SINGAPORE CIVIL DEFENCE FORCE
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Date: 28 Feb 2002

President, Singapore Institute of Architects (SIA)

President, Institution of Engineers, Singapore (IES)

President, Association of Consulting Engineers, Singapore (ACES)

Dear Sirs,

TECHNICAL REQUIREMENTS OF HOUSEHOLD SHELTERS 2001 & PRODUCT LISTING SCHEME FOR HOUSEHOLD SHELTER (HS) DOORS

At the last Shelter Technical Seminar 2001, jointly organised by FSSB/SCDF and CDSD/BCA, held on 28 Sep 2001 at CDANS Country Club, Bukit Batok, we presented the following:

a Review of the "Technical Requirements For Household Shelters 1997".

Jointly with BCA, SCDF carried out and largely completed the review of the technical requirements of household shelters (HS) in early 2001. The review covered all aspects relating to the planning, design, construction and commissioning of HS. The salient changes to the HS technical requirements, i.e. architectural, structural and other requirements, were highlighted at the seminar. (Note: The revisions to the HS size and setback distance requirements had earlier been made known to your institution or association through our circular of 26th Apr 2001 and implemented from 1st May 2001.)

b Product Listing Scheme for Household Shelter (HS) Doors.

For purpose of quality control in the manufacturing of the HS doors, SCDF and BCA have been working closely with PSB on the details of implementing the Product Listing Scheme for HS doors. (Note: In preparation of PLS, SCDF and PSB briefed all the current approved HS door suppliers in Sep 2001).

"TECHNICAL REQUIREMENTS FOR HOUSEHOLD SHELTERS 2001"

2 We would like to inform your institution or association that the new "Technical Requirements For Household Shelters 2001" has been published and is now available for sale at our HQ SCDF at Ubi Avenue 4, S (408827). The "Technical Requirements For Household Shelters 2001" is priced at $10 per copy.

3 Among others, the "Technical Requirements For Household Shelters 2001" covers revised HS size, setback distance requirements, HS tower stability, control of non-shelter (NS), basement HS in landed dwelling units and HS beneath an internal staircase. Most of these changes had already been made known via our circulars of 26th Apr 2001 and 13th Nov 2001. As the requirements in the new "Technical Requirements For Household Shelters 2001" have largely been implemented since Nov 2001, it shall therefore replace the existing "Technical Requirements For Household Shelters 1997".

PRODUCT LISTING SCHEME FOR HOUSEHOLD SHELTER (HS) DOORS

4 On the proposed Product Listing Scheme (PLS) for HS doors, we had in Dec 2001 notified all the approved HS door suppliers that this scheme would be implemented with effect from **1st Mar 2002**. Please note that only HS doors whose design and details have been evaluated by the Civil Defence Shelter Engineering Department (CDSD) of BCA and approved by SCDF (for which a BCA-approved HS door reference number would be issued) are eligible for the PLS which is administered by PSB.

5 We would like to inform your institution or association that only HS doors registered under the PLS and issued with PLS label shall be supplied to residential developments (required under the CD Shelter Act 1997) when their building plans are submitted to BCA (for private residential projects) or HDB (for HDB housing projects) for approval on or after **1st May 2002**.

6 With the implementation of PLS requirement for HS doors, Clause 5.2 of the "Technical Requirements For Household Shelters 2001" is amended to read:

> **"Only HS doors of an approved design, and which have been certified and listed under the Product Listing Scheme to the test standards and specifications in Annex A shall be used."**
>
> A copy of **Annex A** to the Technical Requirements For HS 2001 is attached.

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

8 Please contact me at 8481470 or Maj Chan Keen Mun at 8481406, should you require further clarifications.

Yours faithfully,

Cpt Chong Kim Yuan
for Commissioner
Singapore Civil Defence Force

cc

CEO, BCA - Attn: Deputy CEO (Building Control)
Director (Special Functions)
Senior Manager (CDSD)
Manager (CDAS)

Members of FSSB Standing Committee

President, REDAS

President, IFE

President, SISV

Ms Tan Chiew Wan
Vice President (Certification & Inspection)
PSB Corporation

Mr Lau Joo Ming
Chief Structural Engineer, Structural Engineering Dept, HDB

TEST STANDARDS AND SPECIFICATIONS FOR HOUSEHOLD SHELTER DOORS

TYPE TESTS		
S/N	**TEST**	**STANDARD/ SPECIFICATION**
1	Door locking mechanism cyclic test	**Test Cycles** The entire test shall consist of 60,000 cycles, which in turn comprise two cyclic types : • **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) (Note : 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.) **Test Method and Requirements** • 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**
		After completion of 60,000 cycles • 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**	
		CED	Electro-galvanised
3	CED/galvanised coating test *	• ASTM D3359 - Rating 5B (No removal of coating) • SS5 : Part F2 - The coating shall withstand test load of 2000g • ASTM 3363 - 2H shall be the hardest pencil that does not scratch the film • SS5 : Part B1 - Dry film thickness shall be 20 ± 5 μm • SS5 : Part G1. Test duration = 500 hours - Blister : few No. 6 to No.10 - Less than 0.1% rusting • SS5 : Part G6. Test duration = 500 hours - Blister : few No. 8 to No.10 - Less than 0.03% rusting	• ASTM A90 Coating thickness = 3.5 microns minimum
4	Rubber gasket test *	ASTM D1056 (Grade 2B)	

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

SURVEILLANCE TESTS			
S/N	**TEST**	**STANDARD/SPECIFICATION**	
1	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.	
2	CED/galvanised coating test *	CED	Electro-galvanised
		• ASTM D3359 - Rating 5B (No removal of coating) • SS5 : Part F2 - The coating shall withstand test load of 2000g • ASTM 3363 - 2H shall be the hardest pencil that does not scratch the film • SS5 : Part B1 - Dry film thickness shall be 20 ± 5 μm • SS5 : Part G1. Test duration = 500 hours - Blister : few No. 6 to No.10 - Less than 0.1% rusting • SS5 : Part G6. Test duration = 500 hours - Blister : few No. 8 to No.10 - Less than 0.03% rusting	• ASTM A90 Coating thickness = 3.5 microns minimum
3	Production test	Dimensional checks in accordance to BCA-approved HS door design drawings.	

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