

SINGAPORE CIVIL DEFENCE FORCE

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Please quote our ref. no. in all future correspondences

Our File Ref: CD/FSSB/12/01/03/04

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8 Feb 2006

President, Singapore Institute of Architects (SIA)
President, Institution of Engineers, Singapore (IES)
President, Association of Consulting Engineers, Singapore (ACES)
President, Real Estates Development Association of Singapore (REDAS)
Registrar, Board of Architects (BOA)
Registrar, Professional Engineers Board (PEB)

Dear Sir/Mdm,

PRODUCT LISTING SCHEME FOR HOUSEHOLD SHELTER DOORS – REVISION IN CED COATING TEST SPECIFICATION

The circular titled “Product Listing Scheme for Household Shelter (HS) Doors” was issued on 28 Feb 2002. Annex A of aforementioned circular contained the relevant test standards and specifications.

2 For consistency with prevailing Singapore Standards (SS5 Part G1 and G6), the specifications for CED coating test for the HS door has been reviewed and updated as shown in **Annex A3 and A6**. The relaxation in test requirements shall take place with immediate effect.

3 We would appreciate it if you could disseminate the contents of this circular to members of your Institution or Association.

4 Please contact undersigned at 68481470 or Maj Ng Shu Herng at 68481406, should you require further clarifications.

Yours faithfully,

(Transmitted via e-mail)

Cpt Yoong Eng Chee
SO Shelter Development
for Commissioner, Singapore Civil Defence Force



A PROUD MEMBER OF THE HOME TEAM



CC

Members of FSSD Standing Committee

President, SISV

CEO, HDB
Attn: Mr Lau Joo Ming

CEO, URA

CEO, BCA
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PRODUCT LISTING SCHEME FOR HOUSEHOLD SHELTER DOORS

TYPE TESTS		
S/N	TEST	STANDARD/ SPECIFICATION
1	Door locking mechanism cyclic test	<p><u>Test Cycles</u></p> <p>The entire test shall consist of 60,000 cycles, which in turn comprise two cyclic types :</p> <ul style="list-style-type: none"> • Type A : 10,000 in the Civil Defence (CD) mode when the lock bolts are activated • Type B : 50,000 for normal opening and closing of door (based on 90° angle of opening function) <p>(<u>Note</u> : Type A cycles are to be performed interspersed between the Type B cycles in the ratio 1:5 i.e. 1 Type A cycle to be done after every 5 Type B cycles.)</p> <p><u>Test Method and Requirements</u></p> <ul style="list-style-type: none"> • The test is conducted using the test rig designed to be able to support the doorset and holding it rigidly in place, preventing any movement that may occur during the tests. • 5 Type B cycles to be carried out. Each cycle shall consist of the latch of lockset unlatching (with its lever handle completing a 90° angle movement), followed by the door leaf opening to 90° angle and then by the closing of the door leaf and finally latching in place. During each cycle, the lockset shall be able to latch fully. • After the 5 Type B cycles, 1 Type A cycle to be performed. The type A cycle is a 90° angle movement of the lever handle of the lockset in locking and unlocking the doorset. During each cycle, the lockset shall fully engage the bolts onto the door frame, with the lever handle completing the full cycle of operation without straining. • This pattern of 5 Type B cycles followed by 1 Type A cycle is to be repeated 10,000 times.

TYPE TESTS		
S/N	TEST	STANDARD/ SPECIFICATION
		<p><u>After completion of 60,000 cycles</u></p> <ul style="list-style-type: none"> • After the test the doorset shall be checked manually that it is still able to lock in place without causing any strains and all functions of the lockset shall still operate. • Check that there shall be no damages, or evidence of undue wear or loosening of any parts of the doorset including the hardwares installed, or other defects that may impair its reliability of functioning and the test leaf shall remain connected to the frame. • Check that the lockset's spring bolt through the striking plate shall continue to function correctly, and be able to return to its normally extended position under its own spring pressure, and all functions of the lockset shall still operate. • Check for visible cracking or breakage of any components on the hinges; and check that the doorset is capable of closing properly, maintaining all clearances between leaf to frame and floor as measured before the test.
2	Water-tightness test	Water tightness test shall be carried out on the door leaf and frame assembly in their closed position. The enclosure formed by the door leaf and frame assembly in their closed position shall be filled with water to a uniform depth of 25 mm water for a period of two hours. There shall be no seepage of water within this period.

TYPE TESTS			
S/N	TEST	STANDARD/ SPECIFICATION	
3	CED/galvanised coating test	CED	Electro-galvanised
		<ul style="list-style-type: none"> • ASTM D3359 <ul style="list-style-type: none"> - Rating 5B (No removal of coating) • SS5 : Part F2 <ul style="list-style-type: none"> - The coating shall withstand test load of 2000g • ASTM 3363 <ul style="list-style-type: none"> - 2H shall be the hardest pencil that does not scratch the film • SS5 : Part B1 <ul style="list-style-type: none"> - Dry film thickness shall be $20 \pm 5 \mu\text{m}$ • SS5 : Part G1. Test duration = 500 hours <ul style="list-style-type: none"> - The coating may have any quantity of Size 2 blisters but shall have no more than Density 2 Size 3 blisters as illustrated in ISO 4628-2. - Degree of rusting shall not be more than scale Ri 2 according to ISO 4628-3 • SS5 : Part G6. Test duration = 500 hours <ul style="list-style-type: none"> - The coating shall have no more than Density 2 Size 2 blisters as illustrated in ISO 4628-2. - Degree of rusting shall not be more than scale Ri 1 according to ISO 4628-3 	<ul style="list-style-type: none"> • ASTM A90 Coating thickness = 3.5 microns minimum
4	Rubber gasket test	ASTM D1056 (Grade 2A3, 2A4, 2A5, 2B3, 2B4 or 2B5)	

* The test methods refer to in the relevant ASTM, SS and ISO shall be of the latest version.

SURVEILLANCE TESTS		
S/N	TEST	STANDARD/ SPECIFICATION
1	Door locking mechanism cyclic test	<p><u>Test Cycles</u></p> <p>The entire test shall consist of 60,000 cycles, which in turn comprise two cyclic types :</p> <ul style="list-style-type: none"> • Type A : 10,000 in the Civil Defence (CD) mode when the lock bolts are activated • Type B : 50,000 for normal opening and closing of door (based on 90° angle of opening function) <p>(<u>Note</u> : Type A cycles are to be performed interspersed between the Type B cycles in the ratio 1:5 i.e. 1 Type A cycle to be done after every 5 Type B cycles.)</p> <p><u>Test Method and Requirements</u></p> <ul style="list-style-type: none"> • The test is conducted using the test rig designed to be able to support the doorset and holding it rigidly in place, preventing any movement that may occur during the tests. • 5 Type B cycles to be carried out. Each cycle shall consist of the latch of lockset unlatching (with its lever handle completing a 90° angle movement), followed by the door leaf opening to 90° angle and then by the closing of the door leaf and finally latching in place. During each cycle, the lockset shall be able to latch fully. • After the 5 Type B cycles, 1 Type A cycle to be performed. The type A cycle is a 90° angle movement of the lever handle of the lockset in locking and unlocking the doorset. During each cycle, the lockset shall fully engage the bolts onto the door frame, with the lever handle completing the full cycle of operation without straining. • This pattern of 5 Type B cycles followed by 1 Type A cycle is to be repeated 10,000 times.

SURVEILLANCE TESTS		
S/N	TEST	STANDARD/ SPECIFICATION
		<p><u>After completion of 60,000 cycles</u></p> <ul style="list-style-type: none"> • After the test the doorset shall be checked manually that it is still able to lock in place without causing any strains and all functions of the lockset shall still operate. • Check that there shall be no damages, or evidence of undue wear or loosening of any parts of the doorset including the hardwares installed, or other defects that may impair its reliability of functioning and the test leaf shall remain connected to the frame. • Check that the lockset's spring bolt through the striking plate shall continue to function correctly, and be able to return to its normally extended position under its own spring pressure, and all functions of the lockset shall still operate. • Check for visible cracking or breakage of any components on the hinges; and check that the doorset is capable of closing properly, maintaining all clearances between leaf to frame and floor as measured before the test.
2	Water-tightness test	Water tightness test shall be carried out on the door leaf and frame assembly in their closed position. The enclosure formed by the door leaf and frame assembly in their closed position shall be filled with water to a uniform depth of 25 mm water for a period of two hours. There shall be no seepage of water within this period.
3	Production test	Dimensional checks in accordance to approved drawings.

SURVEILLANCE TESTS			
S/N	TEST	STANDARD/ SPECIFICATION	
4	CED/galvanised coating test	CED	Electro-galvanised
		<ul style="list-style-type: none"> • ASTM D3359 <ul style="list-style-type: none"> - Rating 5B (No removal of coating) • SS5 : Part F2 <ul style="list-style-type: none"> - The coating shall withstand test load of 2000g • ASTM 3363 <ul style="list-style-type: none"> - 2H shall be the hardest pencil that does not scratch the film • SS5 : Part B1 <ul style="list-style-type: none"> - Dry film thickness shall be $20 \pm 5 \mu\text{m}$ • SS5 : Part G1. Test duration = 500 hours <ul style="list-style-type: none"> - The coating may have any quantity of Size 2 blisters but shall have no more than Density 2 Size 3 blisters as illustrated in ISO 4628-2. - Degree of rusting shall not be more than scale Ri 2 according to ISO 4628-3 • SS5 : Part G6. Test duration = 500 hours <ul style="list-style-type: none"> - The coating shall have no more than Density 2 Size 2 blisters as illustrated in ISO 4628-2. - Degree of rusting shall not be more than scale Ri 1 according to ISO 4628-3 	<ul style="list-style-type: none"> • ASTM A90 Coating thickness = 3.5 microns minimum
5	Rubber gasket test	ASTM D1056 (Grade 2A3, 2A4, 2A5, 2B3, 2B4 or 2B5)	

* The test methods refer to in the relevant ASTM, SS and ISO shall be of the latest version.