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| <b>Order number:</b>     | 20663392   |
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| <b>Manufacturer:</b>     | DIRAK GmbH<br>Königsfelder Straße 1<br>58256 Ennepetal<br>GERMANY  |
| <b>Order of:</b>         | 18.07.2016   |
| <b>Content of order:</b> | Test of a vertical division with closures and hinges by the DIRAK GmbH at a small scale furnace acc. to DIN 4102-8 in connection with DIN EN 45545-3 |
| <b>Test methods:</b>     | DIN 4102-8:2003-10<br>DIN EN 45545-3:2013-08   |
| <b>Date of test:</b>     | 18.08.2016   |
| <b>Date of report:</b>   | 16.12.2016   |

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## **1 Fundamentals**

The fire technical test is based upon the following regulations /R/.

- /R1/           DIN EN 13501-2, „Fire classification of construction products and building elements – Part 2: Classification using data from fire resistance tests, excluding ventilation services“, February 2010
- /R2/           DIN EN 1364-1 „Fire resistance tests for non-loadbearing elements – Part 1: Walls“, September 2015
- /R3/           DIN EN 1363-1, „Fire resistance tests – Part 1: General Requirements“, October 2012
- /R4/           DIN 4102-8, “ Fire behaviour of building materials and components - Part 8: Small scale test furnace”, October 2003
- /R5/           DIN EN 45545-3, „Railway applications – Fire protection on railway vehicles – Part 3: Fire resistance requirements for fire barriers“, August 2013

## **2 Description of the tested construction**

### **2.1 Origin of the tested products**

Products: „7-040 Rod Latch FS PrC“ with „7-061 NT Swinghandle FS PrC“ and  
„7-069 Profile-Cylinder“,  
„7-050 Quarter-Turn Pr14.1 L13.5“,  
„7-071 Compression Latch with Spring Loaded Flap“,  
„7-072 Dish Handle PrA“,  
„7-075 Safety Quarter-Turn Pr20.1 L18“,  
„7-078 Compression Latch Pr20.1“,  
„7-079 Compression Latch Pr20.1“,  
„7-080 Quarter-Turn Pr20.1 L18“,  
„7-090 Quarter-Turn with T-Handle Pr20.1 L18“,  
„7-165.01 Concealed Hinge Pr03 120“,  
„7-201 Hinge Pr01 180“,  
„7-202 Hinge Pr01 270“,  
„Compression Latch SW11 LH“,  
„Compression Latch with clip RH signal“

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### **2.2 Description of the tested construction**

For the fire technical examination the division element was mounted in front of the opening of the test furnace acc. to DIN 4102-8 /R4/ and secured. The division element consisted of a steel sheet (540 mm x 600 mm x 4 mm; W x H x T), into which 11 closures were built in. In addition to the closures three hinges were screwed to the steel plate from the unexposed side (see also appendices 1.1 to 1.18).

For the simulation of the contact pressure of the real application the tongues of the closures were equipped with screws, by which a contact pressure responding to reality could be simulated.

„7-040 Rod Latch FS PrC“ with „7-061 NT Swinghandle FS PrC“ and „7-069 Profile-Cylinder“:

On the exposed side the bar lock type „7-040 Rod Latch FS PrC“ was mounted over an installation opening (50 mm x 25 mm) and fixed to the steel sheet by 2 fillister head self-tapping screws type “M4 x 20” made of stainless steel.

Into an installation opening (50 mm x 25 mm; H x W) a swiveling lever type “7-061 NT Swinghandle FS PrC” was placed and screwed to the steel sheet by 2 countersunk-head screws type “M4 x 12” made of stainless steel. The swiveling lever was connected with the bar lock. Into the trough a profile half cylinder type “7-069 Profile-Cylinder” (actuation: square shaft 8 mm) (see also appendices 1.1 to 1.4)

„7-050 Quarter-Turn Pr14.1 L13.5“:

Into an installation opening with a diameter of 16.3 mm a twist lock type “7-050 Quarter-Turn Pr14.1 L13.5” (actuation: square shaft 6 mm; H tongue: 13.5 mm) was mounted from the unexposed side to the steel sheet (see also appendices 1.1 and 1.5).

„7-071 Compression Latch with Spring Loaded Flap“:

Into an installation opening with a diameter of 24.5 mm a twist lock type “7-071 Compression Latch with Spring Loaded Flap” (actuation: square shaft 8 mm) was mounted from the unexposed side to the steel sheet (see also appendices 1.1 and 1.6).

„7-072 Dish Handle PrA“:

Into an installation opening (50 mm x 25 mm) a closure type “7-072 Dish Handle PrA” with O-Rings (IP65) was mounted from the unexposed side to the steel sheet (see also appendices 1.1 and 1.7).

„7-075 Safety Quarter-Turn Pr20.1 L18“:

Into an installation opening with a diameter of 22.5 mm a twist lock type “7-075 Safety Quarter-Turn Pr20.1 L18” (actuation: square shaft 8 mm) was mounted from the unexposed side to the steel sheet (see also appendices 1.1 and 1.8).

„7-078 Compression Latch Pr20.1“:

Into an installation opening with a diameter of 22.5 mm a twist lock type “7-078 Compression Latch Pr20.1” (actuation: square shaft 8 mm) was mounted from the unexposed side to the steel sheet (see also appendices 1.1 and 1.9).

„7-079 Compression Latch Pr20.1“:

Into an installation opening with a diameter of 22.5 mm a twist lock type “7-079 Compression Latch Pr20.1” (actuation: square shaft 8 mm) was mounted from the unexposed side to the steel sheet (see also appendices 1.1 and 1.10).

„7-080 Quarter-Turn Pr20.1 L18“:

Into an installation opening with a diameter of 22.5 mm a twist lock type “7-080 Quarter-Turn Pr20.1 L18” (housing with earthing nut (stainless steel) on one side and flat seal; actuation: square shaft 8 mm) with a tongue length of 45 mm and a tongue height of 18 mm was mounted from the unexposed side to the steel sheet (see also appendices 1.1 and 1.11).

„7-090 Quarter-Turn with T-Handle Pr20.1 L18“:

Into an installation opening with a diameter of 22.5 mm a twist lock type “7- Quarter-Turn with T-Handle Pr20.1 L18” (without lock) was mounted from the unexposed side to the steel sheet (see also appendices 1.1 and 1.12).

„7-165.01 Concealed Hinge“:

A hinge type „7-165.01 Concealed Hinge“ (with threaded bolt M6 and locking disc) was screwed onto the steel sheet from the unexposed side by two threaded bolts type “M6” with locking discs (see also appendices 1.1 and 1.13).

„7-201 Hinge Pr01 180“:

A hinge type „7-201 Hinge Pr01 180“ (design B; 50 mm x 50 mm) was screwed onto the steel sheet from the unexposed side by 4 screws type “M6 x 25” and nuts (see also appendices 1.1 and 1.14).

„7-202 Hinge Pr01 270“:

A hinge type „7-202 Hinge Pr01 270“ (design A; 50 mm x 76 mm x 11.5 mm) was screwed onto the steel sheet from the unexposed side by 4 screws type “M6 x 25” and nuts (see also appendices 1.1 and 1.15).

„Compression Latch SW11 LH“:

Into an installation opening with a diameter of 24.5 mm a twist lock type “Compression Latch SW11 LH” was mounted from the unexposed side to the steel sheet (see also appendices 1.1 and 1.16).

„Compression Latch with clip RH signal“:

Into an installation opening with a diameter of 24.5 mm a twist lock type “Compression Latch with clip RH signal” and “Cam with plug AS and H variable” was mounted from the unexposed side to the steel sheet (see also appendices 1.1, 1.17 and 1.18).

### **3 Test setup and test execution**

#### **3.1 Test setup**

The division construction was heated following DIN EN 1363-1 /R1/.

##### **3.1.1 Arrangement of the furnace thermocouple**

The furnace was heated according to the uniform-temperature-time-curve (UTTTC). For the determination of the furnace temperature one sheath thermocouple was used. The course of the recorded furnace temperature is shown in appendix 2.1

##### **3.1.2 Arrangement of the measuring point for the furnace pressure**

The furnace pressure was run according to DIN 4102-8, paragraph 3.4. The course of the recorded pressure during the fire test is shown in appendix 3.1. Following DIN EN 1363-1 /R3/ a furnace pressure of 10 Pa was set.

#### **3.2 Test execution**

The ordered test was conducted on 18-08-2016 following DIN EN 13501-2 /R1/, DIN EN 1364-1 /R2/ and DIN EN 1363-1 /R3/ on a furnace according to DIN 4102-8 /R4/ and DIN EN 45545-3 /R5/.

The duration of the fire test was 62 minutes and 42 seconds.

Prior to and after the test the operability of the closures (twist locks) was checked.

## **4 Test results and observations**

### **4.1 Observations during the fire test**

The observations made during the fire test are given in appendix 4.1.

### **4.2 Summary of the test results**

The test results are summarized in table 1.

Table 1: Summary of the test results

| <b>Criterion</b>        | <b>Result</b>  |
|-------------------------|--|
| <b>Flaming:</b>         | no flame formation on the unexposed side   |
| <b>Gap gauges:</b>      | the gap gauges were not able to penetrate at any point   |
| <b>Cotton wool pad:</b> | due to the design of the specimen (non-insulated steel sheet) and the resulting heat radiation by the steel sheet in the later test-process the cotton wool pad was not used for the determination of the integrity  |
| <b>Operability:</b>     | The closures (twist locks) were operational prior to and after the test.<br>By the visaul examination of the test objects no cracks, bursts, deformations or other mechanical damage could be observed.<br>Furthermore no autonomous opening of the closures could be observed during the test |



## **5 Conclusion**

The products

**„7-040 Rod Latch FS PrC“ with „7-061 NT Swinghandle FS PrC“ and  
„7-069 Profile-Cylinder“, „7-050 Quarter-Turn Pr14.1 L13.5“,  
„7-071 Compression Latch with Spring Loaded Flap“, „7-072 Dish Handle PrA“,  
„7-075 Safety Quarter-Turn Pr20.1 L18“, „7-078 Compression Latch Pr20.1“,  
„7-079 Compression Latch Pr20.1“, „7-080 Quarter-Turn Pr20.1 L18“,  
„7-090 Quarter-Turn with T-Handle Pr20.1 L18“, „7-165.01 Concealed Hinge Pr03 120°“,  
„7-201 Hinge Pr01 180°“, „7-202 Hinge Pr01 270°“, „Compression Latch SW11 LH“ and  
„Compression Latch with clip RH signal“**

fulfilled the performance criterion

**E60**

with the design described within this test report and shown in the appendices 1.1 to 1.18.

The test results relate to the behaviour of the test specimens of a product under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.

This test report is not a type approval or certification of the products.

Dortmund, 16.12.2016

  
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(Hauschild)

The circular logo of the DMT-Prüflaboratorium für Brandschutz, featuring the DMT logo and the text "DMT-Prüflaboratorium für Brandschutz" around the perimeter.

  
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