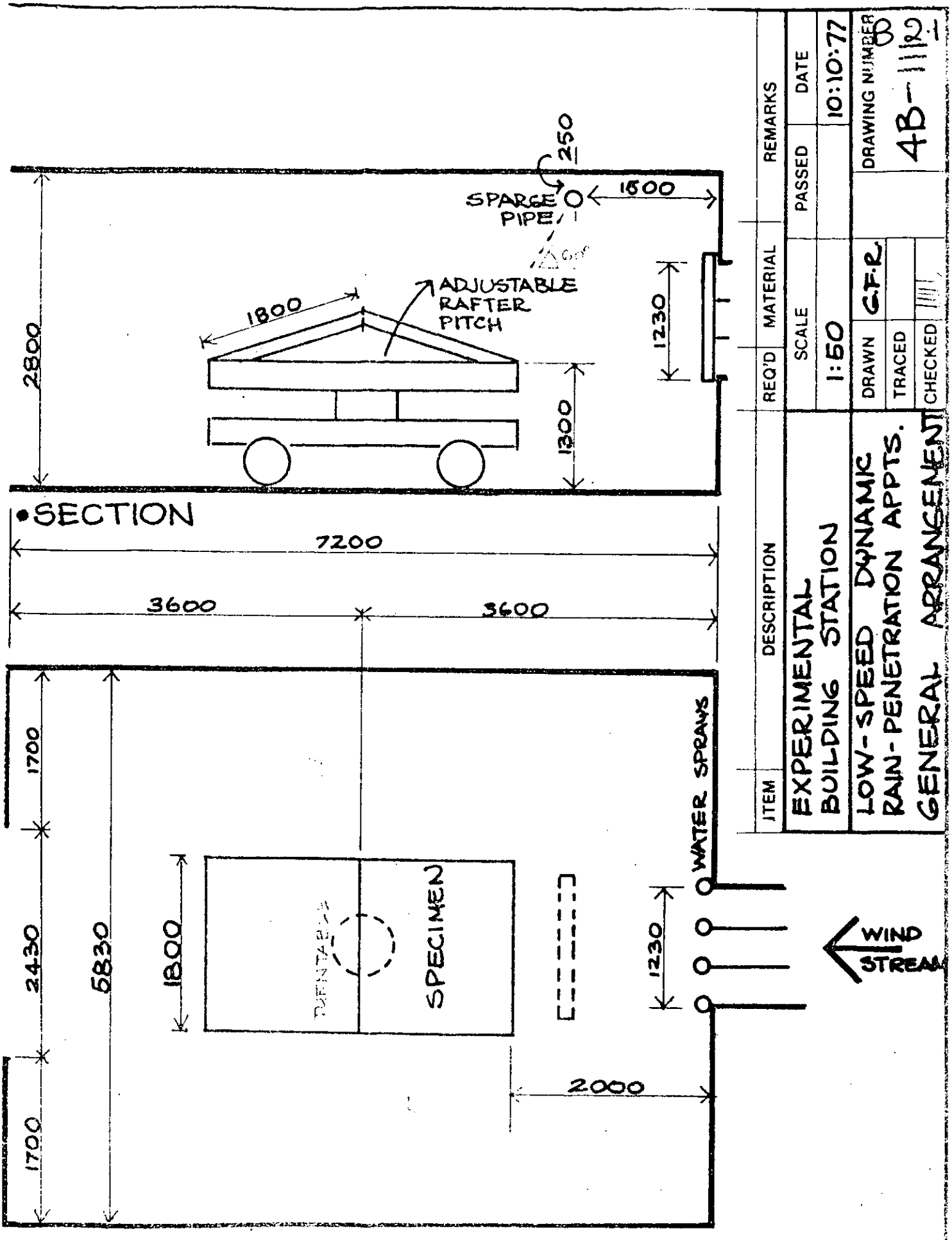
SPONSORED INVESTIGATION No. 1411

In Confidence to the Sponsor

LOW-SPEED DYNAMIC RAIN-PENETRATION TESTS ON DECRABOND LIGHTWEIGHT ROOFING TILES FOR A.H.I. ROOFING OF AUSTRALIA

EXPERIMENTAL BUILDING STATION

DEPARTMENT OF HOUSING AND CONSTRUCTION


250
SPARGE PIPE
1500
ADJUSTABLE RAFTER PITCH
1800
2800
1230
1300
SECTION
7200
3600
3600
1700
2430
5830
1800
SPECIMEN
TURNTABLE
WATER SPRAYS
1230
WIND STREAM
2000
1700
PLAN
NOTE: ALL DIMENSIONS IN MM
ITEM
DESCRIPTION
REQ'D
MATERIAL
REMARKS
SCALE
1:50
PASSED
DATE
10:10:77
DRAWN
G.F.R
TRACED
CHECKED
DRAWING NUMBER
AB-1182
EXPERIMENTAL BUILDING STATION
LOW-SPEED DYNAMIC RAIN-PENETRATION APPTS.
GENERAL ARRANGEMENT

3.03 A model roof is placed in the windstream with its ridge 3600 mm downstream from the discharge orifice. The rafter pitch is adjustable from 45° down to flat, and the attitude of the specimen can be altered by rotating the roof on a turntable.

3.04 The test chamber is 7200 mm long, 5230 mm wide and 2800 mm high. The end of the chamber is freely open to ambient conditions through a set of sliding doors, 2430 mm wide. The chamber and test apparatus are depicted in the attached sketch.

4. PROCEDURE

4.01 The specimen tiles were installed on the model roof in the test chamber and subjected to a simulated wind velocity of 16 m/s. Water was introduced into the windstream to give a measured run-off from the specimen of 0.17 L/s. This is equivalent to a water application rate of 50 mL/s.m^2 of roof area. The conditions were applied for a period of 2 minutes at rafter pitches of 27.5°, 22°, 15° and 9° firstly with the ridge normal to the windstream and secondly with the ridge at 45° to the windstream with the laps facing into the wind.

5. RESULTS

5.01 At 27.5°, 22°, 15° and 9° pitches with the ridge normal to the windstream. No water was observed underneath the roof at any time during the test.

5.02 At 27.5°, 22°, 15° and 9° pitches with the ridge at 45° to the windstream. No water was observed underneath the roof at any time during the test.

Test by

(J.W. Kerkin)
October 1980

$9° = \tan^{-1} 0.1584$
U.S. pitch
1.9 in 12
i.e. approx 1⅞" in 12".

(G.M. Miskin)
for Chief, EBS.

SI No. 1411

LOW-SPEED DYNAMIC RAIN-PENETRATION TESTS ON DECRABOND LIGHTWEIGHT ROOFING TILES MANUFACTURED BY A.H.I. ROOFING AUSTRALIA

1. INTRODUCTION

1.01 On 2nd October 1980, low-speed dynamic rain-penetration tests were carried out on a panel of pressed-metal roofing tiles designed for use in low-rise situations.

2. SPECIMENS

2.01 The specimens consisted of a panel of pressed-metal roofing tiles 1800 mm wide by 1800 mm rafter length. The tiles were laid in straight bond on 50-mm by 25-mm softwood battens spaced at 370 mm centres. Each sheet of seven pressed metal tiles was approximately 1320 mm long by 414 mm wide and fixed with five 50 mm by 2.6 mm galvanised prepainted flat head nails driven through the front edge of the tiles into the edge of the battens, one nail through each end lap and the others through the "ridge" between each second tile. Particular attention was paid to the aligning and seating of each tile prior to fixing, since if the front edges of the tiles become distorted through bad fixing, leakage is likely to occur. The roof was fixed with the full length sheets of tiles on the right-hand side and the straight bonded lapped joints to the left. The top surfaces of the tiles were finished with a stone chip decorative coating.

2.02 Details of the specimen tiles are shown on the attached technical information sheet, a technical supplement dated July 1980 and three detailed drawings showing all relevant sizes and profiles for pressing of tiles by the manufacturers, AHI Roofing Australia. A copy of this report complete with the above sheets and drawings is filed at the Experimental Building Station under the reference SI No. 1411.

3. EQUIPMENT

3.01 The Station's low-speed dynamic rain-penetration test apparatus consists of a 1200-mm-diameter 8-blade fan driven by an 18.65 kW electric motor. The windstream from this fan is discharged into the test chamber via a 1230-mm square duct, 3000 mm long and fitted with flow-straightening vanes at the discharge end.

3.02 Water is introduced into the windstream by two sets of spray nozzles. The first consists of a set of 12 nozzles installed in vertical pipes which are mounted immediately downstream from, and in line with the straightening vanes. This set discharges water horizontally into the windstream. The second consists of a set of 8 nozzles installed in a horizontal sparge pipe mounted 900 mm above the centre of the windstream and 1500 mm downstream from the discharge orifice. It discharges water downwards at an angle of 60° to the horizontal and in the direction of the windstream.