CONSTRUCTION INDUSTRY COUNCIL
建造業議會

HONG KONG CONSTRUCTION INDUSTRY TRADE TESTING CENTRE
香港建造業工藝測試中心

The 1st Hong Kong Construction Skills Competition

Competition Handbook
(Version 4)

Plumbing and Heating (Open Group)

〈The document only serves as a reference for pre-competition preparation and is updated from time to time without prior notification.〉

The 1st Hong Kong Construction Skills Competition

Plumbing and Heating (Open Group)

Competition Handbook

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1. Test Project

Content	Score
Complete the following items according to the drawings at the designated location:	
a. With reference to drawings 1, 2 and 3, install drain pipes, flush water pipes and sanitary ware completed with water test. This includes: i) installing acid-resistant PVC drain pipes, elbows, brackets, etc., according to the drawings. ii) assembling the flushing water tank and joining drain pipe fittings, by using methods including binding. iii) installing sanitary wares, e.g. wash basin, water taps and assembling water supply pipes, bottle trap, drain pipes, shower, and connecting the shower and mixer with copper pipes. The wash basin should also be sealed with silicone sealant.	(50 marks)

b. With reference to drawings 1 and 2, install hot and cold water supply pipes completed with water test. This includes (50 marks)

i) cutting and bending copper pipes, installing brackets

ii) connect pipe fittings by methods including threading, soldering and compressing followed by pressure testing.

iii) Carry out pressure testing after work completion at the speed of 10.5 kg/cm^2 and make corresponding amendments.

Time allowed: 6 hours (lunch time excluded)

2. Notes to Competitors

2.1 General Instructions

2.1.1 Read the test project, specifications and regulations listed in the Handbook carefully and ask the adjudicators for any queries.

2.1.2 Carry out the test project according to working drawings and specifications provided.

2.1.3 Check and collect the tools and materials required before the competition starts. Obtain additional items as soon as possible in case of shortage.

2.1.4 Competitors are required to handle tools and materials and carry out associated works on their own. All tools must be returned after the competition. Please ask the adjudicators for any queries.

2.1.5 Stop all works when time is up.

2.1.6 Do not talk loudly, cause nuisance or affect other Competitors during the competition.

2.1.7 No photos or videos are allowed, including those taken with cameras and mobile phones.

2.1.8 The use of mobile phones is not allowed during the competition except for emergency situations.

2.1.9 The display of behaviours and objects with religious, political, sexual and violent implications or causing discomfort and controversies are not allowed during the competition. The Construction Industry Council (CIC) reserves the right to discretion

on the above behaviour without the need to provide any explanations.

2.1.10 In case of substantiated violations of item 2.1.9, Competitors will be disqualified from the competition.

2.1.11 The judging criteria are briefly listed as follows:

a. Understanding of drawings and specifications
b. Preparation before work
c. Work procedures
d. Accuracy and quality of work
e. Work progress
f. Appropriate use of handling of materials
g. Proper use of tools and equipment
h. Housing-keeping after work completion
i. Safety precautions

Note: Detailed judging criteria will be announced later.

2.2 Technical Guidelines

2.2.1 Ensure secure installation of brackets. The installation locations and quantity should comply with industry standards.

2.2.2 All spacings should be reserved according to the drawing specifications and the working environment. Carry out works in accordance with the ink line reference if there is one.

2.2.3 The level, verticality and spacing of pipelines should comply with drawing specifications and industry standards.

2.2.4 The judging criteria of drain pipes include plumbing skills, accuracy, compliance to gradient standards, pipeline stability and appearance. No flushing test is needed.

2.2.5 The main judging criteria of water supply pipes include plumbing skills, accuracy, water test, pipeline stability and appearance.

2.2.6 Bent copper pipes lose marks in the case of radian error, shape distortion, flattening, crookedness and displacement of pipes, while marks will be given based on the curvature, quality and task difficulty.

2.2.7 Joints lose marks in the case of wrong directions, defects, uneven level, and seepage.

2.2.8 As for sanitary wares, they are evaluated based on the location, height deviation, stability, fitting assembling standards, levelling accuracy and the skills of applying silicone sealant.

2.3 Safety and Environmental Guidelines

2.3.1 Competitors should wear the safety helmet with chinstrap provided by the organizer during the competition.

2.3.2 Bring and wear proper clothing and safety shoes. Other safety equipment will be provided at the venue.

2.3.3 Wear safety goggles, dust masks and ear protectors when carrying out grinding and cutting work with abrasive wheels.

2.3.4 Wear the personal protective equipment provided by the organizer. Do not wear cotton gloves when operating motor tools and machinery with spinning components.

2.3.5 Certain works involve work above ground. Competitors can use related safety equipment provided by the organizer if necessary.

2.3.6 Check the tools and materials distributed by the organizer before the competition starts. For any irregularities, inform staff members on the site for follow-up.

2.3.7 No eating and drinking at the workstation area.

2.3.8 Safety constitutes one of the judging criteria. Competitors should take all safety precautions to ensure safety. Those displaying unsafe behaviour or affecting other Competitors would receive mark penalty or face disqualification from the competition.

2.3.9 In case of emergency (e.g. fire), the competition will be halted. Competitors should evacuate according to the instructions of fire wardens (personnel wearing red safety helmets) at the venue.

2.3.10 In case of physical discomfort or injury, inform staff members immediately for arranging first-aid assistance.

2.3.11 The organizer has prepared a sufficient supply of materials for all Competitors. Competitors should make good use of all materials to avoid wastage.

2.3.12 All tools and materials used in the competition will be recycled for other uses after the competition.

3. Reference List of Tools

Item no.	Item	Quantity
1	Hydraulic drill	1
2	13mm hydraulic drill bit	1
3	10mm hydraulic drill bit	1
4	8mm hydraulic drill bit	1
5	250mm pipe wrench	1
6	300mm pipe wrench	1
7	300mm pump plier	1
8	250mm pump plier	1
9	Adjustable plier	1
10	300mm adjustable spanner	2
11	Copper tube bender	1 set
12	Stainless steel pipe cutter	1
13	PVC pipe cutter	1
14	Saw	1
15	18-tooth saw blade	2
16	Slotted screwdriver	1
17	Cross-head screwdriver	1
18	Ball peen hammer	1
19	Chisel	1
20	Spirit level (Large, Small)	2
21	Steel tape rule	1
22	LPG gas blow burner	1
23	Deburring tool	1
24	Caulking gun	1
25	Hydraulic test gauge kit	1 set

4. Reference List of Materials

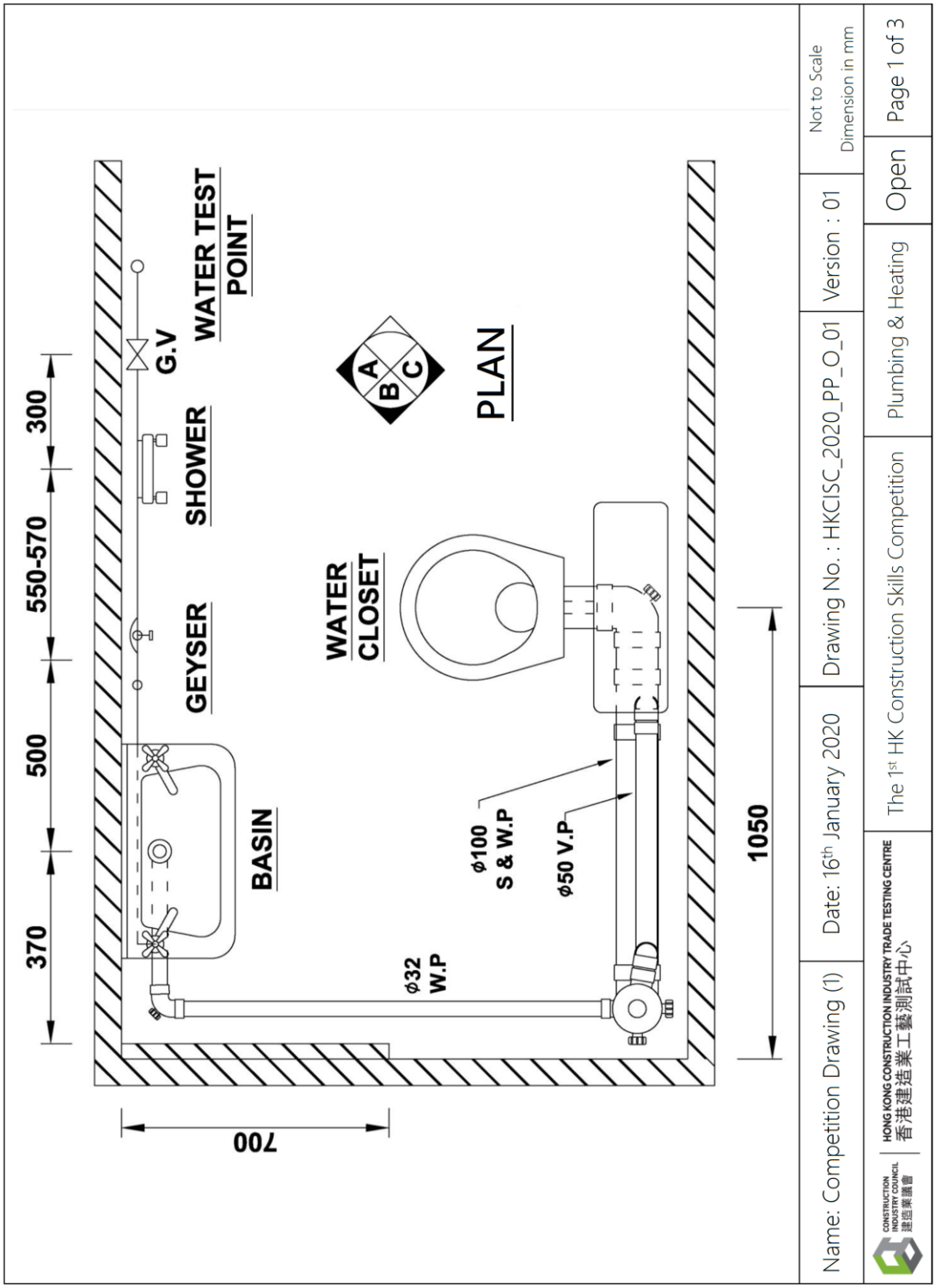
Item no.	Item	Quantity
1	22mm copper tube	2.5m
2	15mm copper tube	3.5m
3	22 mm holderbat	6
4	15 mm holderbat	6
5	15 mm angle valve with nozzle	2 set
6	22 mm x 22mm x 15 mm tee	1
7	22 mm x 15 mm x 22 mm tee	1
8	22mm x 15mm x 15mm tee	1
9	22 mm gate valve	2
10	22 mm x15mm press-fit reducer	2
11	15mm soldering 90° elbow	3
12	15mmx1/2" single thread soldering elbow	4
13	15mm press-fit-to-threaded coupler	1
14	100mm acid-proof PVC pipe	3m
15	50mm acid-proof PVC pipe	3m
16	32mm acid-proof PVC pipe	2m
17	50mm white PVC elbow 45°	2
18	50mm white PVC elbow	1
19	32mm white PVC bend 88° with access door	2
20	100x50mm white PVC tee with access door	1
21	100x50mm white PVC tee 45°	2
22	100mm adjustable white PVC tee with access door	1

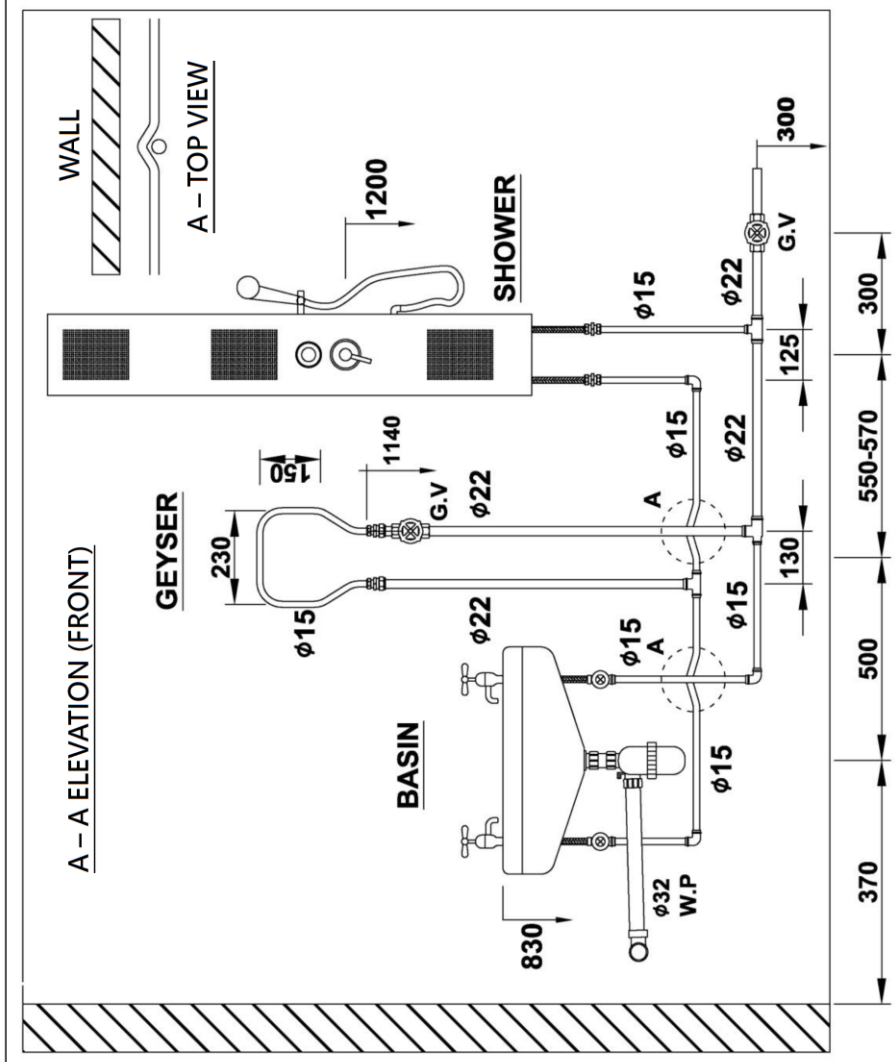
Item no.	Item	Quantity
23	50 mm x32mm white PVC reducing set	1
24	520 mm x330mm wash basin with wall-mounted brackets and waste	1 set
25	Wash basin mixer	2 set
26	Showering components	1 set
27	32mm basin trap	1 set
28	32mm white PVC-covered stainless steel bracket	2
29	50mm white PVC-covered stainless steel bracket	3
30	100mm white PVC-covered stainless steel bracket	3
31	100mm white PVC vent cowl	1
32	100mm white PVC toilet short elbow connector	1
33	Toilet flush bend	1
34	Toilet with water tank	1 set
35	Putty, PVC adhesive, silicone sealant, steel wire	1 set
36	Red pencil, chalk, rag	1 set
37	Rubber stopper, screw, washer	1 set
38	rosin flux, solder bar, gauze, hemp, tape	1 set

5. Reference List of Safety Equipment

Item no.	Item	Quantity
1	Safety helmet with chinstrap	1
2	Safety goggles	1
3	Corded ear plugs	1
4	Dust mask	1
5	Safety step stool	1
6	Light duty working platform (for work above ground)	1 set

6. Reference Test Project Drawings





Legend :

G. V = Gate Valve
S & W.P = Sewage & Waste Pipe
V.P = Vent Pipe

Remarks :

1. Connection of hot water copper pipes by compressing and soldiering method;
2. Connection of cold water pipes by compressing and soldiering method;
3. Connection of drain pipes / vent pipes by binding method;
4. Connect the basin using angle valve with nozzle;
5. Installation of water heater is not required. Bend the copper pipe and connect with the hot and cold water pipes in accordance with the drawing;
6. Connect both hot and cold water pipe to the shower pack ;
7. All pipe joints must be able to withstand the hydraulic pressure test in 10.5kg/cm^2;
8. The wash basin should be sealed with silicone sealant;
9. This drawing is not to scale, work should be completed with reference to the dimension as shown; and
10. All marked dimension in mm.

Name: Competition Drawing (2)	Date: 16th January 2020	Drawing No. : HKCISC_2020_PP_O_01	Version : 01	Not to Scale Dimension in mm
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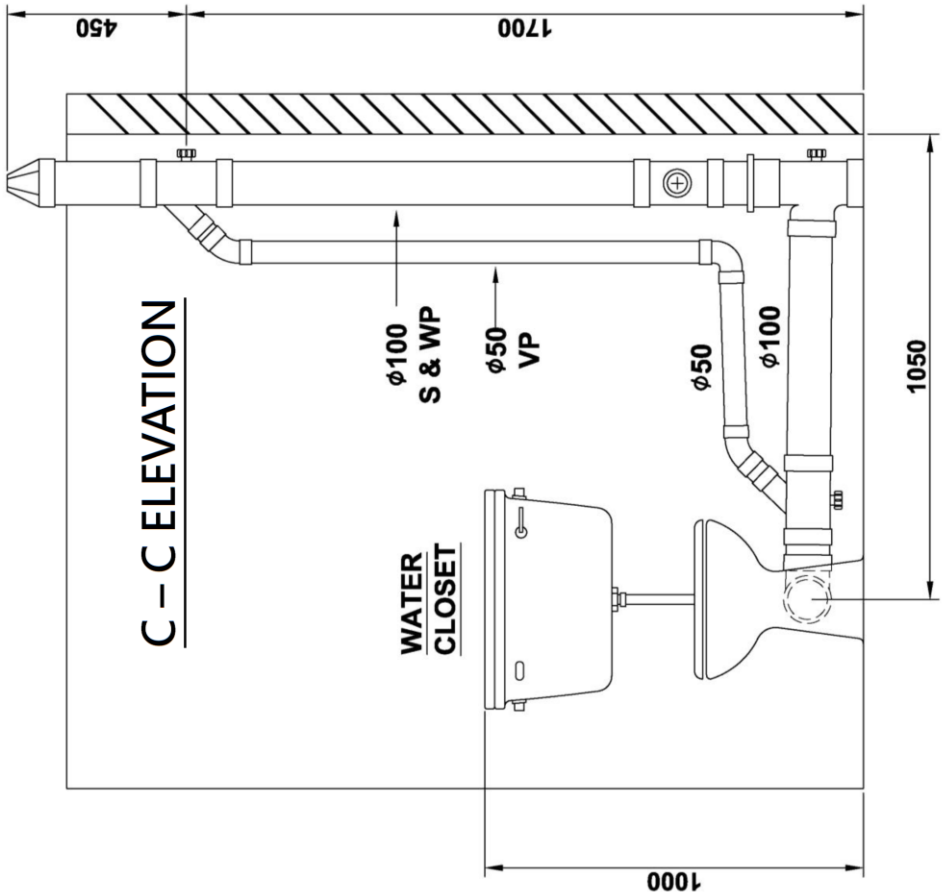

Legend :

V.P = Vent Pipe
S & W.P = Sewage & Waste Pipe
W.C = Water Closet

Remarks :

1. Connect sewage & waste pipes / vent pipes using acid-resistant PVC pipe by binding method;
2. Brackets should be installed at appropriate positions and comply with the industry standard;
3. 1:40 inclination is required for horizontal laying of drain pipes;
4. Horizontal pipe connecting antisiphonage pipe and vent pipe should be laid inclined;
5. Clearance between drain pipe and vent pipe should be kept within industrial compliance;
6. Adjustable fittings should be assembled at designated position as shown in drawing;
7. This drawing is not to scale, work should be completed with reference to the dimension as shown; and
8. All marked dimension in mm.

Name: Competition Drawing (3) | Date: 16th January 2020 | Drawing No. : HKCISC_2020_PP_O_01 | Version : 01 | Not to Scale Dimension in mm

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7. Contact Information

For an enquiries related to the Competition Handbook, please refer to the official website
http://www.cic.hk/chi/main/aboutcic/news_and_updates/events_calendar/event-370.html
or contact the Hong Kong Construction Industry Trade Testing Centre via:

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