

**BUILDING MATERIALS EVALUATION COMMISSION
(BMEC)
AUTHORIZATION REPORT**

DATE OF AUTHORIZATION
BMEC REFERENCE
BMEC APPLICATION #

July 26, 2001
BMEC # 01-09-261
BMEC # A 2001-03

**DURAKIT SHELTERS INC.
Corrugated Fibreboard Building Envelope System**

1. Applicant

DuraKit Shelters Inc.
2785 Hwy 27
P.O. Box 200
Bond Head, Ontario
LOG 1B0

Tel: (905) 953 - 8976
Fax: (905) 953 - 8945

2. Manufacturing Facilities

DuraKit Shelters Inc.
2785 Hwy 27
P.O. Box 200
Bond Head, Ontario
LOG 1B0

3. Description

The DuraKit Shelters Inc. corrugated fibreboard building envelope system, is a high strength corrugated structural fibreboard and building envelope system.

4. Authorization Requested

The applicant sought authorization for the use of the DuraKit Shelters Inc. corrugated fibreboard building envelope system as a wall and roof assembly system acceptable under Section 9.4 "Structural Requirements" of the 1997 Ontario Building Code as amended.

5. Assessment

Reports and assessments provided by the applicant indicate that if the DuraKit Shelter structural fibreboard and building envelope system is designed, performance tested and installed in accordance with the manufacturer's instructions and limitations, and the specific terms and conditions stated in this authorization, the level of performance required by the Ontario Building Code will be provided.

Reports, assessments and information reviewed included the following:

1. "Full Scale Testing of DuraKit Shelter Subjected to Static- Equivalent Wind Loads" testing and report by the University of Western Ontario.
2. "Load Criteria, Material Testing and Component testing of DuraKit Shelter" testing and report by the University of Western Ontario.
3. "Finite Element Analysis of DuraKit Shelter" testing and report by the University of Western Ontario.
4. "A Study of Material Properties a Triple Corrugated Board" testing and report by the University of Western Ontario.
5. Compressive Test: Testing by Norampac Testing and Technical Services of Toronto, Ontario.
6. "Water Penetration" ASTM E 457-86: Testing by Bodycote Ortech.
7. "Air Leakage" ASTM E 283-91: Testing by Bodycote Ortech.
8. "Water Vapour Transmission" ASTM E 96-00: Testing by Bodycote Ortech.
9. "Surface Burning Characteristics of Fire Retardant Coatings" ULC-CAN-S102-M88 and UL 723: Testing by underwriters' Laboratory of Canada - interior finish only.
10. "Surface Burning Characteristics of Coated Paperboard Panel" ASTM E 84: Testing performed by Bodycote Ortech.
11. Performance Tests Conducted on One Vertical Sliding Window S-3450/4450 Series" CAN/CSA A440-M90: Testing by AIRS-INS.
12. "Door Test" CAN/CGSB-82.5-M88: testing and report by Inchcape Testing Services / Warnock Hersey.
13. "Impact Testing on an Entrance Door" ASTM F476-8: testing and report by Inchcape Testing Services.
14. "Water Vapour Transmission" ASTM E 96-94: Testing performed by Bodycote Ortech.
15. Sealant/Joints CAN/CGSB-19.13-M87.
16. "Full Scale Dynamic Testing of DuraKit Cardboard Shelter Using A Shake Table Device" testing and report by the University of Western Ontario.
17. Site visit: 01 June 2001.

18. Installation video tapes: "The Instant House" duration 10 minutes, and "The Instant House" duration 12 minutes.

6. Authorization

The DuraKit Shelters Inc. is a high strength corrugated structural fibreboard and building envelope system. The system may be used for wall and roof assemblies as described under Section 9.4 "Structural Requirements" of the 1997 Ontario Building Code. All other requirements pertaining to the construction of the DuraKit shelter shall conform to the requirements of the 1997 Ontario Building Code as amended, and subject to the following terms and conditions.

A. SPECIFIC TERMS AND CONDITIONS:

1. This authorization is valid only for DuraKit Shelter Inc.
2. This authorization is valid only for this tested model:
 - a. Model name: 16' x 20' Test House Layout, 21 June 2001
Model size: 4.9 m x 6.0 m (16' x 20')
Total number of windows: three (3)
Window size: 600 x 900 mm (24" x 36")
Total number of doors: one (1)
Door size: 800 x 2030 mm (32" x 80")
Window/door configuration: One opening per side
3. The design and general review of the floor wall connection shall be carried out by a Professional Engineer as defined in the Professional Engineers Act, (Ontario). The Professional Engineer shall provide the chief building official with a document certifying that the installation conforms with this authorization.
4. The DuraKit shelter shall not be assembled, installed or located in areas where the ground snow load exceeds 2.25 kPa as per Sentence 2.5.1.1.(1) and Table 2.5.1.1. Column 10. To calculate the roof loading limitations, multiply the ground snow load by 0.8 and add a minimum rain load of 0.4 kPa.
5. The DuraKit shelter shall be assembled and installed as per the "Instant House" Installation Manual dated May 2001.
6. The DuraKit shelter shall be installed and assembled as per the "Instant House" Quality Control Manual dated January 2001.
7. The high strength corrugated fibre board used to construct the DuraKit shelters shall be provided by Norampac.
8. The Norampac high strength fibre board shall be (Grammage is a measurement

of weight in pounds per 1000 sq.ft. of paper) :

- a. Exterior Grammage (lbs) 90 26 69 26 69 26 90
Flute Size A A C
- b. Interior Grammage (lbs) 90 26 69 26 69 26 42/42
10 oz Poly Layer Between the 42/42 Layer
Flute Size A A C
- c. Stud Grammage (lbs) 69 26 69
Flute Size C

- 9. The maximum corrugated fibre board panel size permitted is:
 - a. 1.2 m x 2.4 m for standard wall sections, and
 - b. 520 mm (short leaf) x 600 mm (long leaf) x 2 400 mm for corner sections.
- 10. Sealants used in the installation and assembly of the DuraKit shelter must be Spectrem® 1 Ultra Low Modulus Silicone Joint Sealant conforming to CAN/CGSB-19.13-M87.
- 11. Windows installed in the DuraKit high strength corrugated structural fibreboard shall be:
 - a. limited to one per 1 200 mm panel,
 - b. a minimum dimension of 300 mm from the intersection of the ceiling,
 - c. centred on the 1 200 mm panel, having a minimum of 220 mm from the edge of the 1 200 mm panel.
 - d. incorporate a 38 x 89 mm wood frame, and
 - e. located as per the size and configurations set out in Specific Terms and Conditions # 2 of this authorization.
- 12. Doors installed in the DuraKit high strength corrugated structural fibreboard shall be:
 - a. limited to one per 1 200 mm panel,
 - b. a minimum dimension of 300 mm from the intersection of the ceiling,
 - d. centred on the 1 200 mm panel,
 - e. incorporate a 38 x 89 mm wood frame, and
 - f. located as per the size and configurations set out in Specific Terms and Conditions # 2 of this authorization.
- 13. A 38 x 89 mm wood top plate shall be installed around the perimeter of the panels.
- 14. 38 x 89 mm wood framing members must be installed 1200 mm o.c. at the connection of every 1200 mm panel.
- 15. The Durakit panel joints and the interlocking top and bottom track shall be staggered. The joint cap base shall not be located where two wall panels

intersect along the same plane.

16. Electrical devices such as, but not limited to smoke alarms, outlets, receptacles, switches and fixtures shall be surface mounted on the high strength corrugated structural fibreboard system and be reinforced as required.
17. Additional loads such as, but not limited to shelves, cabinets, and fans which may be located on the walls, roofs and ceilings that the system has not been designed or tested for shall have reinforcements added which comply with the requirements of the 1997 Ontario Building Code as amended.
18. Only DuraKit authorized personnel shall install and assemble the system.
19. Individuals/ installers must have completed the following requirements to be considered DuraKit authorized personnel:
 - a. undergo "On Site" training and supervision sessions from DuraKit authorized personnel,
 - b. successfully install and assemble two complete units, and
 - c. be listed with DuraKit Shelters Inc. as authorized personnel.

B. GENERAL CONDITIONS

1. The use of the DuraKit shelter system must comply with the Building Code Act, 1992 as amended or re-enacted from time to time and except as specifically authorized herein, with the OBC as amended or remade from time to time.
2. A copy of this authorization shall accompany each application for a building permit and shall be maintained on the site of the construction with the building permit.
3. The applicant named in Part 1 hereof shall promptly notify the BMEC of:
 - (a) the failure of the applicant, or of the material, system or building design that is the subject matter of this authorization, to comply with any of the terms and conditions set out in 6. A. above; or
 - (b) the occurrence of any of the events described in Conditions 6. B. 4. below.
4. The BMEC may amend or revoke this authorization where it determines that:
 - (a) any change has been made to:
 - (i) the material, system or building design that is the subject matter of this Authorization;
 - (ii) the address of the applicant specified in Part 1 of this

Authorization; or,

- (iii) the ownership of the applicant specified in Part 1 of this authorization.
- (b) the use of the material, system or building design authorized herein;
 - (i) does not comply with the Building Code Act, 1992 or any relevant legislation as they may be amended or re-enacted from time to time; or
 - (ii) provides an unsatisfactory level of performance, in situ.
- (c) the applicant, or the material, system or building design that is the subject matter of this authorization, has failed to comply with any of the terms and conditions set out in this authorization; or
- (d) any Ontario Building Code provision relevant to this authorization has been amended or remade.

Dated at Toronto on this 26th day of July 2001

BUILDING MATERIALS EVALUATION COMMISSION

per: Rashmi Nathwani, Chairman

