

Performance Monitoring System for
Class 1 competent person
on Testing and Certification of LPG Cylinders, Tanks, Vaporisers and Mains

Performance Monitoring System (PMS) on Class 1 competent person (CP)

1. Background

According to Regulations 8(2), 8(3), 8(4) and 14(1) of the Gas Safety (Gas Supply) Regulations (Cap. 51B), the owner of an LPG cylinder, tank or vaporiser shall not use the cylinder, tank or vaporiser unless it has been tested and examined at predetermined intervals to ascertain whether the cylinder, tank or vaporiser is safe to use. Clause 6.2 of the Code of Practice for Hong Kong LPG Industry Module 2 and Clause 9.3.9 of the Code of Practice for Liquefied Petroleum Gas Filling Stations in Hong Kong require underground LPG pipework to be tested at pre-determined intervals to ascertain the integrity of the underground mains. The owner shall therefore employ a person, who is competent by virtue of his training and practical experience, to test and certify LPG cylinders, tanks, vaporisers and mains.

Currently, the Gas Standards Office (GasSO) administers the following lists of six classes of CPs, viz:

Class 1 CP - Testing and Certification of LPG Cylinders, Tanks, Vaporisers and Mains;

Class 2 CP - Inspection and Certification of LPG Compounds and Cylinder Stores;

Class 3 CP - Examination and certification of gasholders;

Class 4 CP - Installation, commissioning and maintenance of LPG tanks, vaporisers, pipework, pressure regulators and associated equipment in LPG compounds and cylinder stores as well as LPG mains;

Class 5 CP - Installation, commissioning and maintenance of LPG pipework, pressure regulators and associated equipment in LPG vapour withdraw cylinder stores as well as LPG mains;

Class 6 CP - Repair and maintenance of LPG vehicles

2. Objective

The objective of this performance monitoring system for Class 1 CP is to establish a more systematic approach on monitoring their performance.

3. Performance Monitoring System (PMS)

- (a) With a more systematic approach in monitoring the performance of Class 1 CP, the PMS is aimed at:
- (i) Raising the quality of testing and certification of LPG cylinders, tanks, vaporisers and mains;
 - (ii) Acting as a tool to measure the performance of Class 1 CP so as to identify those under-performer.
- (b) The PMS is developed based upon the requirements of the following Ordinance and Code of Practices:
- (i) Gas Safety Ordinance (Cap. 51) and related Regulations;
 - (ii) Code of Practice (COP) for Hong Kong LPG Industry
 - a. Module 1 - LPG Compounds and Cylinder Stores Issue 2, September 1999 edition;
 - b. Module 2 - Underground LPG Pipework Issue 1, May 2003 edition; and
 - c. Module 9 - LPG Cylinders Issue 1, September 2004 edition.
 - (iii) Guideline for Revalidation of LPG Fuel Tanks for LPG Vehicles, December 2004 edition.
 - (iv) Code of Practice for Liquefied Petroleum Gas Filling Stations in Hong Kong, November 2007 edition.
- (c) The PMS operates as follows:
- (i) All practicing CPs are required to notify GasSO of the testing and certification of LPG cylinders, tanks, vaporisers and mains 3 working days prior to the actual test (except in case of emergency repair) to facilitate audit inspection by GasSO.
 - (ii) The performance of each practicing CP is monitored through an audit inspection to be carried out by Engineer/Inspector of GasSO during the testing and examination carried out by the CP.
 - (iii) An audit inspection on each practicing CP is selected randomly. Additional audit inspections will be conducted as and when required. The Class 1 CP would be informed of the audit arrangement.
 - (iv) The audit inspection is focused on the following areas:
 - Testing of LPG cylinders, tanks, vaporisers and mains;
 - Certification of LPG cylinders, tanks, vaporisers and mains as well as relevant submission on the 'Proof of fitness' calculation/ information, where applicable, of the LPG tanks, vaporisers and mains under audit.
 - (v) The performance of the CP is measured by assessing the degree of non-compliance against the Critical Compliance List as set out in Section 4 and

the Inspection Requirements (IR) as set out in Section 5 of the PMS. The assessment mechanism is as follows:

- (a) One non-compliance (N/C) is given to a CP when in the opinion of GasSO's Engineer/Inspector that the CP has failed to observe/identify any one item laid down in the Critical Compliance List during an audit inspection;
 - (b) Demerit points are accorded to a CP when in the opinion of GasSO's Engineer/Inspector that the CP has failed to observe/identify items laid down in the IR during an audit inspection.
- (vi) N/C and demerit points are assigned by taking into account the following factors:
- (a) Compliance with relevant Ordinance, Regulations and Code of Practices; and
 - (b) Degree of severity and potential impact to safety.
- (vii) CP shall be notified in writing on the N/C or demerit points accorded within fourteen working days from the date of the audit inspection or the receipt of inspection report/ certificate/ proof of fitness submission etc whichever come later.
- (viii) In the event on any dispute on the result of the N/C or demerit points accorded, CP may appeal to the Assistant Director, Gas and General Legislation (AD/GGL), Electrical & Mechanical Services Department, HKSAR Government within fourteen working days from the notification date. The decision made by the AD/GGL shall be final.
- (ix) Each N/C or demerit points shall remain valid for a 12 months rolling period. This rolling period is referred to as the 'specified period'.
- (x) The PMS has three levels of action towards any under-performed CP.
- (a) The first level of action will be taken if
 1. A CP has been given one N/C within a specified period; or
 2. A CP has accumulated 31 to 60 demerit points within a specified period.

Under the first level of action, a reminder will be issued to the CP pinpointing his/her unsatisfactory performance. Subsequent audit inspections will be closely monitored by GasSO, and a Senior Inspector/ Engineer may need to carry out the audit inspection if necessary.
 - (b) The second level of action will be taken if
 1. A CP has been given two N/Cs within a specified period; or
 2. A CP has been given one N/C and has accumulated 31 to 60 demerit points within a specified period; or
 3. A CP has accumulated 61 to 90 demerit points within a specified period.

Under the second level of action, a warning letter will be issued to the CP instructing him/her to immediately improve his/her performance and advising him/her on the possible removal from the Class 1 CP list. Subsequent audit inspections on this CP may need to be conducted by a GasSO Engineer and Inspector.

- (c) The third level of action will be taken if
1. A CP has been given three N/Cs within a specified period; or
 2. A CP has been given two N/Cs and has accumulated 31 to 60 demerit points within a specified period; or
 3. A CP has been given one N/C and has accumulated 61 to 90 demerit points within a specified period; or
 4. A CP has accumulated 91 or more demerit points within a specified period.

Under the third level of action, a letter will be issued to the CP informing him/her that his/her name has been temporarily removed from the list of Class 1 CP kept by EMSD for a period of 6 months. He/she will also be requested to suspend from all Class 1 CP related inspection works during the period.

- (d) The CP may apply for uplifting the 'temporary-removal' status from GasSO at the end of the removal period. If accepted, his/her name will be re-listed in the Class 1 CP list kept by EMSD.
- (xi) Once the temporary removal from the CP list action is taken, all the N/C and demerit points accorded to the CP will be cleared.

4. Critical Compliance List for Class 1 CP audit inspections

Item No.	Critical Item Description	Ref
<i>LPG cylinders, tanks, vaporisers and mains related item</i>		
A	Failed to supervise in person the testing and examination.	

5. Inspection Requirements (IR) for Class 1 CP audit inspections

<i>LPG cylinders specific items</i>			
Item No.	Requirement Description	Demerit Points	Ref
<i>Revalidation works</i>			
C1	Failed to carry out visual inspection	15	M9-8.9
C2	Failed to use regularly calibrated pressure gauges for hydraulic test	10	M9-8.8
C3a	Failed to carry out hydraulic test to the pressure specified by the cylinder design standard	10	M9-3.6
C3b	Failed to carry out hydraulic test using the medium specified in the COP or cylinder design standard	5	M9-8.7
C3c	Failed to carry out hydraulic test for the specified duration	5	M9-8.9
<i>Documentation</i>			
C4	Failed to indicate or indicate incorrectly the following information in the test records: i) Type or Size of LPG cylinder ii) Cylinder water capacity iii) Cylinder serial number or reference number iv) Cylinder manufacturer test date v) Maximum Design pressure vi) Hydraulic Test pressure vii) Visual Examination condition/ results viii) Test duration	3 Each Item	
C5	Failed to complete a legible Test and Examination Report	3	

<i>LPG fuel tanks specific items - Revalidation works</i>			
Item No.	Requirement Description	Demerit Points	Ref
FT1	Failed to carry out external visual inspection	15	G-6.3
FT2	Failed to carry out internal visual inspection	15	G-6.4
FT3	Failed to use regularly calibrated pressure gauges for hydraulic test	10	G-6.5.2
FT4a	Failed to carry out hydraulic test at 1.5 times of the LPG fuel tank design pressure (unless specified by the tank design code)	10	G-6.5.5
FT4b	Failed to carry out hydraulic test using the specified test medium	5	G-6.5.6
FT4c	Failed to carry out hydraulic test for the specified duration	5	G-6.5.7
<i>Test and examination of associated safety devices</i>			
FT5	Failed to carry out test on pressure relief valve (PRV)	15	G-6.6.1
FT6	Failed to carry out test on excess flow valve (EFV)	15	G-6.6.2
FT7	Failed to carry out test on automatic fill limiter	15	G-6.6.3
FT8	Failed to carry out test on content gauge	10	G-6.6.4
<i>Assembly and pneumatic leakage test</i>			
FT9	Failed to thoroughly drain and positively dry the LPG fuel tank after the hydraulic test.	5	G-6.7.1
FT10	Failed to apply new sealing materials (i.e. gaskets, O-rings, etc) between the devices/valves and the LPG fuel tank.	5	G-6.7.2
FT11	Failed to fit all the devices/valves in correct orientation.	5	G-6.7.3
FT12	Failed to carry out pneumatic leakage test to the pressure as specified by its design code.	15	G-6.8
<i>Documentation</i>			
FT13	Failed to complete a legible Test and Examination Report	3	G-7.3
FT14	Failed to indicate or indicate incorrectly in the Test and Examination Report the following test records: i) LPG fuel tank serial number and last test date; ii) External Examination results; iii) Internal Examination results iv) PRV test result with actuation pressure; v) Hydraulic test result with test pressure; vi) Examination result of associated fittings including excess flow valve, fill limiter and level gauge; and vii) Pneumatic leak test result with test pressure; and viii) Confirmation of fixing the new information plate	3 Each Item	G-7.3

<i>LPG bulk tanks and mini-tanks specific items</i>			
Item No.	Requirement Description	Demerit Points	Ref
<i>Revalidation works</i>			
T1	Failed to carry out external visual inspection	15	M1-10.3.2
T2	Failed to carry out internal visual inspection (where applicable)	15	M1-10.3.2
T3	Failed to use regularly calibrated pressure gauges for hydraulic test	10	M1-10.2.12
T4a	Failed to carry out hydraulic test at 1.5 times of the tank design pressure (unless specified by the tank design code)	10	M1-8.2.2
T4b	Failed to carry out hydraulic test using the medium specified in the COP or the tank design code	5	M1-8.2.2
T4c	Failed to carry out hydraulic test for the specified duration	5	M1-8.3.5
<i>Test and examination of associated safety devices</i>			
T5	Failed to carry out test on pressure relief valve (PRV) or verify the suitability of its replacement	15	M1-10.3.2 M1-4.2.5
<i>Documentation</i>			
T6	Failed to report the following test/ examination results i) Full visual examination & hydraulic test ii) Ultrasonic thickness test iii) Magnetic particle test iv) Paint thickness & holiday test v) Testing & examination of tank fittings vi) Cathodic protection test vii) Electrical continuity test	10 Each Item	F106
T7	Failed to indicate or indicate incorrectly the following information in F106: i) Location of installation ii) Tank mode of storage iii) Serial number iv) Tank water capacity v) Tank Design code vi) Test Date(s) vii) Document reference number(s) viii) Name of person/ company carrying out the test	3 Each Item	F106
T8	Failed to complete a legible F106 inspection report	3	

<i>LPG vaporisers specific items</i>			
Item No.	Requirement Description	Demerit Points	Ref
<i>Revalidation works</i>			
V1	Failed to carry out test on pressure relief valve (PRV) or verify the suitability of its replacement.	15	M1-10.3.2 M1-4.4.2
V2	Failed to use regularly calibrated pressure gauges for hydraulic test.	10	M1-10.2.12
V3	Failed to report the overall condition of the vaporiser in F107	10	F107
V4a	Failed to carry out hydraulic test at 1.5 times of the vaporiser design pressure (unless specified by the manufacturer or respective design code)	10	M1-8.2.2
V4b	Failed to carry out hydraulic test using the medium specified in the COP or respective design code	5	M1-8.2.2
V4c	Failed to carry out hydraulic test for the specified duration	5	M1-8.3.5
<i>Documentation</i>			
V5	Failed to indicate or indicate incorrectly the following information in F107: i) Location of installation ii) Name of person and company carrying out the test iii) Date of Test iv) Make & Model of vaporiser v) Serial Number vi) Date of Manufacture vii) Vaporising Capacity viii) Pressure vessel code ix) Test Pressure x) Duration of Test xi) Pressure relief valve	3 Each Item	F107
V6	Failed to complete a legible F107 inspection report.	3	

<i>LPG mains related items</i>			
Item No.	Requirement Description	Demerit Points	Ref
<i>LPG mains related items – New and existing mains</i>			
P1	Failed to use regularly calibrated pressure gauges for the hydraulic test.	10	M2-5.1.21
P2	Failed to ensure that the pipe section under test is suitably blanked or physically isolated from any gas supply.	10	M1-8.3.6 M2-5.1.13
P3a	Failed to carry out hydraulic test at the required pressure (unless specified by respective design code)	10	M1-8.3.2
P3b	Failed to carry out hydraulic test using the medium specified in the COP or respective design code	5	M2-5.1.8
P3c	Failed to carry out hydraulic test for the specified duration	5	M1-8.3.3 M1-8.3.5 M2-5.1.12
<i>LPG mains related items – New mains</i>			
P4	Failed to check the LPG pipe under test/examination is not adequately protected against corrosion.	10	F108
<i>LPG mains related items – Existing mains</i>			
P5	Failed to produce written procedures on the testing operations.	10	M2-5.1.2
<i>Documentation – New and existing mains</i>			
P6	Failed to report specific causes and remedial measures when pressure drop is observed during the test	10	F108
P7	Failed to indicate or indicate incorrectly the following information in F108: i) Location of the LPG installation and details of the section of the pipe under test ii) Name of Tester and company carrying out the test iii) Date of Test iv) Pipeline specification v) Fitting specification vi) Valve material & rating vii) Test medium viii) Working pressure ix) Test pressure x) Duration of test xi) Pressure setting of hydrostatic pressure relief valve	3 Each Item	F108
P8	Failed to complete a legible F108 inspection report	3	

Reference

M9 - " Code of Practice for Hong Kong LPG Industry Module 9 Issue 1, September 2004"

G - " Guideline for Revalidation of LPG Fuel Tanks for LPG Vehicles, December 2004"

M1 - " Code of Practice for Hong Kong LPG Industry Module 1 Issue 2, September 1999"

M2 - " Code of Practice for Hong Kong LPG Industry Module 2 Issue 1, May 2003"

F106 - " Form EMSD/GSO/106"

F107 - " Form EMSD/GSO/107"

F108 - " Form EMSD/GSO/108"

6. PMS Implementation and Review

The performance monitoring system will be implemented after consultation with all listed Class 1 CP.

After the PMS has been put into operations for 12 months, a review will be conducted to assess its effectiveness and consider any amendment necessary.

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Electrical & Mechanical Services Department
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