FIRELAB

TITLE	:	Report on the evaluation of the fire propagation properties of **Calcium Silicate Ceiling Tile System** in terms of **SANS 10177 – Part 5** and **Part 10**
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1. INTRODUCTION

The purpose of the investigation was to evaluate the fire propagation properties of a **Calcium Silicate Ceiling Tile Systems** as supplied by **CAPCO**.

The sample delivered had thicknesses of 6 mm and the composition and surface finish was as follows:

- **Sample 1**: Calcium Silicate Board, painted with non-combustible material on front side and water resistant material on back side.

2. TEST PROCEDURES

2.1. SANS 10177 – PART 5: 2012 (COMBUSTIBILITY)

For this evaluation, three 40 x 40 mm specimens per sample type was prepared and in turn placed on a sample holder and lowered into the standard **SANS 10177-5** electrically-heated furnace, which has been pre-set to have a furnace enclosure temperature of 750 °C. The standard test duration is 10 minutes.

The test criteria for non-combustibility are that the specimen should neither increase the furnace enclosure temperature by more than 50 °C nor support flaming continuously for more than 10 seconds during the exposure period. Should either of these criteria not be met, the material will be regarded as combustible at 750 °C.

2.2. SANS 10177 – PART 10 (FLAME SPREAD)

Only **Sample 1** (Description in Section 1) was tested according to **SANS 10177 – Part 10** in the channel tunnel facility shown in Figure 2.2.1. The test installation consisted of 12 ceiling tiles supported along the edge and with tees between the individual tiles.

The fire-spread properties of the ceiling system tested, envisaged for use in buildings, are classified according to Annex C of **SANS 428**, Surface fire properties, also taking in consideration the limitations regarding the use of non-combustible materials described in **SANS 10400-T**.

Temperatures were measured during the investigation with thermocouples located 20 mm below the installation at 1 m centres. The test installation was exposed to the thermal output of three litres of n-hexane, which was placed in the fire source tray. Temperatures were continuously recorded and observations were noted of the behaviour of the material.

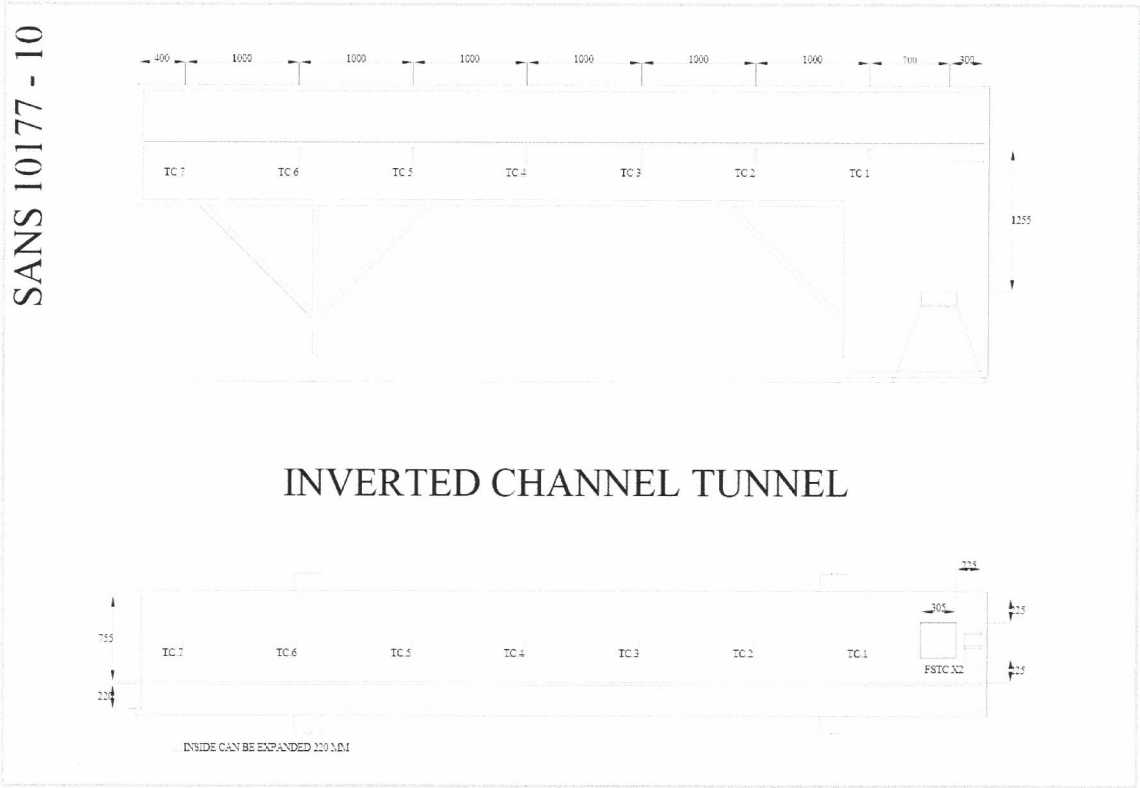

*Figure 2.2.1: Diagram of **SANS 10177 – Part 10** inverted channel testing facility*

Figure 3.2.1: The test installation prior to ignition of the fire source

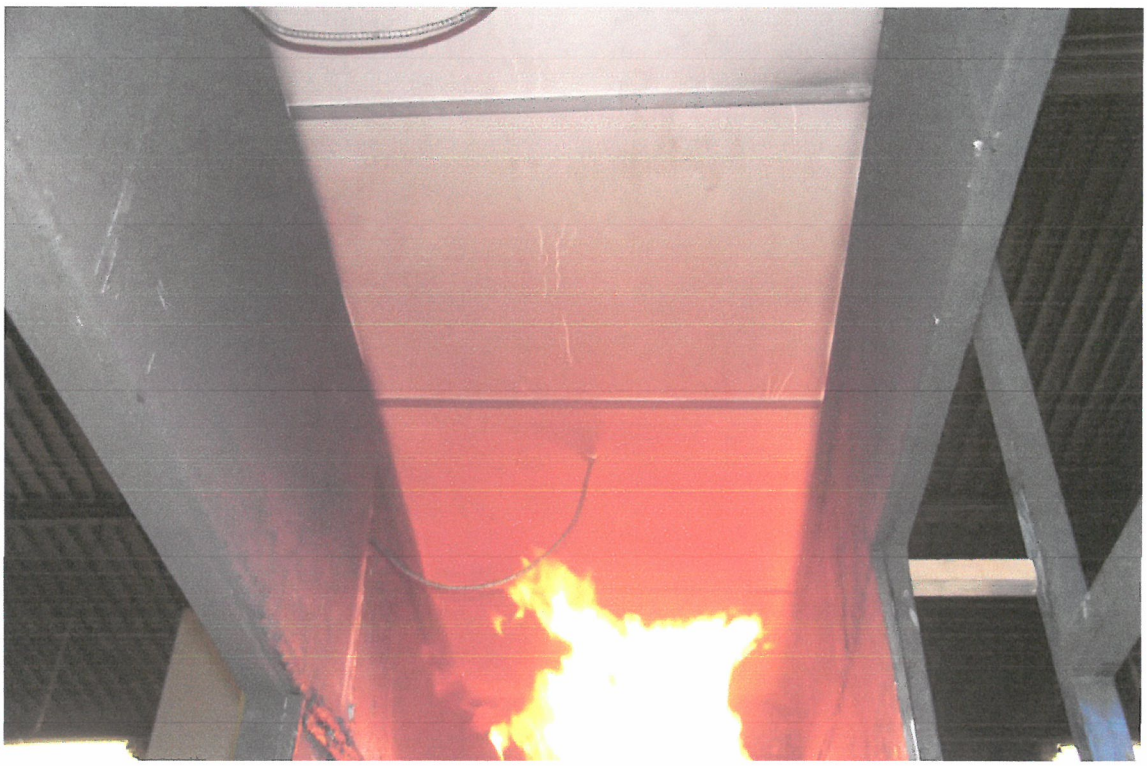

Figure 3.2.2: Cracks visible on the surface coating of the ceiling tiles

Figure 3.2.3: Test installation subsequent to conclusion of test

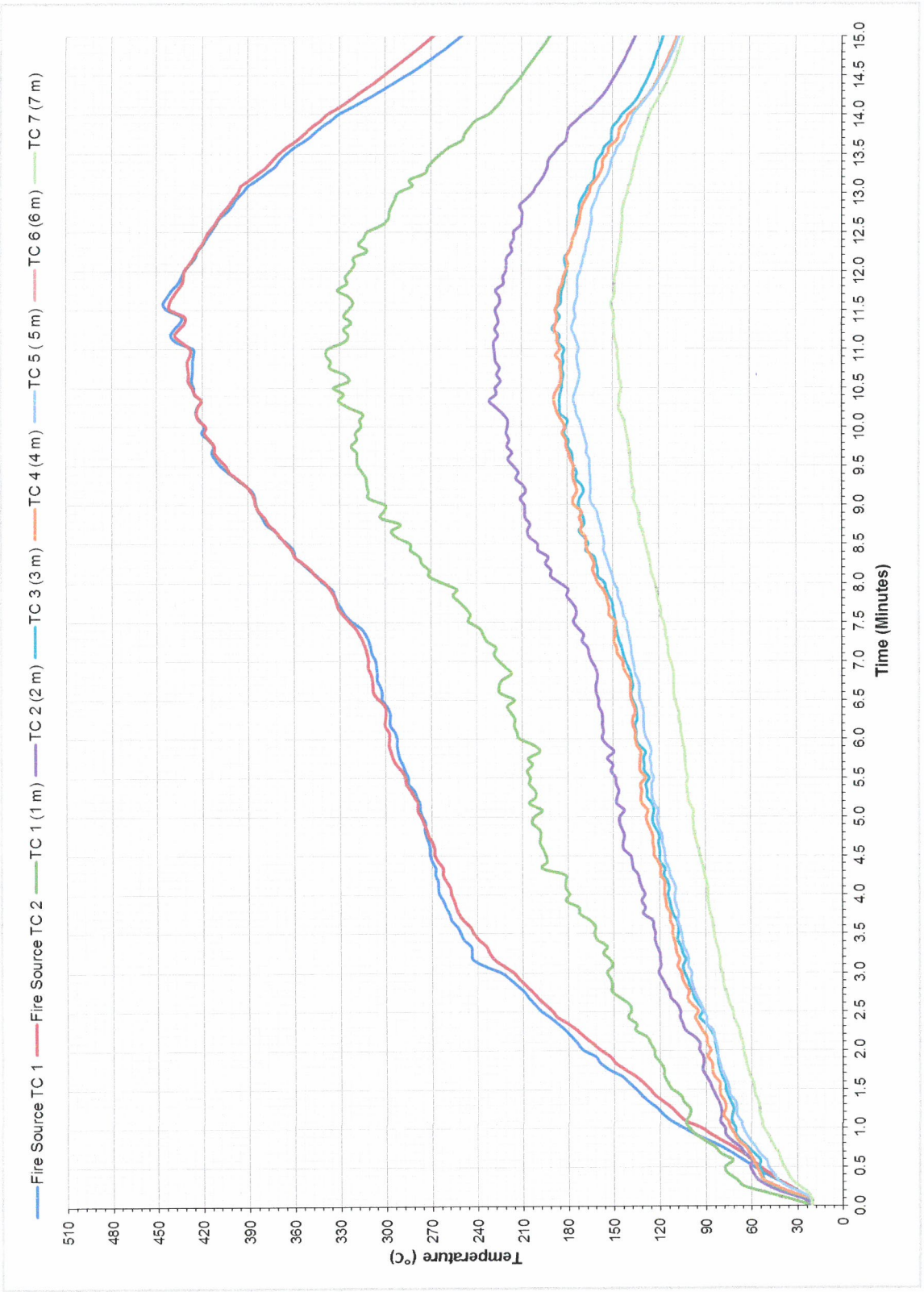

*Figure 3.2.4: Temperatures recorded during the **SANS 10177 – Part 10** test*

4. DISCUSSION OF RESULTS

Sample 1, the Calcium Silicate Board, painted with non-combustible material on the front side and water resistant material on the back side would be classified as non-combustible in terms of the **SANS 10177-5** test, the results from the **SANS 10177-10** test further confirms that the ceiling tiles does not have the propensity to support surface flame spread.

The material as tested did not ignite, nor sporadic or sustained ignition and no flame spread or any burning debris falling to the ground was recorded during the test.

5. CONCLUSIONS

Should the Calcium Silicate Board, painted with non-combustible material on the front side and water resistant material on the back side (**Sample 1**), as supplied by **CAPCO** be used for building applications, the classification would be as follows:

- In accordance with **SANS 10177 – Part 5** the ceiling tiles (**Sample 1**) is classified as non-combustible – **A***
- In accordance with the **SANS 428** protocol the classification awarded to the ceiling tiles (**Sample 1**) as tested is **Class A/ A1/ 1***

The above results does not relate to fire resistance. In instances where fire resistance is a requirement, this property needs to be determined in terms of **SANS 10177-2**.

*Report and classification only valid until July 2018