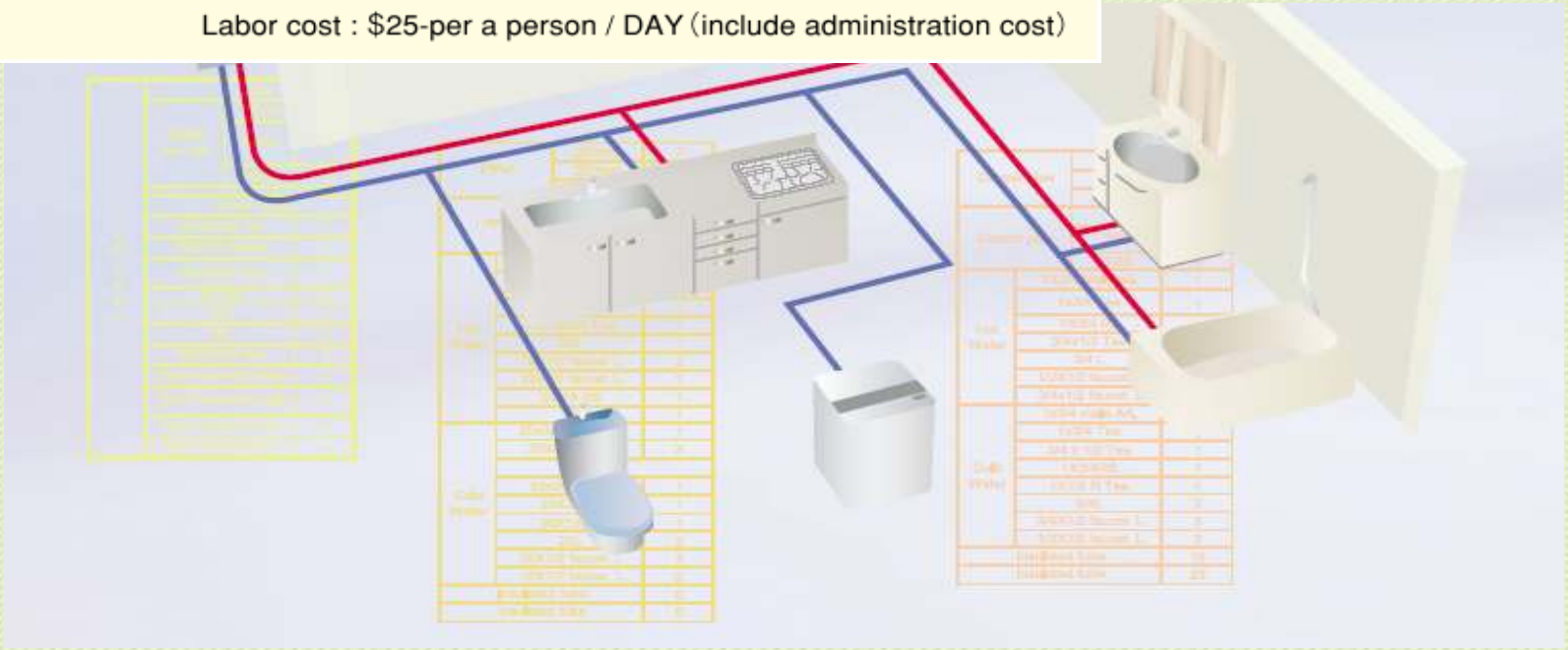


How the "MECHFit" Fitting Works? (Total Cost Comparison)



Labor cost : $25-per a person / DAY (include administration cost)





MECHFit / New generation !

Comparison

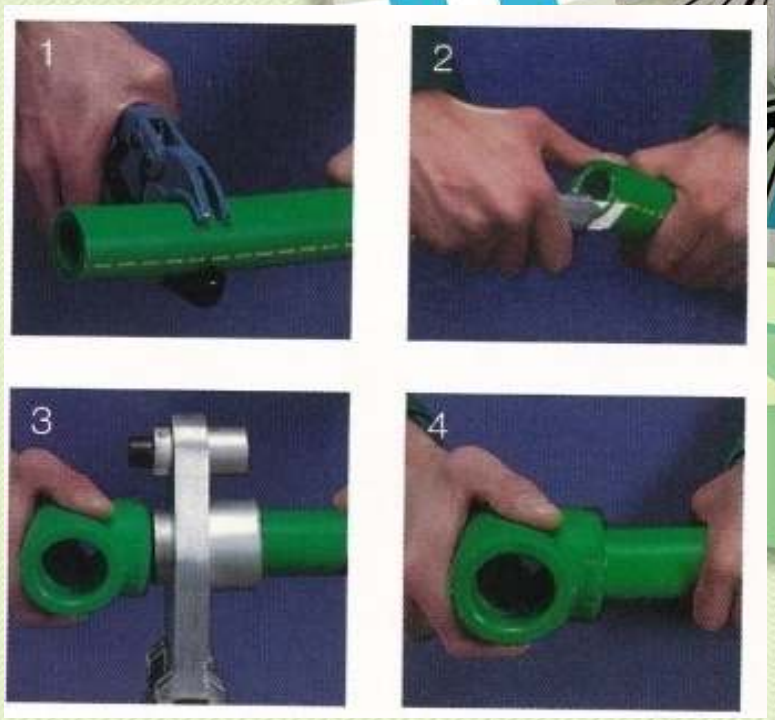
Work Flow Chart

	Fire Risk	Normal	Fair	Blow-out risk	Excellent
	Brazing	Compression	Machine Press	Thermal Fusion	MECHFit
	Copper 	Stainless 	PE-X 	PP-r 	Multilayer 
[4] Cut of Pipe	Pipe correct Sizing De burr Cleaning & buffing (pipe)	Pipe correct sizing De burr Cleaning of pipe	Pipe rough cut is okay NIL Cleaning of pipe	Pipe correct sizing De burr Cleaning of pipe	Pipe rough cut is okay Calibration tool (Round correction) Cleaning of pipe
Not Good Points	Pin-hole trouble Lime scale Corrosion / pitting corrosion Non-flexible pipe Non-stable copper price Heavy equipments Installation skill of labor	Pipe twist & screw back risk Lime scale Corrosion Non-flexible pipe Quality of copper ring Loosen of nut	Creep phenomenon no O-ring fitting (some) Metal detector Machine jaw profile	Temperature control Rain water Dust at the job site Pipe thermal expansion PPr welding sludge inside Metal detector Size application each Installation skill of labor	Fitting cost high Permanent joint
Water leak test	Along with the manuals	Along with the manuals	Along with the manuals	Along with the manuals	Along with the manuals

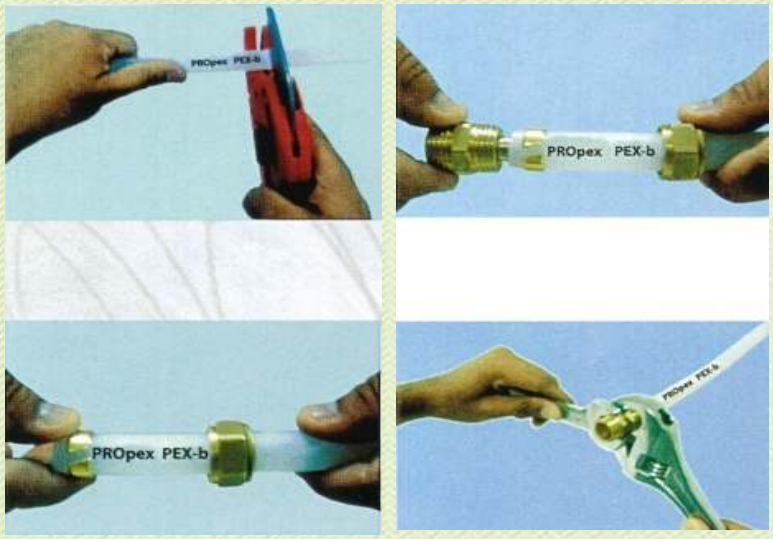
COCOMECH

PP-r Thermal Fusion connection

(1) Electric Power ---------- voltage reduction risk
(2) Temperature control---------- decrease of device heat risk
(3) Depth gauge ---------- inadequate depth risk
(4) Start up the heat device ---- different set-up risk
(5) Hold to cool, straightforward –Holding time risk
(6) SKILL is needed ---------- imperfect connection risk



Tool (skill) was the key

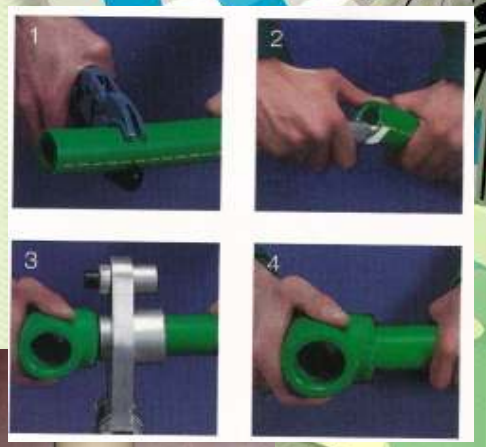


④ Compression type connection

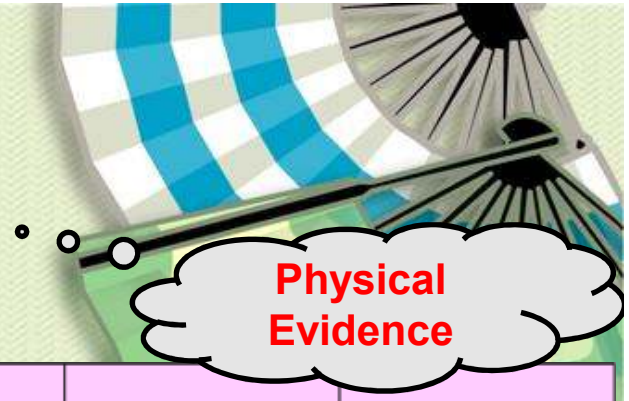
(1) Pipe twist & nut loosen risk
(2) Creep & blow out risk
(3) Stress corrosion crack risk

PP-r vs MechFit

	PEX&ixPress (Our proposal)	PPR&Fusion (Traditional method)
Model	Pipe : PE-Xb (BLANSOL) Fitting : iXPress (Made in Japan) Roof piping application Positioning layout at downline piping would be easier Downline Flexible ⟷ Piping layout ⟷ Difficult ✕	
Fittings	Shall use limited Elbows. small ⟷ Fitting Q'ty ⟷ Many ✕ 3x Tee & 3x Faucet Elbow with base (6pcs in total)	3x Tee, 4x Elbow & 3x Faucet L with base (10pcs in total)
Tool	No tool is necessary ...Press !	Fusing devise (about 20kgs) needs electricity.
Inspection	No need ⟷ Skills for jointing ⟷ Imporant ✕ No skill for perfect installation. Quality can be checked easily by sight. Easy ⟷ Check for jointing ⟷ Impossible ✕ Depend on the installer's skill level, the quality would be various. No way to check.	
Labor	Less than 10s ⟷ Time for jointing ⟷ 120~180s (over 2min.) ✕	
Jointing	Procedure ①Just push a fitting streight in a pipe. ①One-push 4s ...ix... ...Press !	Prodedure ①②③④ repeat ①Carry the special tool and set-up electricity. 20min ②Heating (both a fitting and a pipe) 5-7s ③Press to push for joint 4s ④Cooling process 120s It takes about 20min. to heat-up the fusing device.



Project reference (MECHFit)



No.	Year	Name of Structure	Scale (Units)	Area	Client	Consultant	Construction Company	MEP Construction Company	Situation
1	2009	D-1 Tower	80F	Dubai	Emirates Sunland	National Engineering Bureau	Kelle	Hastie International UAE	Under Construction
2	2010	Traders Hotel	30F	Qatar	Sheikh Faisal Bin Qassem Al Thani	DIWAN	Al Habtoor Engineering	Target Rotary	Under Construction
3	2010	National Convention Center (Extention)	50,000M2	Qatar	Qatar Foundation	KEO International	Midmac-Sixco J/V	Midmac	Completed
4	2009	Marina Bay Sands		Singapore	Marina Bay Sands	MBS	Ssang Yong	Shin Nippon	Completed
5	2010	Hotel 81	3 Units	Singapore	Hotel 81	C & P Consultants		Integrated Engineering	Completed
6	2010	Subway Chain		Singapore	Subway	MPB Services	MPB Services	MPB Services	Completed
7	2010	Single Apartment @ Bayshore Park	1 Units	Singapore	Owner			I & J Plumbing	Completed
8	2010	Single Apartment @ Dover Road	1 Units	Singapore	Owner			Mel Works Engineering	Completed
9	2010	Single House @ Jalan Menarong	1 House	Singapore	Owner			Aya Fuji Engineering	Completed
10	2010	Farrell Condominium	60 Units	Singapore	Premium Land	Architect 61 / UPC	Chang Hua Construction	Markpoint Engineering	Under Construction
11	2011	Hundred Tree Condominium	400 Units	Singapore	City Development Limited	Squiremech	Tiong Seng	Markpoint Engineering	Under Construction
12	2011	Volari Condominium	80 Units	Singapore	City Development Limited	Squiremech	Tiong Seng	Markpoint Engineering	Under Construction
13	2012	NIPRO Medical Equipment factory		Indonesia	NIPRO		SHIMIZU	SHINRYO	Under Construction

Job reference (Worldwide) : Clamp Ring Method 「COCOMECH FITTING」

Dubai “D-1 Tower”

Dubai, U.A.E.

80 stories (284m high) Residential tower building

(Approx. 455,000 fittings & 97,000m PEX pipes)

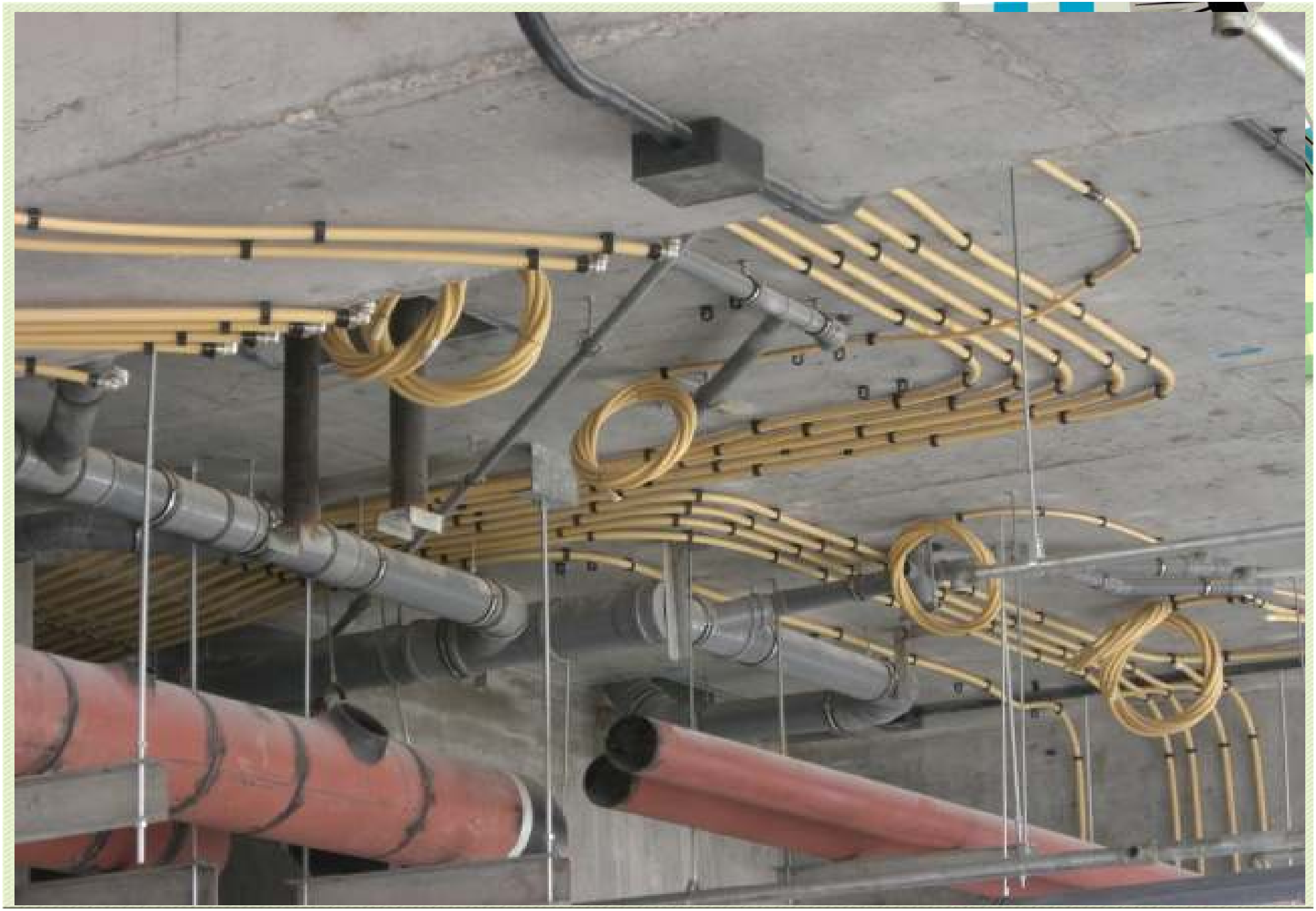
・Clients ： EMIRATES SUNLANDS
・Consultants ： National Engineering Bureau
： Holfords Associates
・Main Contractor ： Kele
・MEP Contractor ： Hastie International

PEX pipe (16-32mm) were used for both horizontal and vertical piping line for hot and cold water supply.


13/11/2010

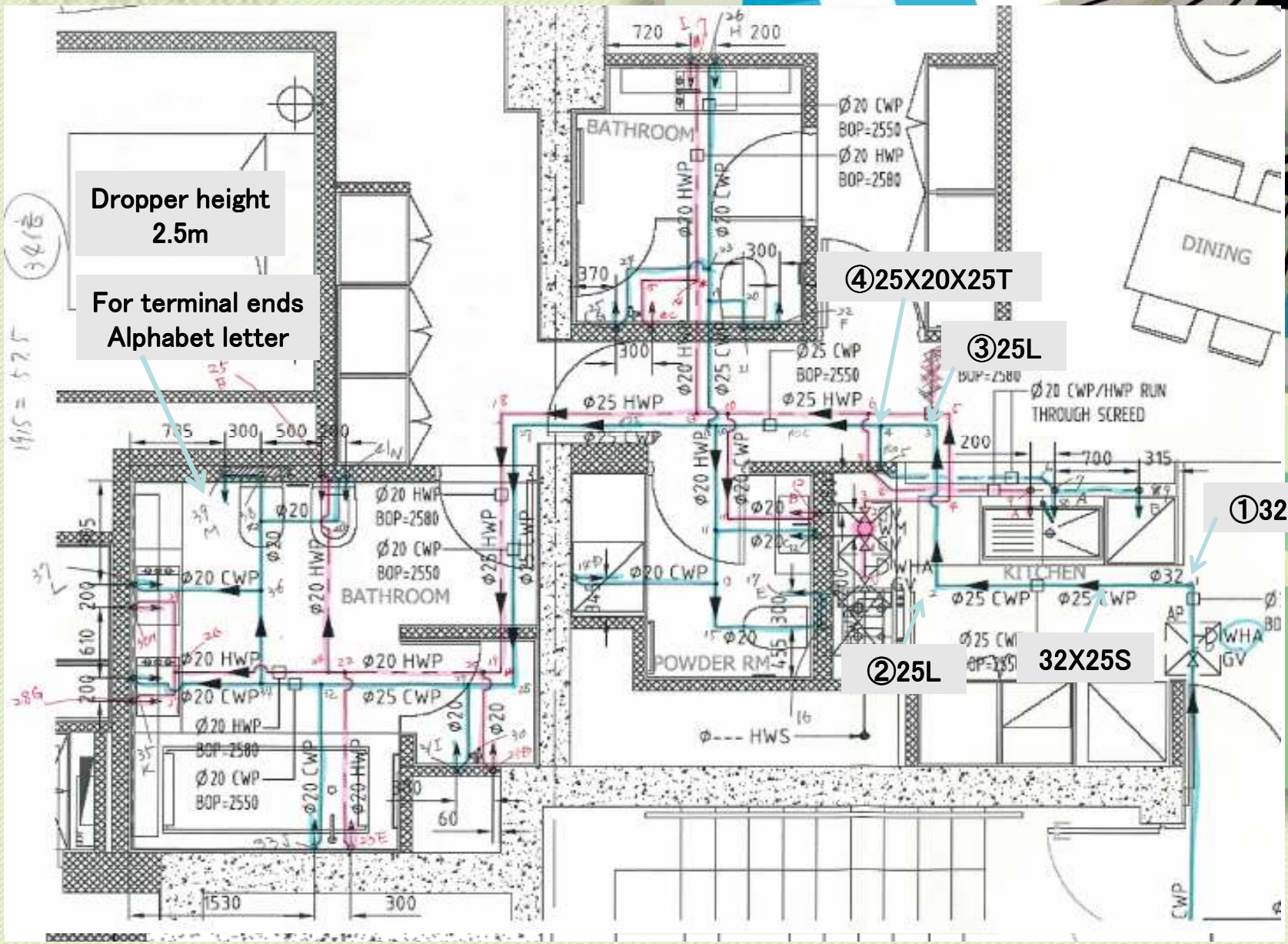

13/11/2010


CWS
RWP
13/11/2010



1 Estimation

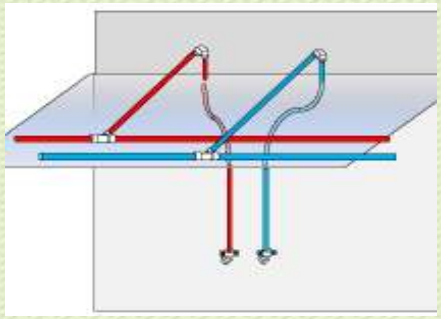
Sample TYPE-E (2 bed rooms)



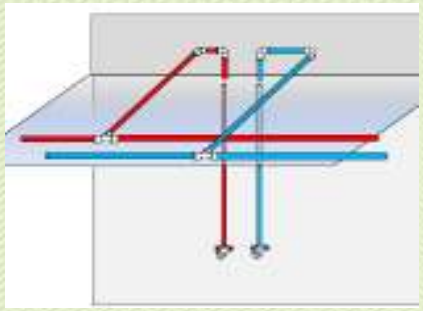
2 Estimation

PRIMARY

MEHFit+PEX



PPr+ Thermal Fusion



PEX= No Elbow is necessary

PPr = Limited Reduction portfolio namely, need more fittings

PPr = Need socket at every 4m

Pipe Length(m)			
Ceiling			
32	1		
25	13	25	9
20	23	20	18
Down wall 14 points		8 points	
20	14x2=28	20	8X2=16
total			
32	1		
25	13	25	9
20	51	20	34

UNIT E

Cold water				HOT water			
0				0			
1	32L	27	25L	1	25x3/4MaleAD	28	20L
	32X25RS	28	25L	2	25x3/4MaleAD	G	20x1/2FL
2	25L	29	25X20RT	3	25L	29	20L
3	25L	30	20L	4	25L	30	20L
4	25X20RT	31	20L	5	25L	H	20x1/2FL
5	20X45L	I	20x1/2FL	6	25X20RT		
6	20X45L	32	25X20X20RT	7	20X45L		
7	20T	33	20L	8	20X45L		
8	20L	J	20x1/2FemaleAD	9	20L		
A	20x1/2FL	34	20T	A	20x1/2FL		
9	20L	35	20L	10	25X20RT		
B	20x1/2MaleAD	K	20x1/2FL	11	20L		
10	25X20RT	36	20T	12	20L		
11	20T	37	20L	B	20x1/2FL		
12	20L	L	20x1/2FL	13	25X20RT		
C	20x1/2FL	38	20L	14	20T		
13	20T	39	20L	15	20L		
14	20L	M	20x1/2FL wB	16	20L		
D	20x1/2FL	40	20L	C	20x1/2FL		
15	20L	41	20L	17	20L		
16	20L	N	20x1/2FL	I	20x1/2FL		
17	20L	42	20T	18	25L		
E	20x1/2FL wB			19	25L		
18	25T			20	25X20X20RT		
19	25X20X20RT						
20	20L			21	20L		
21	20L			D	20x1/2FL		
22	20L			22	20T		
F	20x1/2FL wB			23	20L	Down	20L 8pcX2=16
23	25X20X20RT			E	20x1/2FemaleAD		
24	20L			24	20T		
25	20L			25	20L		
G	20x1/2FL			26	20T		
26	20L			27	20L		
H	20x1/2FL						
		Downwall	20L 14pcX2=28				

3 Estimation LABOR CAL. (LABOR=LABOR RATE X PIPE LENGTH)

Labor rate (Commission rate) = 1 day 8h (Authorize by Japanese Government)
[Statically based commission rate] How many man does it need to joint 1m ?

Labor/day
Cal. Rate
US$32.00
$4.00 /h

Based on "Estimation Standard List" in Japan, (Authorized by Japanese Government) Sheet(4)
Labor cost per 8 hours per a day is listed as a personal labor cost standard include administration cost.

uPVC Pipe and fittings (BM)
TS connection 100%

	Commision rate* (Person／m)	Labor cost (U$／m)
15A	0.046	US$1.47
20A	0.062	US$1.98
25A	0.074	US$2.37
32A	0.079	US$2.53

PEX & Press system (Cal.)
Stainless Press (Listed)
Ptress 100%
TS connection x 113%

	Commision rate (Person／m)	Labor cost (U$／m)
A	0.052	US$1.66
A	0.071	US$2.27
A	0.09	US$2.88
A	0.106	US$3.39

PEX & clamp method

Commision rate (Person／m)	Labor cost (U$／m)
0.04	US$1.28
0.05	US$1.60
0.05	US$1.60
0.06	US$1.92

ライニング鋼管 (SGP-VA)
Table2

Commision rate (Person／m)	Labor cost (U$／m)
0.089	US$2.85
0.100	US$3.20
0.123	US$3.94
0.151	US$4.83

Copper Pipe system (Listed)
brazing conection 100%
TS connection x 128%(Cal.

	Commision rate (Person／m)	Labor cost (U$／m)
15A	0.059	US$1.89
20A	0.082	US$2.62
25A	0.105	US$3.36
32A	0.129	US$4.13

IXPRESS system (Cal.) Table1
PEX & clamp method x70%

Commision rate (Person／m)	Labor cost (U$／m)	vs BM
0.028	US$0.90	61%
0.035	US$1.12	56%
0.035	US$1.12	47%
0.042	US$1.34	53%

PP-R Tube (Cal.) Table3
SGP connection x 75%

Commision rate (Person／m)	Labor cost (U$／m)	vs BM
0.067	US$2.14	145%
0.075	US$2.40	121%
0.092	US$2.95	125%
0.113	US$3.62	143%

＊1＊ Commision Rate : Number of person required for a connection of 1M pipe and fittings.

4 Estimation

Secondary[per fitting type and items

PEX- MECHFit

PPR

⑦-6 Estimation @1 FLOOR SUM

D-1 Tower Estimation of Fitting & Pipe (ATTACH)

Item	Size	List Price (US$/pc)	UNIT A		UNIT B-1		UNIT B-2		UNIT C-1		UNIT C-2		UNIT
			HOT	COLD	HOT	COLD	HOT	COLD	HOT	COLD	HOT	COLD	HOT
Fixed Fitting Male	16XR1/2	3.60											
	20XR1/2	4.50		1		1		1		1		1	
	20XR3/4	6.70											
	25XR3/4	6.20	2										2
	25XR1	9.60											
	32XR1	14.10			2		2						
Equal and Reducing Union	16	5.20											
	20	6.60											
	20X16	5.90											
	25	9.10											
	25X16	10.70											
	25X20	7.90	1	1	1	1	1	1		2		2	
	32	21.60											
	32X25	18.20		2									
Equal and Reducing Tees	16	7.70											
	20	10.10	4	4	4	9	4	9	4	3	4	3	2
	20X16X20	5.30											
	20X16X16	8.60											
	20X20X												
	25												
	25X16X												
	25X20X								2			2	
	25X20X								1	1	1	1	1
	32												
	32X20X												
	32X25X								1			1	
	32X25X												
Elbow	16												
	20								11	6	11	4	
	20)PPr								25	19	25	9	
	25								1	1	1		
	25)PPr								1	2	1	3	
	32												
	32)PPr												
Fixed Fitting Female	16XG1												
	20XG1								1	1	1		
	20XG3												
	25XG3												
	25XG												
	32XG												
Elbow with Short Fixing Base	16XG1												
	20XG1								2			2	
	20XG3												
Elbow with Long Fixing Base	16XG1												
	20XG1												
Terminal Elbow Female End	16XG1												
	20XG1								6	5	6	4	
	20XG3												
	25XG3												
	25XG												
	32XG												
Terminal Elbow Male End	16XG1												
	20XG1												
	20XG3												
	25XG3												
Tee with Female End	16XG1												
	20XG1												
	20XG3												
Manifold Barbi	X20X16												
	X20X16												
	20X16X												
	20X16X												
Shut Off Valve (pomoi)	20												
	25												
Shut Off Valve	20												
	25												
Shut Off Valve	20												
	25	35.00											
Shut Off Valve	20	30.50											
	25	34.80											
Multilayer Pipe (m)	16 x 2.0	1.50											
	20 x 2.0	1.50											
	25 x 2.5	4.00											
	32 x 3.0	6.40											
PEX Pipe (m)	16 x 2.0	1.00											
	20 x 2.0	1.40	37	52	43	64	43	64	31	31	31	31	14
	25 x 2.5	2.10	12.5	14	10	9	10	9	5	10	5	10	5
	32 x 3.0	3.50		4.3	5	5	5	5		0.8		0.8	
TOTAL for FITTING (pcs)			64	102	54	101	54	101	39	57	39	57	25
		Pipe leng	50m	70m	58m	78m	58m	78m	36m	42m	36m	42m	19m
Total cost Comparison (IXP : PP-r)			1 : 0.505		1 : 1.015				1 : 1.066				

	ixPress PEX & ixPress	PP-r Pipe and Fittings
UNIT-A	AED 2,348.34	AED 2,134.72
UNIT-C	AED 1,280.32	AED 1,365.44
UNIT-D	AED 804.44	AED 834.46
UNIT-E	AED 1,789.12	AED 1,946.67
UNIT-B	AED 2,298.60	AED 2,333.90
UNIT-F	AED 1,504.34	AED 1,480.67
UNIT-B	AED 2,298.60	AED 2,333.90
UNIT-E	AED 1,789.12	AED 1,946.67
UNIT-D	AED 804.44	AED 834.46
UNIT-C	AED 1,280.32	AED 1,365.44
Sharing Part	AED 1,602.60	AED 2,280.49
Total cost/ one floor	AED 17,800.24	AED 18,856.82
Comparision⇒	1 6M	1.06 Times

NO.NKC－091107M

山内様

平成21年11月7日

東尾メック株式会社
本社工場 河内長野市菊水町3-22 〒586-0012
TEL 0721-53-2281㈹ FAX 0721-53-2279

D1 Tower 給水給湯向け IXPRESS御照会の件
下記のとおり御見積もり申し上げます。(PEX版)

受渡期日	別途打合せ
受渡場所	Dubai CY / CFS
取引条件	別途打合せ
有効期限	21年 12月 23日
運賃他	別途打合せ

合計金額 US$3,530.40

品番記号	品名仕様	数量	単価	金額
290-0005	PEX pipe Φ20(@120m)	7		
290-0006	PEX pipe Φ25(@50m)	5		
290-0008	PEX pipe Φ32(@50m)	3		
233-0604	Fixed fitting Male 20 x 1/2	10		
233-1006	Fixed fitting Male 25 x 3/4	16		
253-1210	Fixed fitting Male 32 x 1	22		
232-1006	Reduced Union 25x20	13		
232-1210	Reduced Union 32x25	5		
231-0006	Tee 20	87		
231-0010	Tee 25	8		
231-1910	Reduced Tee 25x20x25	29		
231-1906	Reduced Tee 25x20x20	29		
251-0012	Tee 32	1		
251-2006	Reduced Tee 32x20x32	5		
251-2007	Reduced Tee 32x25x25	7		
251-2009	Reduced Tee 32x25x32	2		
230-0006	Elbow 20	203		
230-0010	Elbow 25	10		
250-0012	Elbow 32	1		
234-0604	Fixed Fitting Female 20 x1/2	16		
234-1006	Fixed Fitting Female 25 x3/4	1		
237-0604	Terminal Elbow 20 x1/2	136		
235-0604	Elbow with fixing base 20 x1/2	28		
		629 pc		

納期
備考
・正式注文を頂き、受注確認書を受領後約3-4週間後 Dubai CY着
・IXPRESS公定価表 x45%(fitting) x50%(pipe) にて見積もりしています。
・実際は1カートン or 1巻mにあわせて最小ロット単位にての請求書となります。
・引き取り条件は「CIF Dubai」といたします
・D1タワー低層階ワンフロア全体の見積もりです。詳細は添付ご覧ください。
・Brass品の在庫とPSU品が混在した形での出荷をご了承ください。価格はPSU版に合わせます。

Qatar “Traders Hotel & Apartment”

Doha, Qatar

32 stories Hotel and Residential tower building
(Approx. 13,000 fittings and 26,000m PEX pipes)

- Clients : Shanglira Hotel Group & Sheik Faisal Bin Al Thani
- Consultants : DIWAN
- Main Contractor : Al Habtoor Engineering
- MEP Contractor : Target Rotary

PEX pipe (20-32mm) were used for both horizontal and vertical piping line for hot and cold water supply.

▪Qatar National Convention Center

Extension Project (in Education City, Doha)

(Approx. 13,000 fittings and 26,000m PEX pipes)

- Clients : Qater Foundation
- Consultants : QP-Special Project, KEO International
- Main Contractor : Midmac – Sixt Construct
- MEP Contractor : Midmac

Dubai “Pentominium Tower”

Dubai, U.A.E.

240 Units residential tower

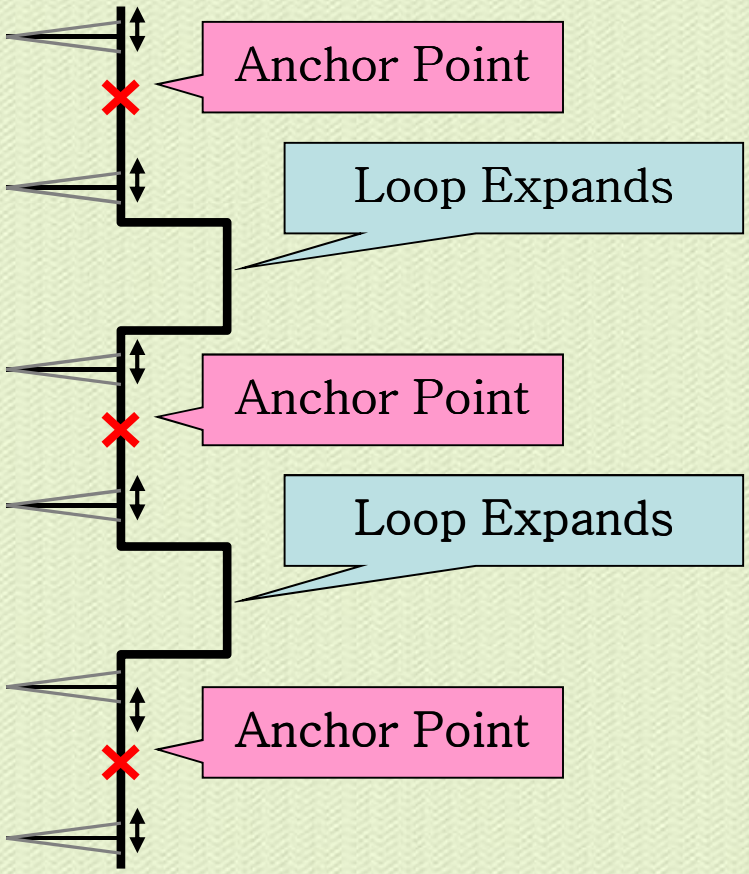
Singapore “Marina Bay Sands”

3,000 Units Hotel

MARINA BAY SANDS IR – HOTEL PACKAGE

New Proposal of Piping System for the Solution against Deformation

i) Initial Idea as at Tender Stage



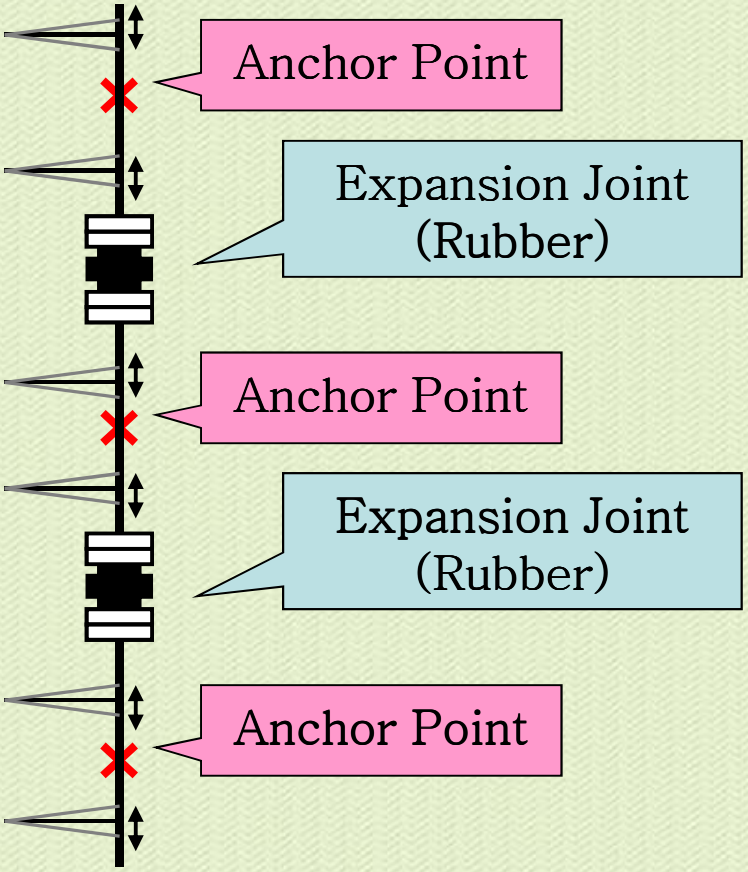
Anchor Points to be provided at Suitable Floors
(Mount on the Floor – Standard Method)

Loop Expands to be provided between Anchor Points to absorb pipe expansion / contraction & Building Deformation

MARINA BAY SANDS IR – HOTEL PACKAGE

New Proposal of Piping System for the Solution against Deformation

ii) Idea as at Design Development (Previous Idea)



Anchor Points to be provided at Suitable Floors (Mounted on the side of concrete slab)

Expansion Joints shall be provided between Anchor Points to absorb pipe expansion / Contraction & Building Deformation

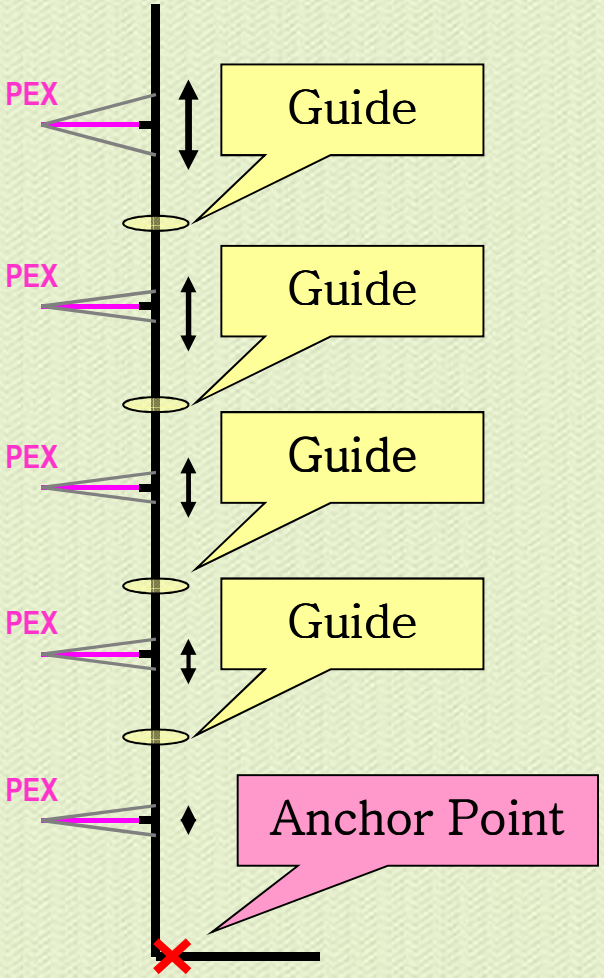
**Found that Loop Expands cannot be installed due to congested space in the shaft.

It causes much frequent maintenance by Owner & higher potential of leakage in future.

MARINA BAY SANDS IR – HOTEL PACKAGE

New Proposal of Piping System for the Solution against Deformation

iii) New Proposed Solution "ixPress" (MechFi



Anchor Points to be provided at Bottom of Riser Pipe only unless the load at bottom exceed 21kN.

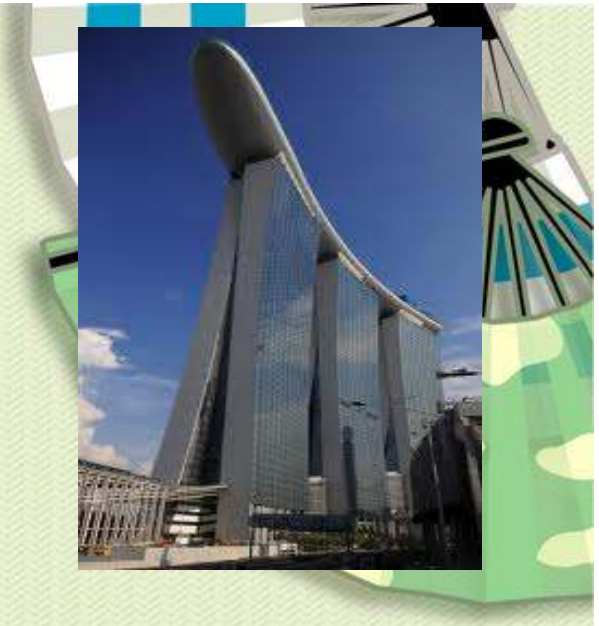
Pipe will move by its expansion/contraction, & relatively moved by Building deformation.

Differential of Movement gets larger and larger with the distance from the anchor point being further.

To use ML tube (3 layer cross-linked polyethylene pipe), which has well-pliability and flexibility.

It enables to minimize number of expansion joints and elbow fitting at branch pipe, which results higher reliability.

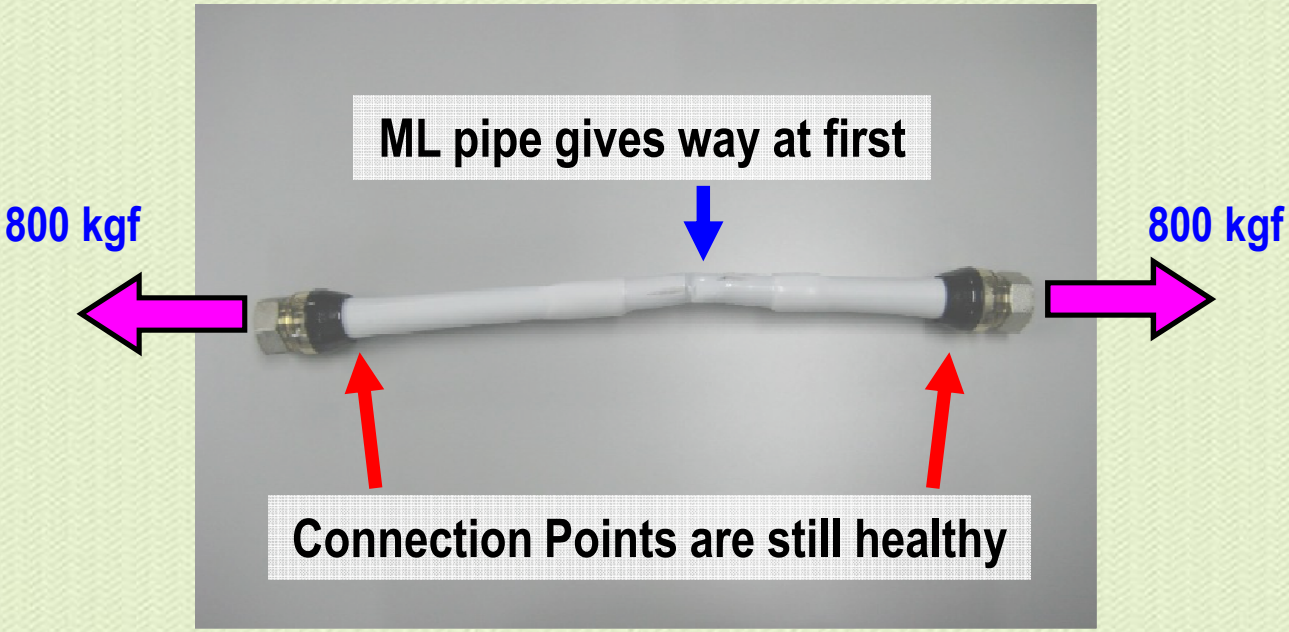
New Proposal of Piping System for the Solution against Deformation



Really doesn't ML Pipe come out from Fitting ?

No.

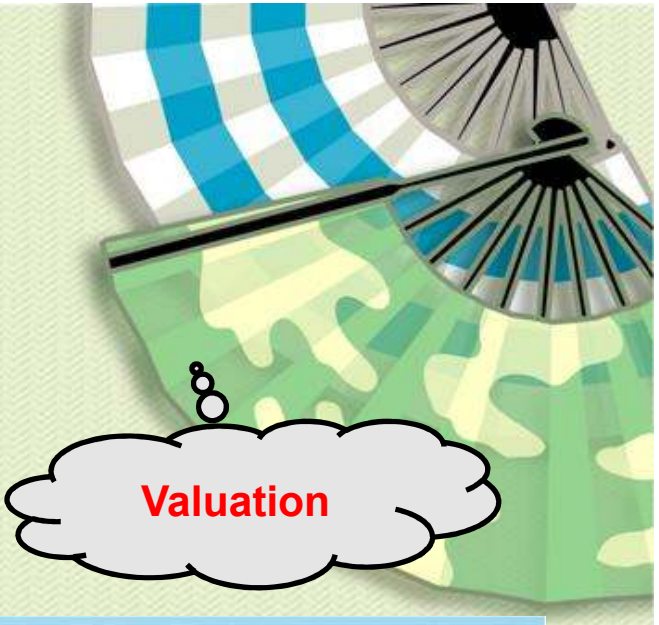
Once the Fitting is fixed properly, the pipe will not come out forever.



Singapore “Hundred Tree Condominium”
“Volari Condominium”

400 Units condominium

80 Units condominium



Also, you can embrace…

BCA productivity point / SGBC tax refund point program by ratifying our system.

BCA

BCA GREEN MARK

SINGAPORE GREEN BUILDING COUNCIL

FOUNDING MEMBER

PUB

Water for All : Conserve, Value, Enjoy

Indonesia “NIPRO Factory”

Medical Equipment production factory

China “Tianjin Eco-City”

Joint Venture Project of
Singapore Tianjin Eco-City Investment Holdings Pte. Ltd. (STEC)
and
Tianjin Eco-City Investment & Development Co., Ltd. (TECID)

Valuation:
“Green”

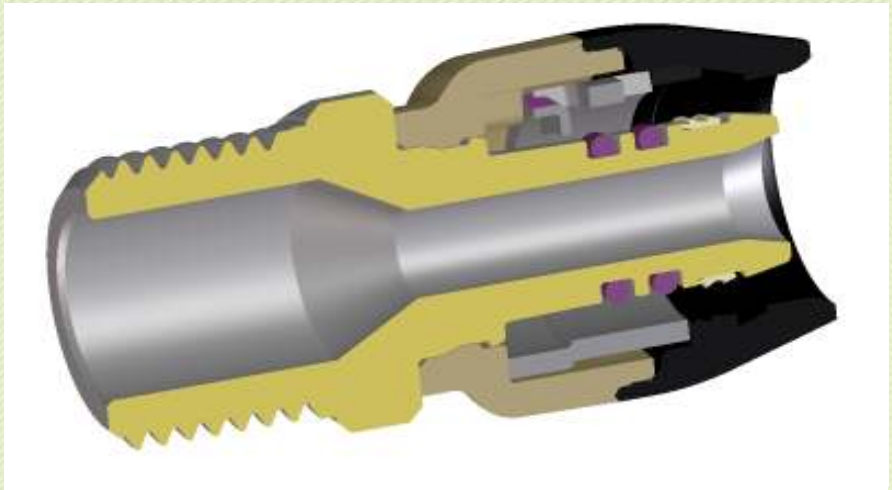
Total Area: 34.2sqkm

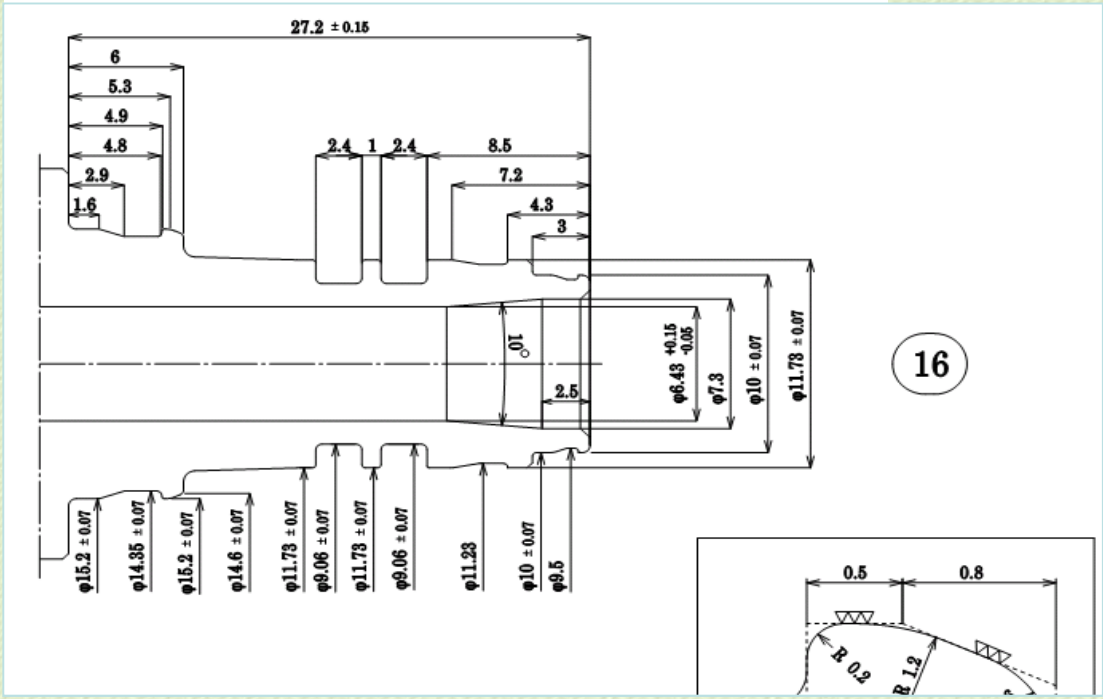
40km east to Tianjin downtown

Loading Unit

Internal Diameter “Mech Fit”

“MECHFit” is designed with EN standard





EN1254-3 standard

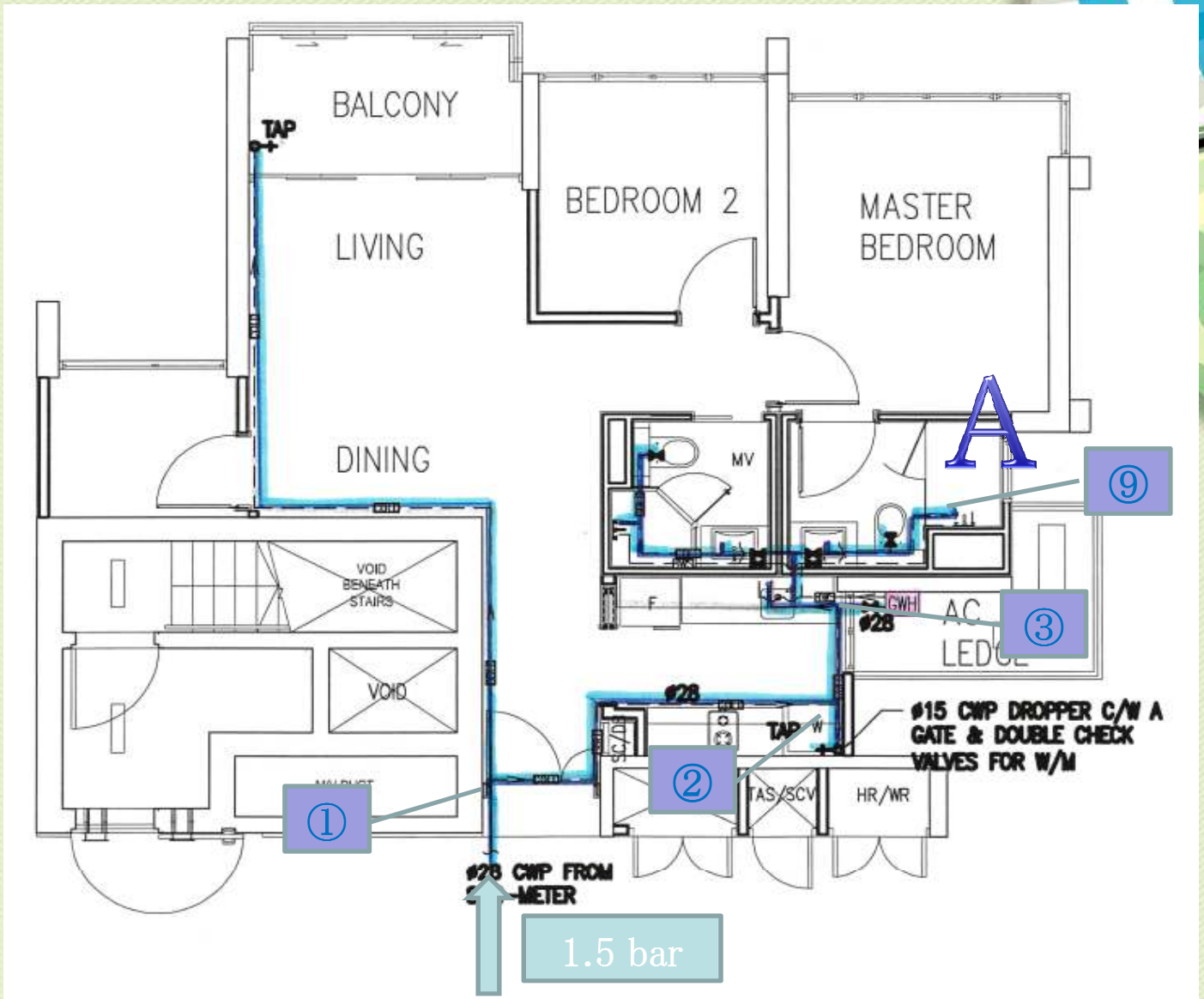
4.3.2 Min. Cross Section area of bores

D16 Bore > 30% / actual 30.3%

=relationship of bore to theoretical min of bore of pipe

4.3.3. Table Min. wall thickness

D16 mm > 1.2 / actual 1.205



MechFit Flow Loss Calculation

TYPE C3 – 2BR+S

Flow 12L/min. is confirmed

How do you believe it?

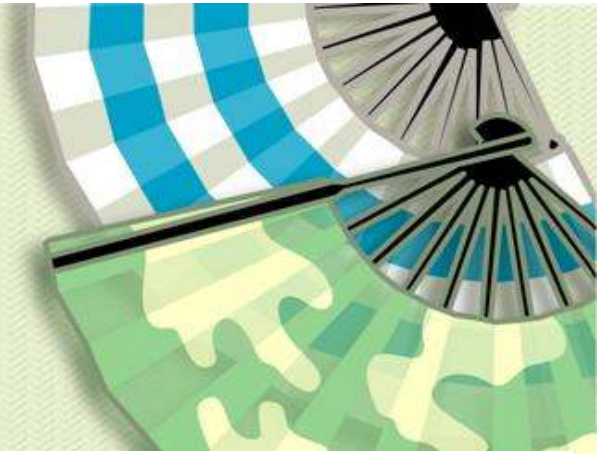


Table -2 Pipe sizing tabulation chart

Initial Head Loss available at the sub-mater = 1.5bar => 15m

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Pipe Reference	Loading Unit	Design Flow rate (l/s)	Assume tube Diameter (mm)	Velocity (m/s)	Head Loss (mm/aqua)	Pipe Length (m)		Total Head Loss (m)	Vertical drop (+) or rise (-) in (m)	Available Head (m)	Residual Head	Residual Head required at Fitting	Final Tube diameter (mm)
						Actual (pipe)	Effective (fittings)						
1-2	22.0	0.47	20	2.5	424.89	7.00	2.00	3.82	-2.5	15	8.68		20
2-4	16.0	0.40	20	2	283.22	1.00	2.00	0.85	0	8.68	7.83		20
4-5	13.0	0.35	20	1.8	234.14	1.00	4.90	1.38	0	7.83	6.44		20
5-8	6.5	0.20	16	1.8	337.08	1.00	6.60	2.56	0	6.44	3.88		16
8-9	5.0	0.16	16	1.4	215.17	1.00	2.40	0.73	2.5	3.88	5.65		16
9-A	3.0	0.11	16	1	118.79	3.00	6.30	1.10	-1	5.65	3.55		16

Equivalent Pipe Length for MechFit Body unit: m

Niminal Dia	Adapter		Socket	Elbow	Terminal L	Tee	
	Male	Female				Straight	Branch
16	3.3	1.6	2.6	6.6	6.3	1.2	10.0
20	3.2	2.0	3.4	5.4	3.2	1.0	4.9
25	1.9	2.0	3.9	NA	NA	NA	NA

Hydrological parameter

Sometime the result is inconsistent.

① Actual labo test (tomorrow) : 12L/min.

② Actual comparison test for PPr (tomorrow)

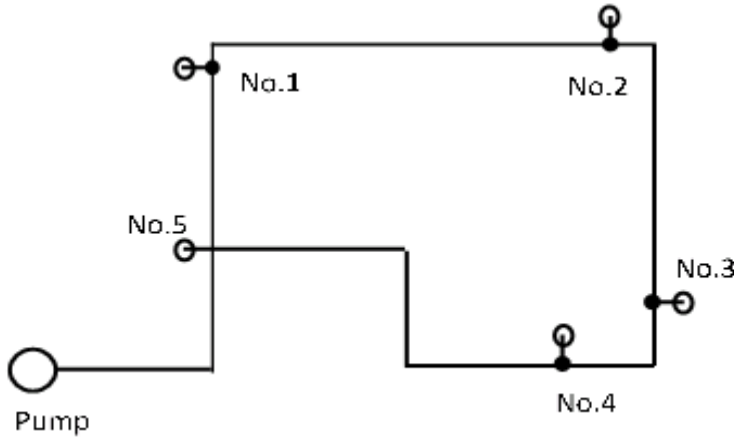
③ Actual pressure loss per a fitting : data.

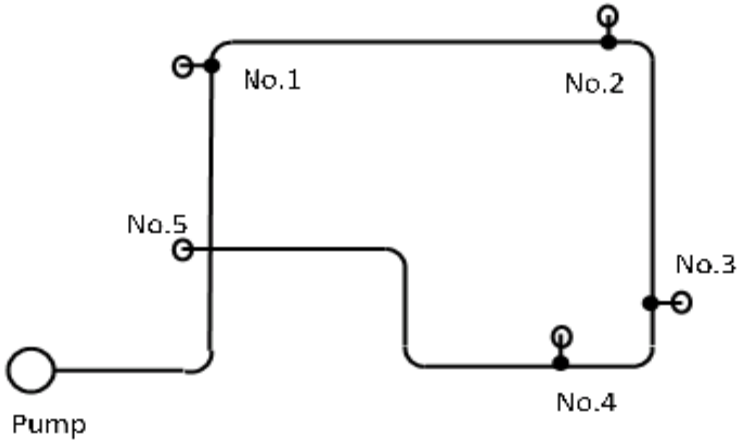
⇒converted to equivalent pipe length

・So that the accumulate results goes our data more consistent direction.

	Water Flow Test No2 (Double)				
	Pressure (Mpa)	Location No	equipment	measure time(sec)	Flow(ℓ/min)
PP-r	0.2	No2	Kitchen		#DIV/0!
			Kitchen		#DIV/0!
			Kitchen		
			average		
		No5	Bath		
			Bath		
			Bath		
			average		

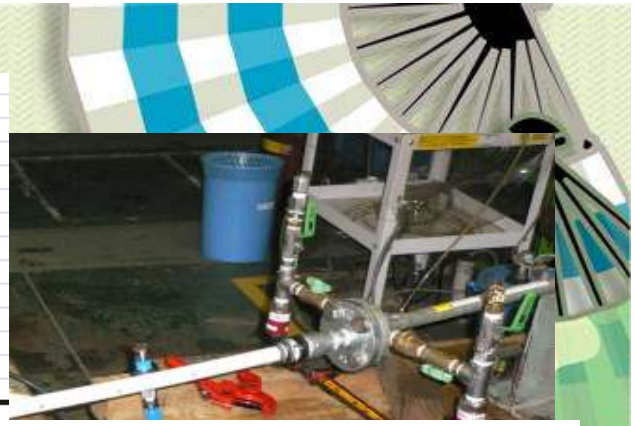
	Water Flow Test No2 (Double)				
	Pressure (Mpa)	Location No	equipment	measure time(sec)	Flow(ℓ/min)
MechFit	0.2	No2	Kitchen	20	18.00
			Kitchen	20	18.00
			Kitchen	20	18.00
			average		18.00
		No5	Bath	21	17.14
			Bath	21	17.14
			Bath	20	18.00
			average		17.43

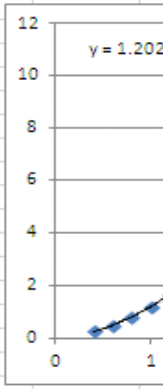




	流速	圧力損失
	(m)	kPa/m
16mm	0.4	0.2449
	0.6	0.489
	0.8	0.804
	1	1.187
	1.2	1.637
	1.4	2.151
	1.6	2.729
	1.8	3.371
	2.00	4.074
	2.50	6.102
	3	8.512

	流速	圧力損失
	(m)	kPa/m
20mm	0.4	0.167
	0.6	0.336
	0.8	0.554
	1	0.82
	1.2	1.133
	1.4	1.491
	1.6	1.894
	1.8	2.341
	2	2.832
	2.5	4.2488
	3	5.933





16mm　Y=1.2025 X^1.7893　　20mm　Y=0.8299 X^1.7793　　2012年3月8日　測定

試料継手	管長さ (20mm)	管長さ (16mm)	流速 (m)	測定値 全体差圧 kPa	1m当たり管の損失 20mm kPa	1m当たり管の損失 16mm kPa	他の継手の損失 MAD 相当管長さ	他の継手の損失 MAD 相当管長さ	1個の試料継手の損失 kPa	試験継手の相当管長さ (m)	試験継手の相当管長さ 計算値
20X3/4MAD	2.00		1.24	9.17	1.2167581				3.368	2.768	3.23
	2.00		1.16	9.24	1.0806465				3.539	3.275	
	2.00		1.16	9.10	1.0806465				3.469	3.210	
	2.00		1.16	9.17	1.0806465				3.504	3.243	
	2.00		1.16	9.17	1.0806465				3.504	3.243	
20X3/4 MAD	0.70		1.33	7.21	1.3782661				3.123	2.266	
	0.70		1.24	7.07	1.2167581				3.109	2.555	
	0.70		1.33	7.35	1.3782661				3.193	2.316	
	0.70		1.33	7.35	1.3782661				3.193	2.316	
	0.70		1.33	7.00	1.3782661				3.018	2.189	
16X1/2MAD		2.00	2.06	41.09		4.3177096			16.227	3.758	3.29
		2.00	2.36	41.58		5.4915107			15.298	2.786	
		2.00	2.36	42.00		5.4915107			15.508	2.824	
		2.00	2.21	42.00		4.8892938			16.111	3.295	
		2.00	2.06	42.07		4.3177096			16.717	3.872	

試料継手	管長さ (20mm)	管長さ (16mm)	流速 (m)	測定値 全体差圧 kPa	1m当たり管の損失 20mm kPa	1m当たり管の損失 16mm kPa	他の継手の損失 MAD 相当管長さ	他の継手の損失 MAD 相当管長さ	継手の総損失 kPa	試験継手の相当管長さ (m)	試験継手の相当管長さ 計算値
20T 通し	2.00		1.24	10.64	1.2167581		3.23	3.23	8.206	0.285	0.95
	2.00		1.24	10.50	1.2167581		3.23	3.23	8.066	0.169	
	2.00		1.16	10.57	1.0806465		3.23	3.23	8.409	1.321	
	2.00		1.08	10.36	0.9516559		3.23	3.23	8.457	2.426	
	2.00		1.16	10.50	1.0806465		3.23	3.23	8.339	1.256	
20T 枝	1.90		1.33	16.52	1.3782661		3.23	3.23	13.901	3.626	4.93
	1.90		1.24	15.89	1.2167581		3.23	3.23	13.578	4.699	
	1.90		1.33	15.68	1.3782661		3.23	3.23	13.061	3.017	
	1.90		1.16	16.03	1.0806465		3.23	3.23	13.977	6.474	
	1.90		1.08	16.10	0.9516559		3.23	3.23	14.292	8.558	

Flow 12L/min. is confirmed

We can believe it consistent now.

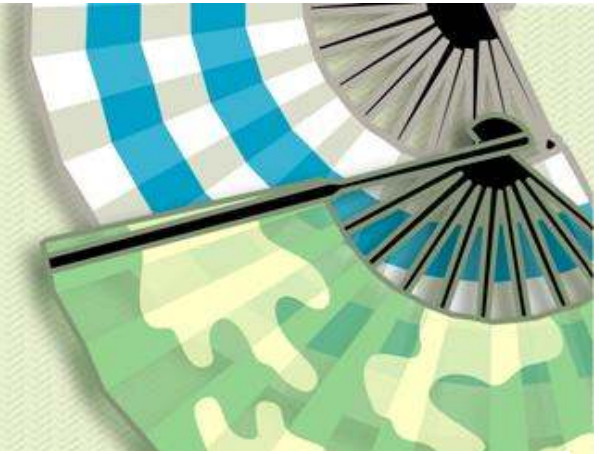


Table -2 Pipe sizing tabulation chart

Initial Head Loss available at the sub-mater = 1.5bar => 15m

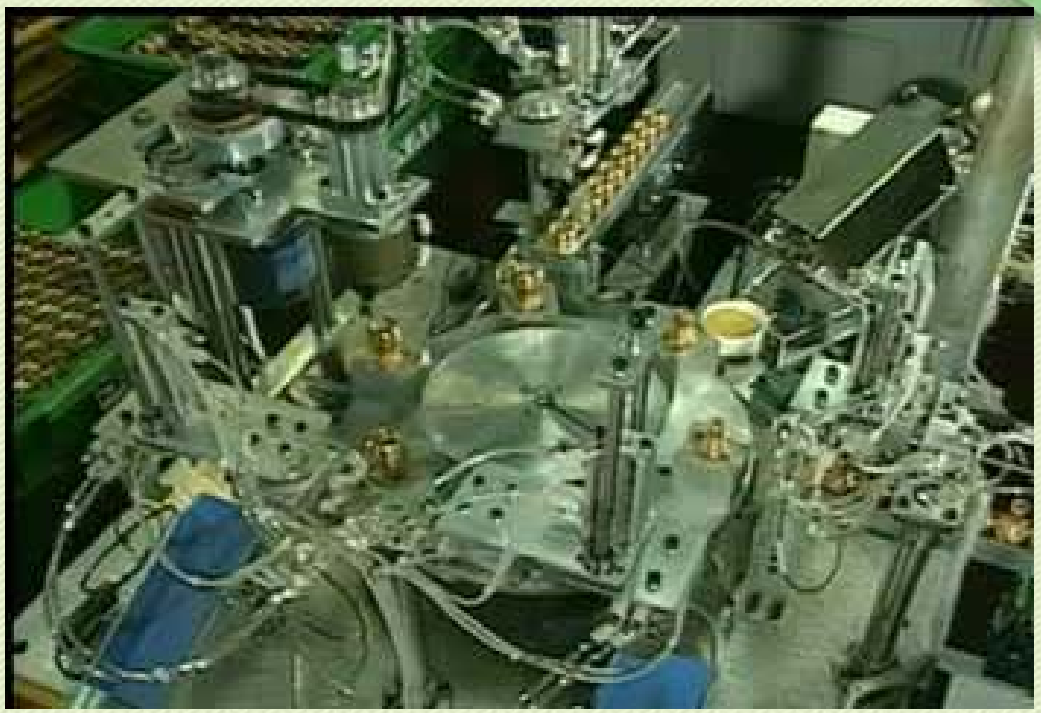
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Pipe Reference	Loading Unit	Design Flow rate (l/s)	Assume tube Diameter (mm)	Velocity (m/s)	Head Loss (mm/aqua)	Pipe Length (m)		Total Head Loss (m)	Vertical drop (+) or rise (-) in (m)	Available Head (m)	Residual Head	Residual Head required at Fitting	Final Tube diameter (mm)
						Actual (pipe)	Effective (fittings)						
1-2	22.0	0.47	20	2.5	424.89	7.00	2.00	3.82	-2.5	15	8.68		20
2-4	16.0	0.40	20	2	283.22	1.00	2.00	0.85	0	8.68	7.83		20
4-5	13.0	0.35	20	1.8	234.14	1.00	4.90	1.38	0	7.83	6.44		20
5-8	6.5	0.20	16	1.8	337.08	1.00	6.60	2.56	0	6.44	3.88		16
8-9	5.0	0.16	16	1.4	215.17	1.00	2.40	0.73	2.5	3.88	5.65		16
9-A	3.0	0.11	16	1	118.79	3.00	6.30	1.10	-1	5.65	3.55		16

Conclusion

PEX and Multilayer Pipe's Quality Performance will Best Regulate the Environmental Issues in the Piping System.

MECHFit brings you a non-error system with a rate of less than 1.0 ppm of reject.

MECHFit assemble facility



Automatic Assembly Machine designed and manufactured by HIGASHIO.