



## **Laboratory for Fire Safety**

*Expectation of the fire resistance of a James Jones & Sons wooden floor construction with ROBUS downlights in a plasterboard ceiling*

*Assessment report*

Report number C 2002-2E-RA-001 dated September 3, 2020



## Laboratory for Fire Safety

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*Assessment report*

Client	LED Group
Report number	C 2002-2E-RA-001
Date	September 3, 2020
Reference	JZ/TBr//C 2002-2E-RA-001
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All orders are accepted and executed according to 'De Nieuwe Regeling 2011' (The New Rules)

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mook – zoetermeer – groningen – düsseldorf – dortmund – berlijn – nürnberg – leuven – parijs – lyon

## Table of contents

<b>1 Introduction</b>	<b>4</b>
<b>2 Data used</b>	<b>5</b>
2.1 Standards used	5
2.2 Reports used	5
2.2.1 Test report Peutz Y 2153-3E-RA-001	6
2.2.2 Test report Peutz Y 2248-3E-RA-001	7
2.2.3 Classification report Peutz YA 2153-1E-RA-001	7
2.2.4 Classification report Peutz YA 2248-1E-RA-001	7
<b>3 Description of the assessed construction and requirements</b>	<b>8</b>
3.1 Description of the assessed construction	8
3.2 Requirements	8
<b>4 Assessment</b>	<b>9</b>
4.1 General	9
4.2 Downlights RSF201, RATR0113060, RSF20165, RRA08406, RSF208, RUL0740	9
<b>5 Field of application</b>	<b>10</b>
5.1 Construction element	10
5.2 JJI-Joists	10
5.3 The dimension crosswise to the span direction	10
5.4 Downlights	10
5.5 Boards of the ceiling	11
5.6 Cavity	11
<b>6 In conclusion</b>	<b>12</b>

## 1 Introduction

*LED Group* asked to assess whether a *James Jones & Sons* wooden floor construction with JJI-Joists can achieve a 30 minutes fire resistance when *ROBUS* downlights are added in the plasterboard ceiling.

The assessment is where relevant focused on construction-specific principles and is therefore not valid for situations other than those described in this report.

On behalf of *LED Group* a fire resistance test had previously been performed on *Staircraft* wooden floor construction with TFSi I-joists, chipboard flooring and a plasterboard ceiling included downlights. *LED Group* asked Peutz to determine whether or not it is possible to add the tested *ROBUS* downlights within the *James Jones & Sons* floor constructions. The required fire resistance is REI 30 for the floor construction including different types of downlights.

The present report is mainly drawn up in accordance with EN 15725:2010 'Extended application reports on the fire performance of construction products and building elements'. For the preparation of this report, test reports provided by the client were used. Finally, use was made of the knowledge and experience acquired by Peutz with the performance of fire resistance tests in its own fire safety laboratory in Mook.

This assessment has been drawn up in accordance with the guideline "Requirements for drawing up assessments or collective reports - 2019-03." as can be found on our website (in Dutch).

*This assessment is issued on the basis of test data and information to hand at the time of issue. If contradictory evidence becomes available to the Peutz Laboratory for Fire Safety the assessment will be unconditionally withdrawn and the applicant will be notified in writing. This report is valid for 3 years. At the end of this period, the validity period can be extended if it is demonstrated that the composition of the materials and the construction have not changed, the direct and extended field of application as described in the relevant standards have not been limited and no test results have become available that require adjustment of the conclusions in this report.*

## 2 Data used

### 2.1 Standards used

Preparing this report, the applicable test standard EN 1365-2:2014 and its direct application were used. Regarding wooden floor constructions an Extended Application standard is not available. For wooden beams EAD 130367-00-0304 can be used. EAD 130367-00-0304 only concerns lightweight composite wood-based beams (and columns), which can be used for floor constructions, but the guideline doesn't provide rules for floor constructions. That means in this report EAD 130367-00-0304 is only used for assessing the JJI-Joists in the floor construction itself.

### 2.2 Reports used

Various reports have been made available by the client for the purpose of this assessment, see table 2.1 below.

#### t.2.1 Documents made available

Laboratory	Client	Number and date of the (test) report	Method used
Peutz bv	James Jones & Sons	Test report No Y 2153-3E-RA-001, January 24, 2020	EN 1365-2:2014
Peutz bv	James Jones & Sons	Classification report No YA 2153-1E-RA-001, February 6, 2020	EN 13501-2:2016
Peutz bv	LED Group	Test report No Y 2248-3E-RA-001, July 31, 2020	EN 1365-2:2014
Peutz bv	LED Group	Classification report No YA 2248-1E-RA-001, August 31, 2020	EN 13501-2:2016

The client has confirmed that this are the most recent version of the reports, that they have not been withdrawn and that the aforementioned reports may be used for the present assessment.

A brief description of the reports is given below.

For a complete description of the floor constructions and the incorporated downlights we refer to the test reports as given in table 2.1.

## 2.2.1 Test report Peutz Y 2153-3E-RA-001

This report describes the results of a fire resistance determination carried out on a loadbearing timber floor assembly, constructed as follows:

Dimensions floor joists:	JJI-Joists, 47 mm wide x 235 mm high x 4150 mm span length, exist of two rectangular timber beams 47 mm x 45 mm connected to each other with 9.2 mm thick OSB
Centre-to-centre distance joists:	600 mm
Density of the joists:	520 kg/m <sup>3</sup> (flanges) and 574 kg/m <sup>3</sup> (web)
Loading on the deck:	102 kg/m <sup>2</sup>
Floor boards (deck):	chipboard 22 mm boards 600 mm wide, tongue and groove, nailed 600 mm centres, clout nails Ø2.65 x 65 mm
Ceiling boards:	Gyproc wallboard type A, 15 mm boards, dimensions 1200 mm x 2400 mm, screwed 230 mm centres along all joists, drywall screws Ø3.5 x 42 mm
Summarized test results:	Loadbearing capacity (R): 39 minutes Integrity (E): 39 minutes (due to failing R) Insulation (I): 39 minutes (due to failing R)
Main cause of failure:	The test was discontinued after a period of 39 minutes, all criteria were failed at that moment. After 39 minutes the whole floor assembly collapsed.

## 2.2.2 Test report Peutz Y 2248-3E-RA-001

This report describes the results of a fire resistance determination carried out on a loadbearing timber floor assembly, constructed as follows:

Dimensions floor joists:	TFSi-I-joists, 47 mm wide x 220 mm high x 4150 mm span length, exist of two rectangular timber beams 47 mm x 47 mm connected to each other with 11 mm thick OSB4	
Centre-to-centre distance joists:	600 mm	
Density of the joists:	458 kg/m <sup>3</sup> (flanges) and 620 kg/m <sup>3</sup> (web)	
Loading on the deck:	106 kg/m <sup>2</sup>	
Floor boards (deck):	chipboard 22 mm boards 600 mm wide, tongue and groove, nailed 600 mm centres, gun nails Ø2.8 x 65 mm	
Ceiling boards:	Gyproc wallboard, 12.5 mm boards, dimensions 1200 mm x 2400 mm, screwed 230 mm centres along all joists, drywall screws Ø3.5 x 38 mm	
Downlight types installed:	RSF201	in Ø73 mm opening
	RATR0113060	in Ø70 mm opening
	RSF20165	in Ø76 mm opening
	RRA084060	in Ø70 mm opening
	RSF208	in Ø86 mm opening
	RUL0740	in Ø72 mm opening
Summarized test results:	Loadbearing capacity (R):	39 minutes
	Integrity (E):	39 minutes (due to failing R)
	Insulation (I):	39 minutes (due to failing R)
Main cause of failure:	The test was discontinued after a period of 39 minutes, all criteria were failed at that moment. After 39 minutes the whole floor assembly collapsed.	

## 2.2.3 Classification report Peutz YA 2153-1E-RA-001

This report describes the classification of the floor assembly tested according to test report Y 2153-3E-RA-001.

## 2.2.4 Classification report Peutz YA 2248-1E-RA-001

This report describes the classification of the floor assembly tested according to test report Y 2248-3E-RA-001.

## **3 Description of the assessed construction and requirements**

### **3.1 Description of the assessed construction**

The assessed construction is a wooden floor construction with JJI-Joists, built as in test report Y 2153-3E-RA-001, see chapter 2. Incorporated in the floor construction are ROBUS downlights, those as tested according to the test report Y 2248-3E-RA-001, see chapter 2.

The following downlights can be incorporated in the floor construction:

- RSF20 in Ø73 mm opening
- RATR0113060 in Ø70 mm opening
- RSF20165 in Ø76 mm opening
- RRA084060 in Ø70 mm opening
- RSF208 in Ø86 mm opening
- RUL0740 in Ø72 mm opening

Drawings of the floor constructions are given in Appendix 1 and 2, drawings of the downlights are given in Appendix 3.

### **3.2 Requirements**

The assessed construction requires a fire resistance of REI 30 in line with EN 13501-2:2016.



## 4 Assessment

### 4.1 General

Where relevant, the assessment focuses on construction-specific principles and therefore cannot be used in situations other than those described in this report.

In the tests with the TFSi I-joists (including downlights) a load of  $106 \text{ kg/m}^2$  was used. In the test with JJI-Joists (without downlights incorporated in the ceiling) a load of  $102 \text{ kg/m}^2$  was used. The centre-to-centre distance of the drywall screws in both tests is identical and equals 230 mm. The length of the drywall screws used in the *James Jones & Sons* floor was 42 mm. In the *Staircraft* floor construction the length was shorter, 38 mm. However, the thickness of the gypsum boards used in the *James Jones & Sons* test was greater (15 mm), therefore the 42 mm length of the screws are leading for the field of application.

The considerations in this report are only valid for floor constructions with the same composition as the tested *James Jones & Sons* floor construction and with same field of application as described in the test and classification reports of Peutz. In the following section the application for all tested downlights in the mentioned *James Jones & Sons* floor construction is assessed.

### 4.2 Downlights RSF201, RATR0113060, RSF20165, RRA08406, RSF208, RUL0740

These downlights are tested in a floor construction loaded with  $106 \text{ kg/m}^2$ . This load was 4% more than in the test without downlights incorporated in the ceiling. Both tests achieved an overrun time of 9 minutes. Considering the test report (Peutz Y 2248-3E-RA-001) behaviour of the floor construction during the test is similar as in Peutz test Y 2153. Deflection in both tests was similar and the falling down of gypsum boards pieces occurred in the same minute. In theory the downlights can lead to extra heat above the ceiling due to openings developed by disintegrated downlights. According to the test report Y 2248-3E-RA-001 downlights didn't create an opening before 30 minutes of testing, therefore it is expected that a negative effect on the fire resistance of the *James Jones & Sons* floor construction is negligible.

## 5 Field of application

The field of application is based on the direct field of application in accordance with the classification report YA 2153-1E-RA-001. The field of application of the assessed construction is only valid for constructions similar to that described in the classification report with number YA 2248-1E-RA-001 and that fulfill the description of the assessed construction in chapter 3. Any changes other than those mentioned below are not allowed.

Only downlights as given in Section 3.1 may be incorporated in the *James Jones & Sons* floor constructions as given in the mentioned classification report.

### 5.1 Construction element

The span of the floor construction is in principle limited to a maximum of 4150 mm, but may be increased under certain circumstances as written below.

The spacing of the JJI-Joists may be decreased, or the depth and flange size of the JJI-Joists increased, provided that the maximum moments and shear forces on the JJI-Joists, considering the load applied in practise, are not greater than those tested, when calculated on the same basis in the fire condition.

The maximum load used in the calculations in the unchanged floor construction is 102 kg/m<sup>2</sup> for all downlights.

### 5.2 JJI-Joists

The density of the I-joists shall be at least 520 kg/m<sup>3</sup> for the flanges and 574 kg/m<sup>3</sup> for the web.

### 5.3 The dimension crosswise to the span direction

The dimension perpendicular to the span direction is unlimited provided that the spacing of the JJI-Joists is not greater than 600 mm.

### 5.4 Downlights

The number of downlights incorporated in the gypsum board ceiling is limited by a maximum of 1 downlight per square meter. The centre-to-centre distance between 2 random downlights shall be no less than 600 mm in the direction parallel and perpendicular to the JJI-Joists. The distance between a downlight and a joint of the gypsum board and between a downlight and centre of JJI-Joist shall be at least 200 mm.

## 5.5 Boards of the ceiling

The maximum dimensions of the boards of the ceiling are 2450 x 1250 mm, provided that the number of fixings per square meter remains at least the same as tested. The boards shall be of the type British Gypsum Wallboard, 15 mm, type A. Drywall screws  $\varnothing 3.5 \times 42$  mm shall be used to fix the gypsum boards along all joists with a maximum c.t.c. distance of 230 mm. The diameter of the holes in the gypsum boards needed for the installation of the downlights shall not exceed those mentioned in Section 3.1.

## 5.6 Cavity

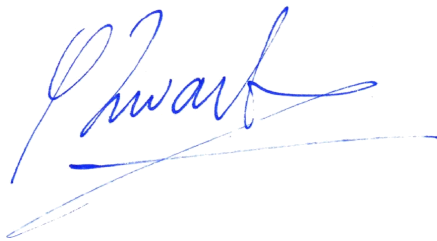
The height of the cavity between the ceiling and the flooring may be increased but with a minimum JJI-Joist height of 235 mm. No extra material may be added to that cavity other than needed for the incorporated downlights.

## 6 In conclusion

Based on Peutz test Y 2248 with downlights in wooden floor constructions with TFSi I-joists, the application of downlights in James Jones & Sons floor constructions is assessed for a fire resistance of REI 30 in line with the classification standard EN 13501-2. The conclusion of this assessment is that all judged downlights in Section 3.1 are permissible in James Jones & Sons floor constructions with an expected fire resistance of at of 30 minutes (REI 30). The associated field of application is described in the next paragraphs.

The fire resistance of the considered modifications to the tested constructions can only be determined with absolute certainty on the basis of a fire resistance test in accordance with the European test standard EN 1365-2:2014. The conclusion of this assessment is that if the floor constructions as described in this report were subject to such tests we would expect a REI 30 fire classification.

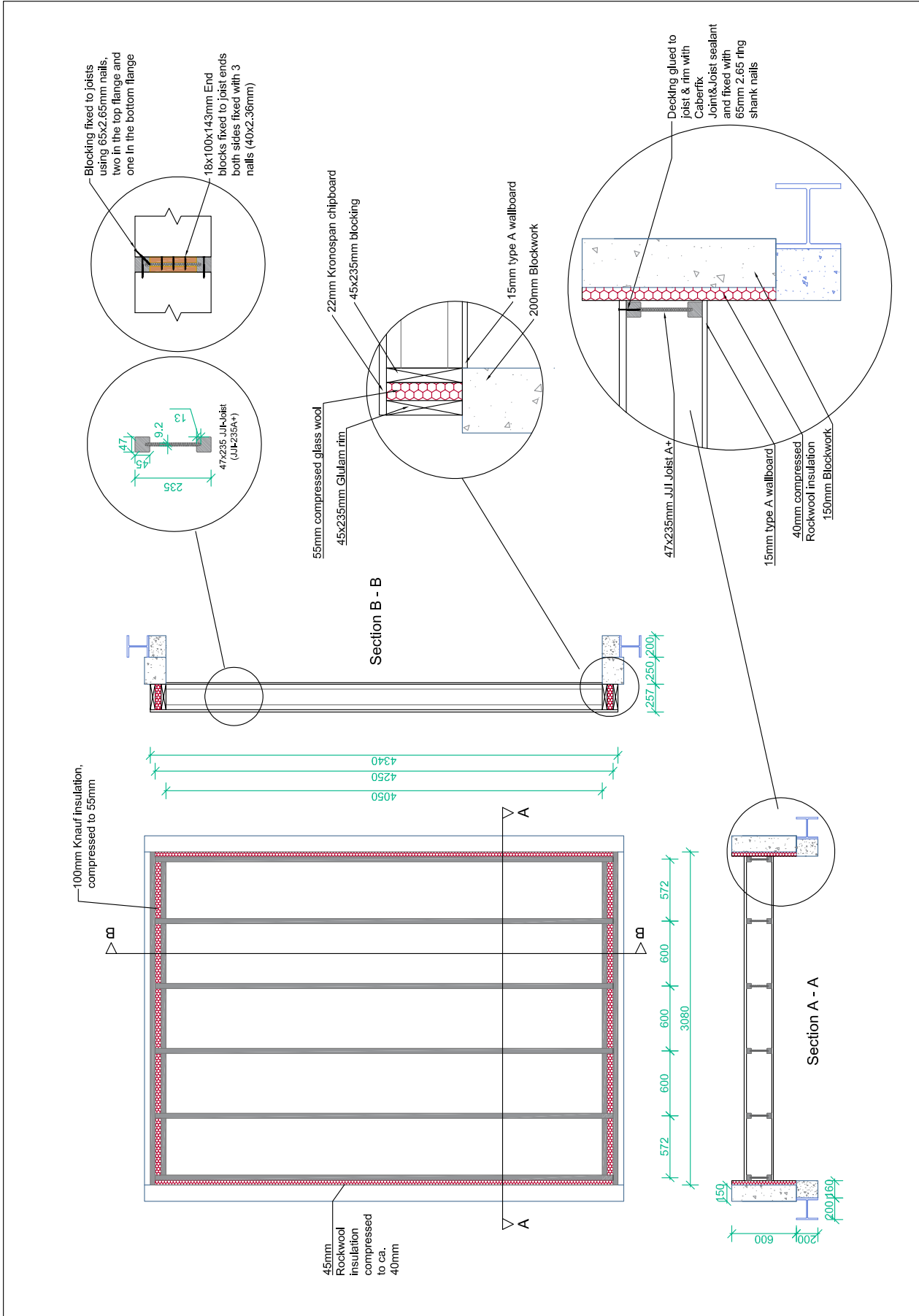
We wish to emphasize that the Peutz Laboratory for Fire Safety has no opinion on whether this assessment will be accepted by the relevant authorities or other third parties in case it is used for a specific project.

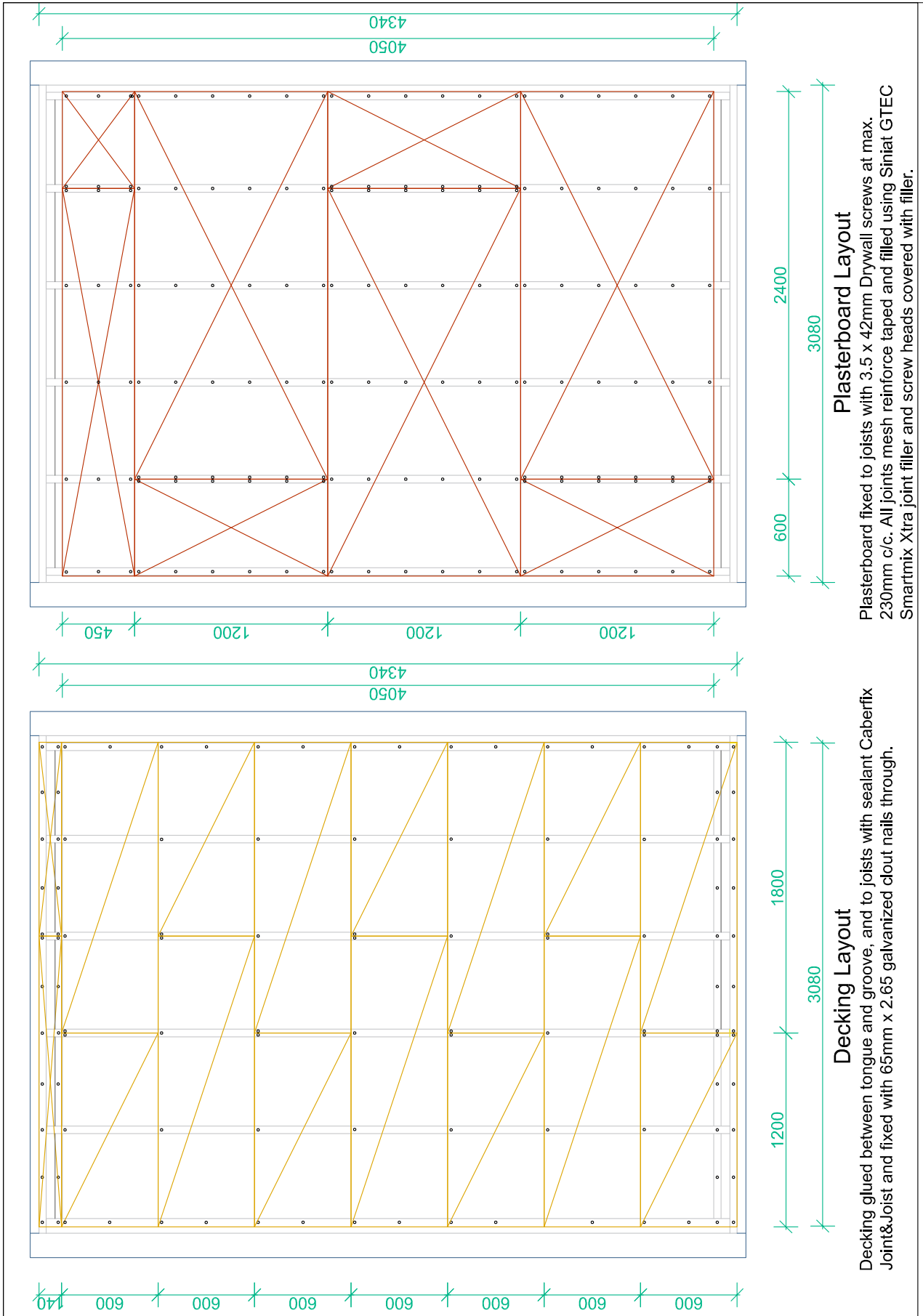


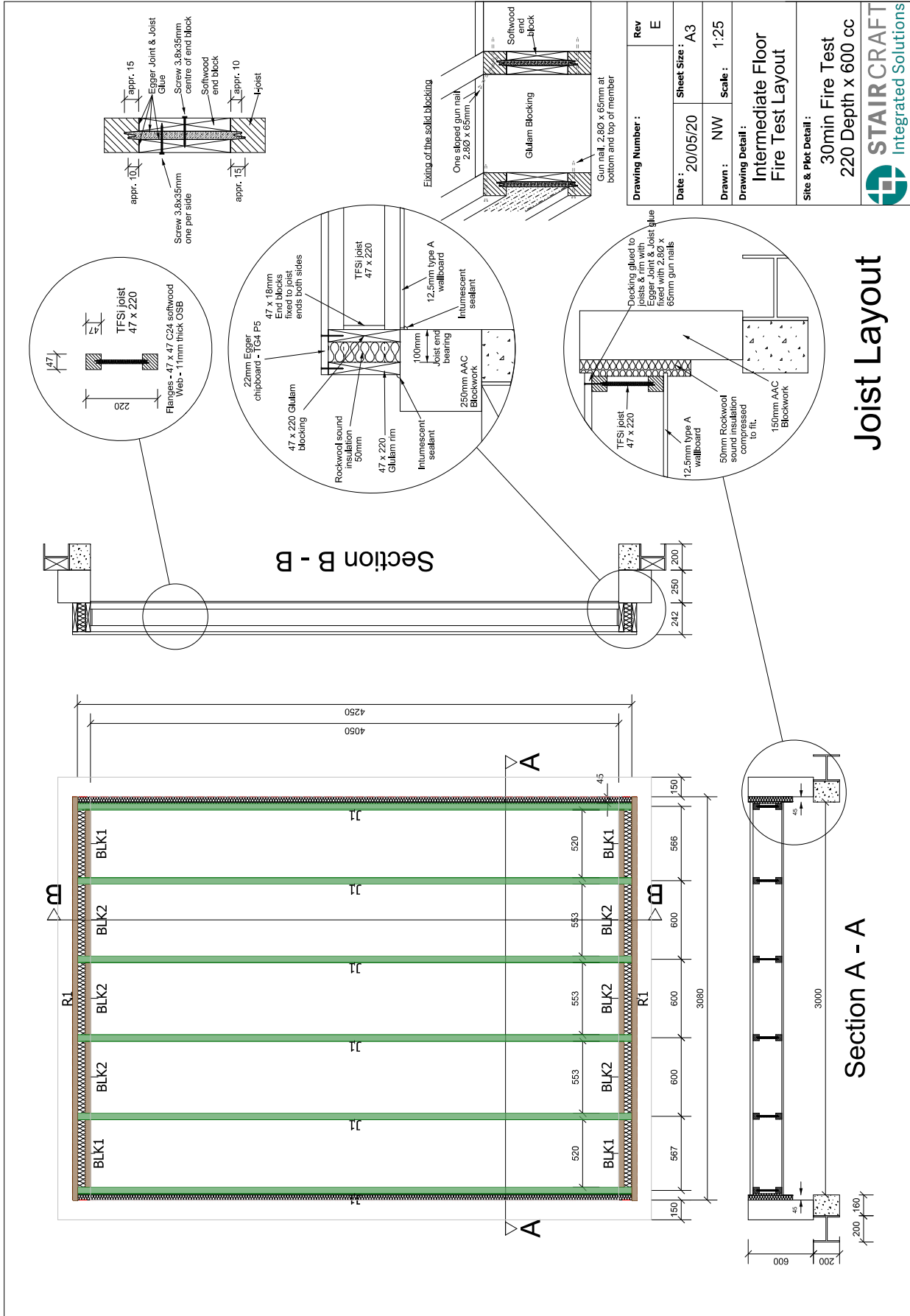
Mook,

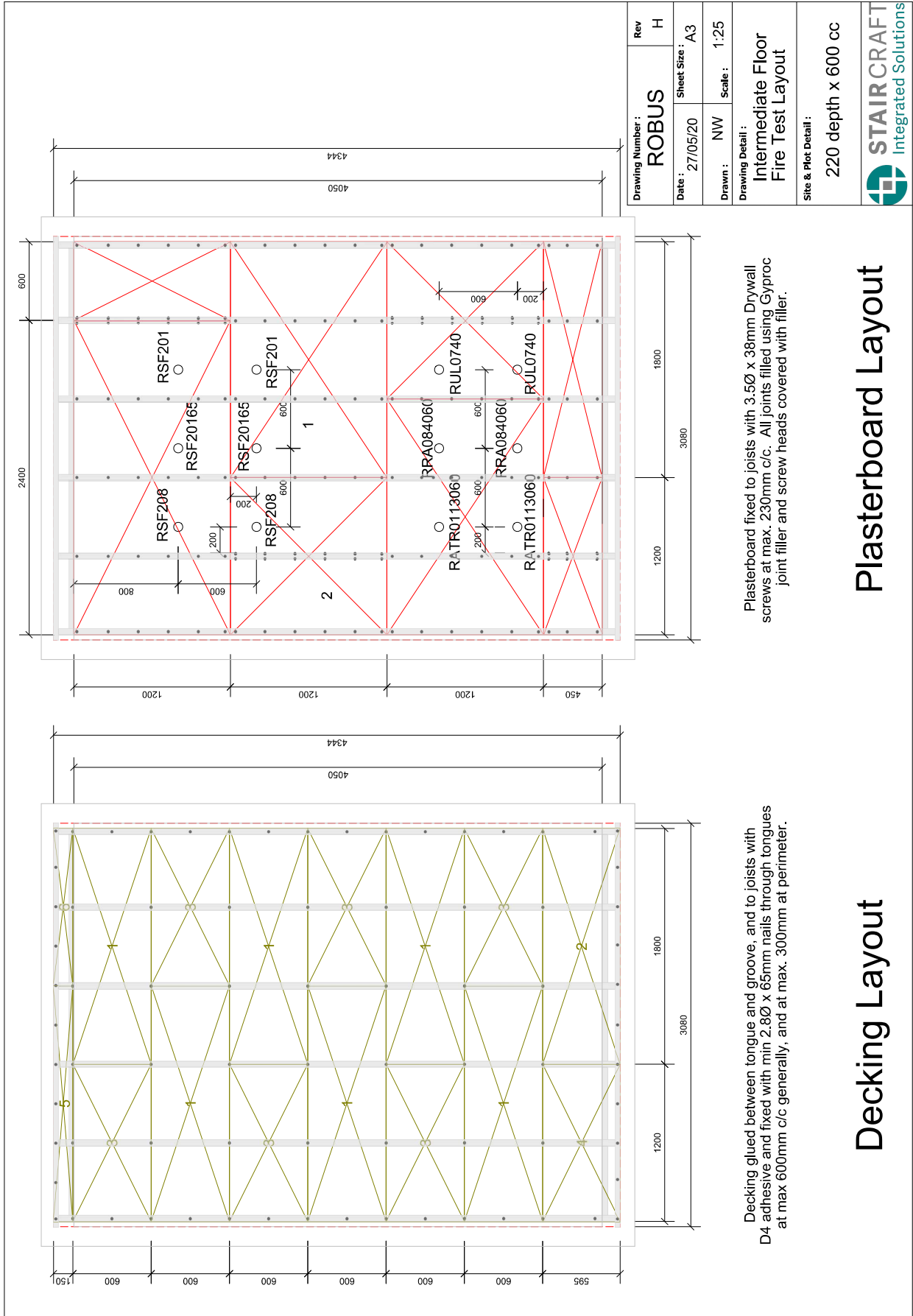
J. Zwart, MSc  
Deputy Head of the Fire Laboratory

This report contains 12 pages and 3 appendices









Drawing Number :	<b>ROBUS</b>	Rev	H
Date :	27/05/20	Sheet Size :	A3
Drawn :	NW	Scale :	1:25
Drawing Detail : <b>Intermediate Floor Fire Test Layout</b>			
Site & Plot Detail : 220 depth x 600 cc			

Plasterboard fixed to joists with 3.5Ø x 38mm Drywall screws at max. 230mm c/c. All joints filled using Gyproc joint filler and screw heads covered with filler.

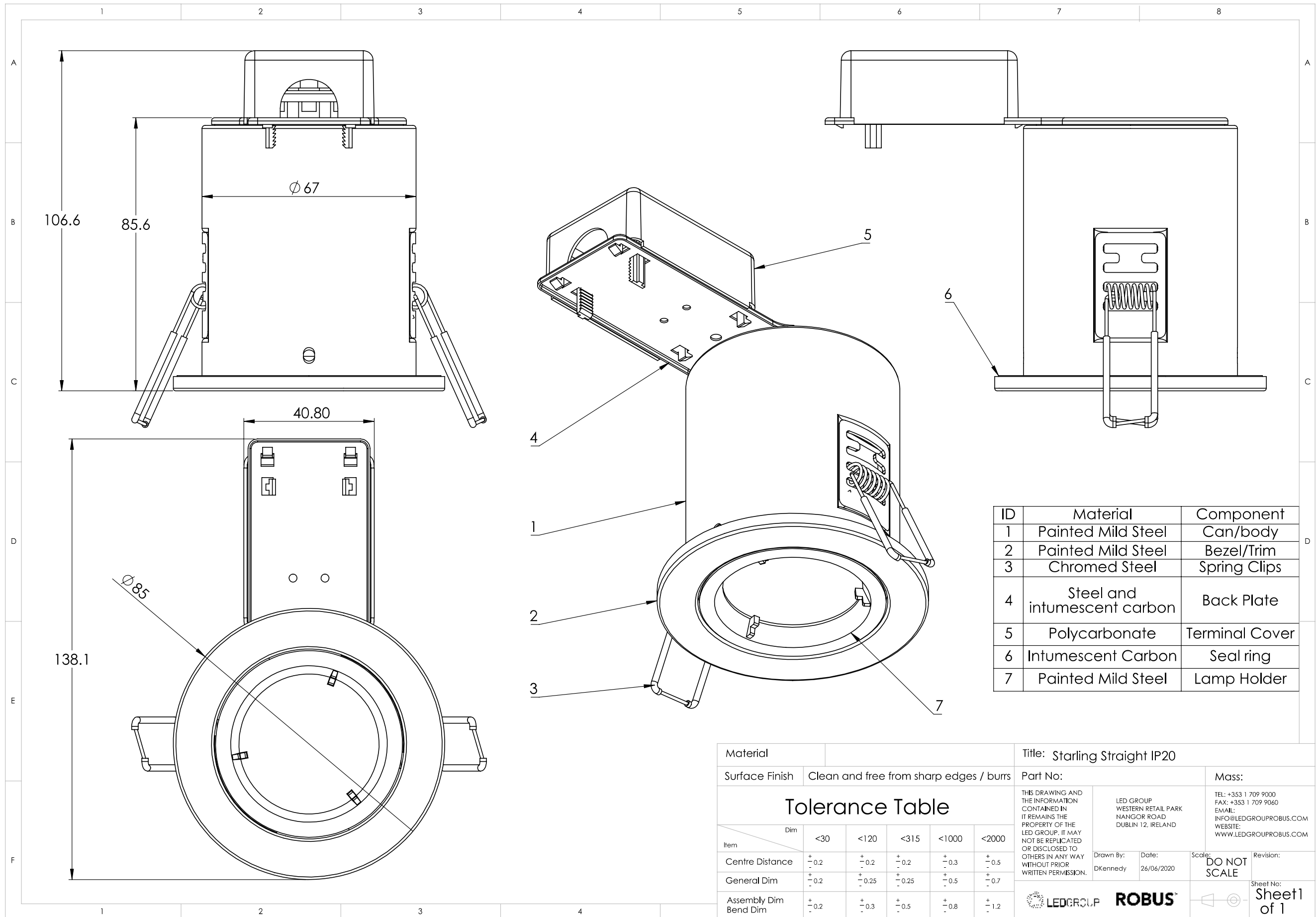
## Plasterboard Layout

Decking glued between tongue and groove, and to joists with D4 adhesive and fixed with min 2.8Ø x 65mm nails through tongues at max 600mm c/c generally, and at max. 300mm at perimeter.

## Decking Layout

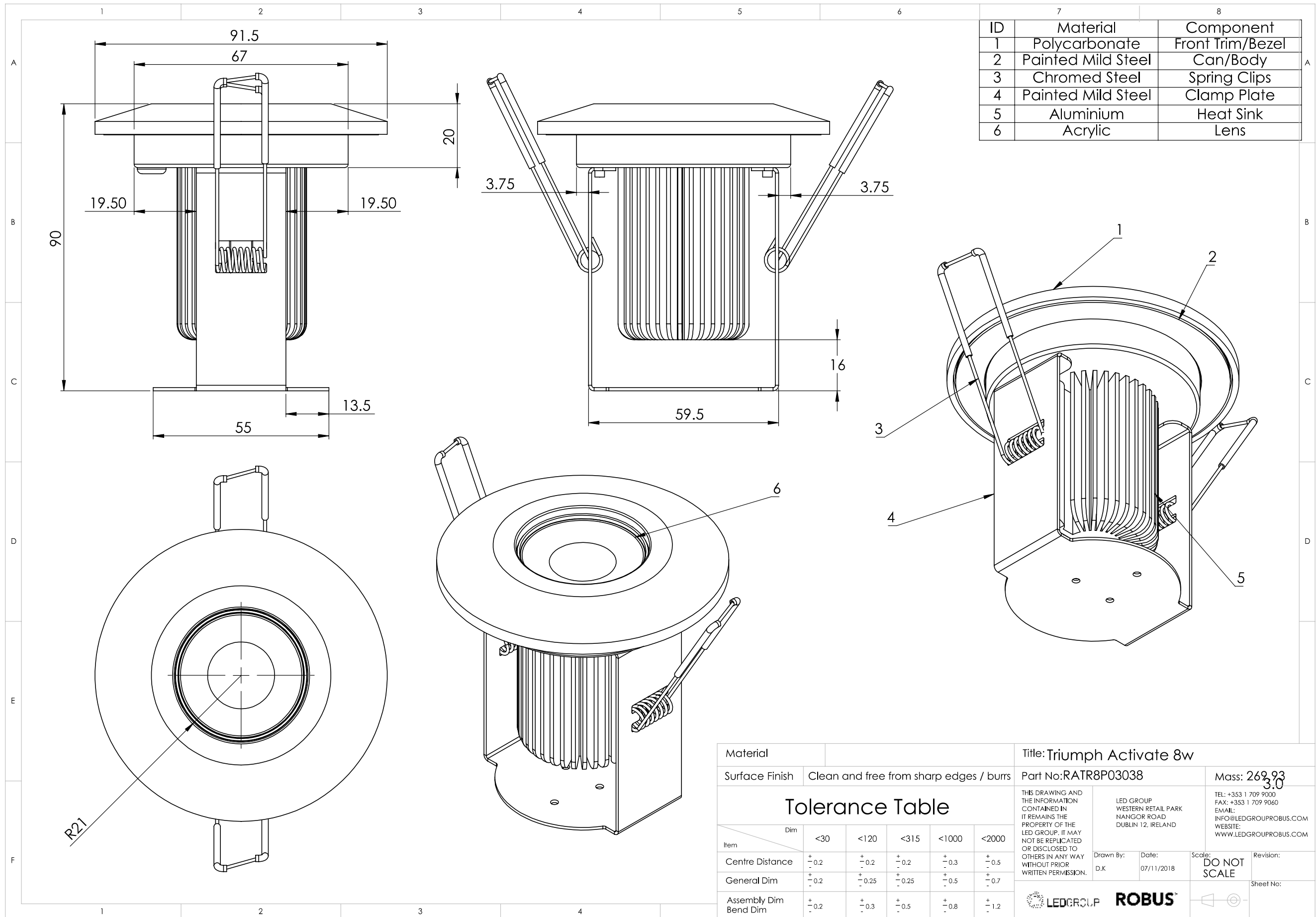


List of downlights										
	ItemCode	ItemName	Width	Depth	Length	Diameter	CutOut	Recessed Depth	Projection	Weight
1	<b>RATR0113060-01 – tested</b>	<b>TRIUMPH ACTIVATE LEDCHROIC 11W LED downlight, IP65, 92mm, White, 3000K, dimmable</b>	na	108		91.5	70	98	10	0.37
2	RATR0114060-01	TRIUMPH ACTIVATE LEDCHROIC 11W LED downlight, IP65, 92mm, White, 4000K, dimmable	na	108		91.5	70	98	10	0.37
3	RATR6P03038-01	TRIUMPH ACTIVATE LEDCHROIC 6W LED downlight, IP65, 92mm, White, 3000K, dimmable	na	63		92	70	53	10	0.27
4	RATR6P04038-01	TRIUMPH ACTIVATE LEDCHROIC 6W LED downlight, IP65, 92mm, White, 4000K, dimmable	na	66	NA	91.5	70	56	10	0.27
5	RATR6P03038NC-01	TRIUMPH ACTIVATE LEDCHROIC 6W LED downlight, IP65, 92mm, White, 3000K, dimmable, no connector	na	63		92	70	53	10	0.27
6	RATR6P04038NC-01	TRIUMPH ACTIVATE LEDCHROIC 6W LED downlight, IP65, 92mm, White, 4000K, dimmable, no connector	na	63		92	70	53	10	0.27
7	RATR8P03038-01	TRIUMPH ACTIVATE LEDCHROIC 8W LED downlight, IP65, 92mm, White, 3000K, dimmable	na	90	NA	91.5	70	80	10	0.32
8	RATR8P03038CE-01	TRIUMPH ACTIVATE 8W Fire Rated Driver On Board COB IP65 Downlight with 38° LEDCHROIC lens, 3000K, w	na	91	NA	91.5	70	80	10	0.34
9	RATR8P03038NC-01	TRIUMPH ACTIVATE 8W Fire Rated Driver On Board COB IP65 Downlight with 38° LEDCHROIC lens, 3000K, S	na	92	NA	91.5	70	80	10	0.34
10	RATR8P04038-01	TRIUMPH ACTIVATE LEDCHROIC 8W LED downlight, IP65, 92mm, White, 4000K, dimmable	na	90	NA	91.5	70	80	10	0.32
11	RATR8P04038CE-01	TRIUMPH ACTIVATE 8W Fire Rated Driver On Board COB IP65 Downlight with 38° LEDCHROIC lens, 4000K, w	na	91	NA	91.5	70	80	10	0.34
12	RATR8P04038NC-01	TRIUMPH ACTIVATE 8W Fire Rated Driver On Board COB IP65 Downlight with 38° LEDCHROIC lens, 4000K, S	na	93	NA	91.5	70	80	10	0.34
13	RRA083060-01	RAMADA 8.5W Fire Rated Downlight 3000K, 60° beam angle, IP65, dimmable, c/w White and B Chrome trim	na	94	NA	86	70	83	10	0.3
14	<b>RRA084060-01 – tested</b>	<b>RAMADA 8.5W Fire Rated Downlight 4000K, 60° beam angle, IP65, dimmable, c/w White and B Chrome trim</b>	na	94	NA	86	70	84	10	0.3
15	<b>RSF201-01 – tested</b>	<b>STARLING 50W mains voltage steel fire rated downlight, IP20, 85mm, White</b>	na	105	NA	85	73	100	5	0.25
16	RSF201-02	STARLING 50W mains voltage steel fire rated downlight, IP20, 85mm, Brass	na	105	NA	85	73	100	5	0.25
17	RSF201-03	STARLING 50W mains voltage steel fire rated downlight, IP20, 85mm, Chrome	na	105	NA	85	73	100	5	0.25
18	RSF201-13	STARLING 50W mains voltage steel fire rated downlight, IP20, 85mm, Br.Chrome	na	105	NA	85	73	100	5	0.25
19	<b>RSF20165-01 – tested</b>	<b>STARLING 50W mains voltage steel fire rated shower downlight, IP65, 91mm, White</b>	na	125	NA	91	76	119	6	0.31
20	RSF20165-01PTC	STARLING 50W mains voltage steel fire rated shower downlight, IP65, 91mm, White c/w push connector	na	125	NA	91	76	119	6	0.31
21	RSF20165-03	STARLING 50W mains voltage steel fire rated shower downlight, IP65, 91mm, Chrome	na	125	NA	91	76	119	6	0.31
22	RSF20165-13	STARLING 50W mains voltage steel fire rated shower downlight, IP65, 91mm, Br.Chrome	na	125	NA	91	76	119	6	0.31
23	RSF201MP-01	ROBUS STARLING Fire Rated 240v Fixed D/L White Pk10	na	105	NA	85	73	100	5	0.25
24	RSF201MP-13	ROBUS STARLING Fire Rated 240v Fixed D/L BR. Chrome Pk10	na	105	NA	85	73	100	5	0.25
25	<b>RSF208-01 – tested</b>	<b>STARLING 50W mains voltage steel fire rated downlight, IP20, 100mm, White, directional (RF208-01)</b>	na	115	NA	100	86	110	5	0.32
26	RSF208-02	STARLING 50W mains voltage steel fire rated downlight, IP20, 100mm, Brass, directional	na	115	NA	100	86	110	5	0.32
27	RSF208-03	STARLING 50W mains voltage steel fire rated downlight, IP20, 100mm, Chrome, directional	na	115	NA	100	86	110	5	0.32
28	RSF208-13	STARLING 50W mains voltage steel fire rated downlight, IP20, 100mm, Br.Chrome, directional	na	115	NA	100	86	110	5	0.32
29	<b>RUL0740-01 – tested</b>	<b>ULTIMUM 7W IP65 Fire Rated Downlight, 4000k, white trim</b>	NA	60	NA	85	72	55	5	0.24
30	RUL0530-01	ULTIMUM 5W IP65 Fire Rated Downlight, 3000k, white trim	NA	60	NA	85	72	55	5	0.24
31	RUL0540-01	ULTIMUM 5W IP65 Fire Rated Downlight, 4000k, white trim	NA	60	NA	85	72	55	5	0.24
32	RUL05X0-01	ULTIMUM 5W IP65 Fire Rated Downlight, colour selectable, white trim	NA	60	NA	85	72	55	5	0.24
33	RUL070WIFI-01	ULTIMUM CONNECT 7W IP65 WIFI Tunable Fire Rated Downlight, white trim	NA	60	NA	85	72	55	5	0.28
34	RUL0730-01	ULTIMUM 7W IP65 Fire Rated Downlight, 3000k, white trim	NA	60	NA	85	72	55	5	0.24
35	RUL0740-01	ULTIMUM 7W IP65 Fire Rated Downlight, 4000k, white trim	NA	60	NA	85	72	55	5	0.24
36	RUL07X0-01	ULTIMUM 7W IP65 Fire Rated Downlight, colour selectable, white trim	NA	60	NA	85	72	55	5	0.24



ID	Material	Component
1	Painted Mild Steel	Can/body
2	Painted Mild Steel	Bezel/Trim
3	Chromed Steel	Spring Clips
4	Steel and intumescent carbon	Back Plate
5	Polycarbonate	Terminal Cover
6	Intumescent Carbon	Seal ring
7	Painted Mild Steel	Lamp Holder

Material		Title: Starling Straight IP20																																
Surface Finish	Clean and free from sharp edges / burrs	Part No:	Mass:																															
<h3>Tolerance Table</h3> <table border="1"> <thead> <tr> <th>Dim</th> <th>&lt;30</th> <th>&lt;120</th> <th>&lt;315</th> <th>&lt;1000</th> <th>&lt;2000</th> </tr> </thead> <tbody> <tr> <td>Centre Distance</td> <td>+0.2</td> <td>+0.2</td> <td>+0.2</td> <td>+0.3</td> <td>+0.5</td> </tr> <tr> <td>General Dim</td> <td>+0.2</td> <td>+0.25</td> <td>+0.25</td> <td>+0.5</td> <td>+0.7</td> </tr> <tr> <td>Assembly Dim</td> <td>+0.2</td> <td>+0.3</td> <td>+0.5</td> <td>+0.8</td> <td>+1.2</td> </tr> <tr> <td>Bend Dim</td> <td>+0.2</td> <td>+0.3</td> <td>+0.5</td> <td>+0.8</td> <td>+1.2</td> </tr> </tbody> </table>		Dim	<30	<120	<315	<1000	<2000	Centre Distance	+0.2	+0.2	+0.2	+0.3	+0.5	General Dim	+0.2	+0.25	+0.25	+0.5	+0.7	Assembly Dim	+0.2	+0.3	+0.5	+0.8	+1.2	Bend Dim	+0.2	+0.3	+0.5	+0.8	+1.2	<p>THIS DRAWING AND THE INFORMATION CONTAINED IN IT REMAINS THE PROPERTY OF THE LED GROUP. IT MAY NOT BE REPLICATED OR DISCLOSED TO OTHERS IN ANY WAY WITHOUT PRIOR WRITTEN PERMISSION.</p>	<p>LED GROUP WESTERN RETAIL PARK NANGOR ROAD DUBLIN 12, IRELAND</p>	<p>TEL: +353 1 709 9000 FAX: +353 1 709 9060 EMAIL: INFO@LEDGROUPROBUS.COM WEBSITE: WWW.LEDGROUPROBUS.COM</p>
		Dim	<30	<120	<315	<1000	<2000																											
Centre Distance	+0.2	+0.2	+0.2	+0.3	+0.5																													
General Dim	+0.2	+0.25	+0.25	+0.5	+0.7																													
Assembly Dim	+0.2	+0.3	+0.5	+0.8	+1.2																													
Bend Dim	+0.2	+0.3	+0.5	+0.8	+1.2																													
Drawn By: DKennedy	Date: 26/06/2020	Scale: <b>DO NOT SCALE</b>	Revision:																															
		Sheet No: <b>Sheet 1 of 1</b>																																



Material		Title: Triumph Activate 8w				
Surface Finish	Clean and free from sharp edges / burrs	Part No:RATR8P03038	Mass: 269.93 3.0			
<b>Tolerance Table</b>						
Item	Dim	<30	<120	<315	<1000	<2000
Centre Distance		+0.2	+0.2	+0.2	+0.3	+0.5
General Dim		+0.2	+0.25	+0.25	+0.5	+0.7
Assembly Dim		+0.2	+0.3	+0.5	+0.8	+1.2
Bend Dim		+0.2	+0.3	+0.5	+0.8	+1.2

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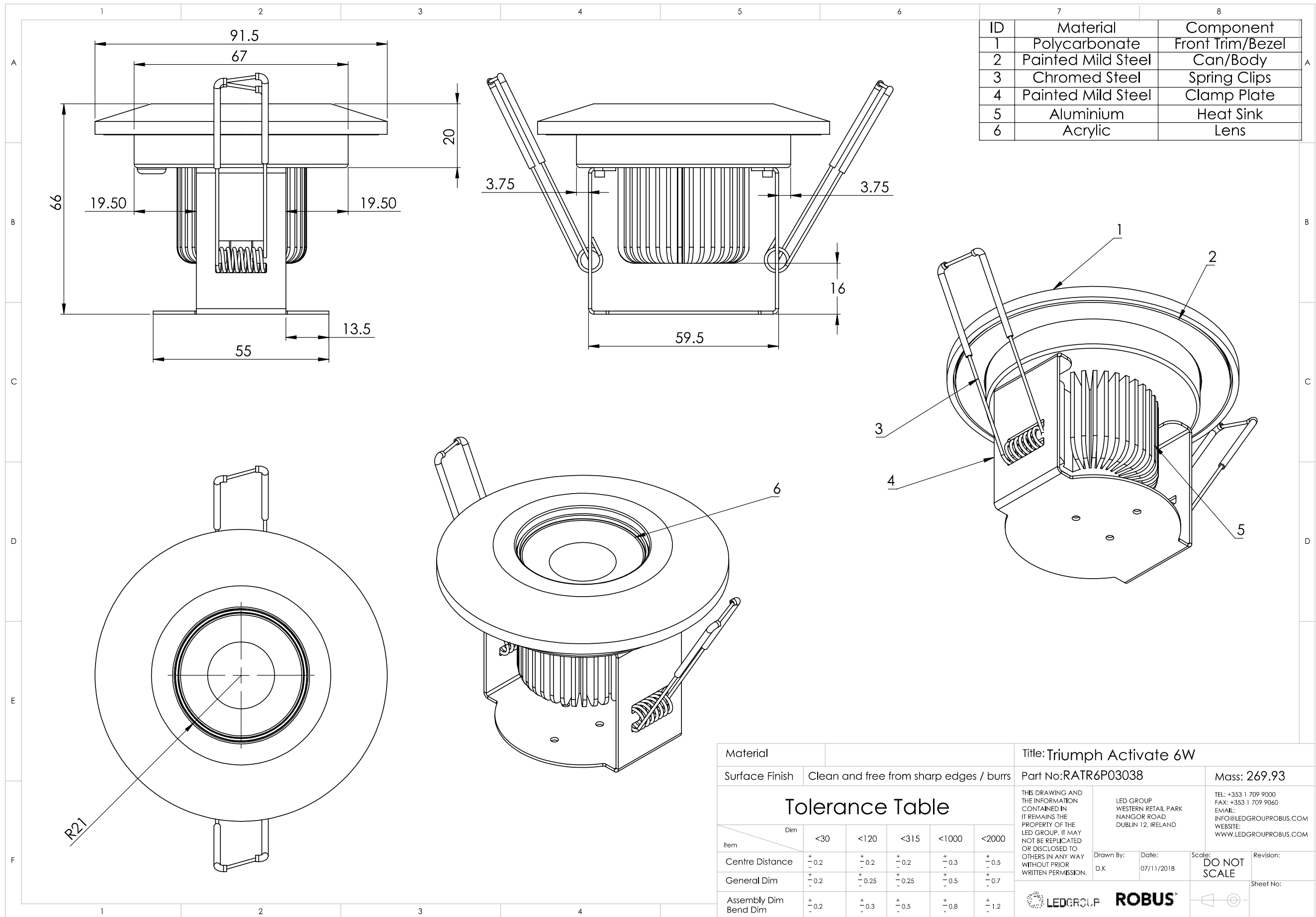
TEL: +353 1 709 9000  
FAX: +353 1 709 9060  
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INFO@LEDGROUPROBUS.COM  
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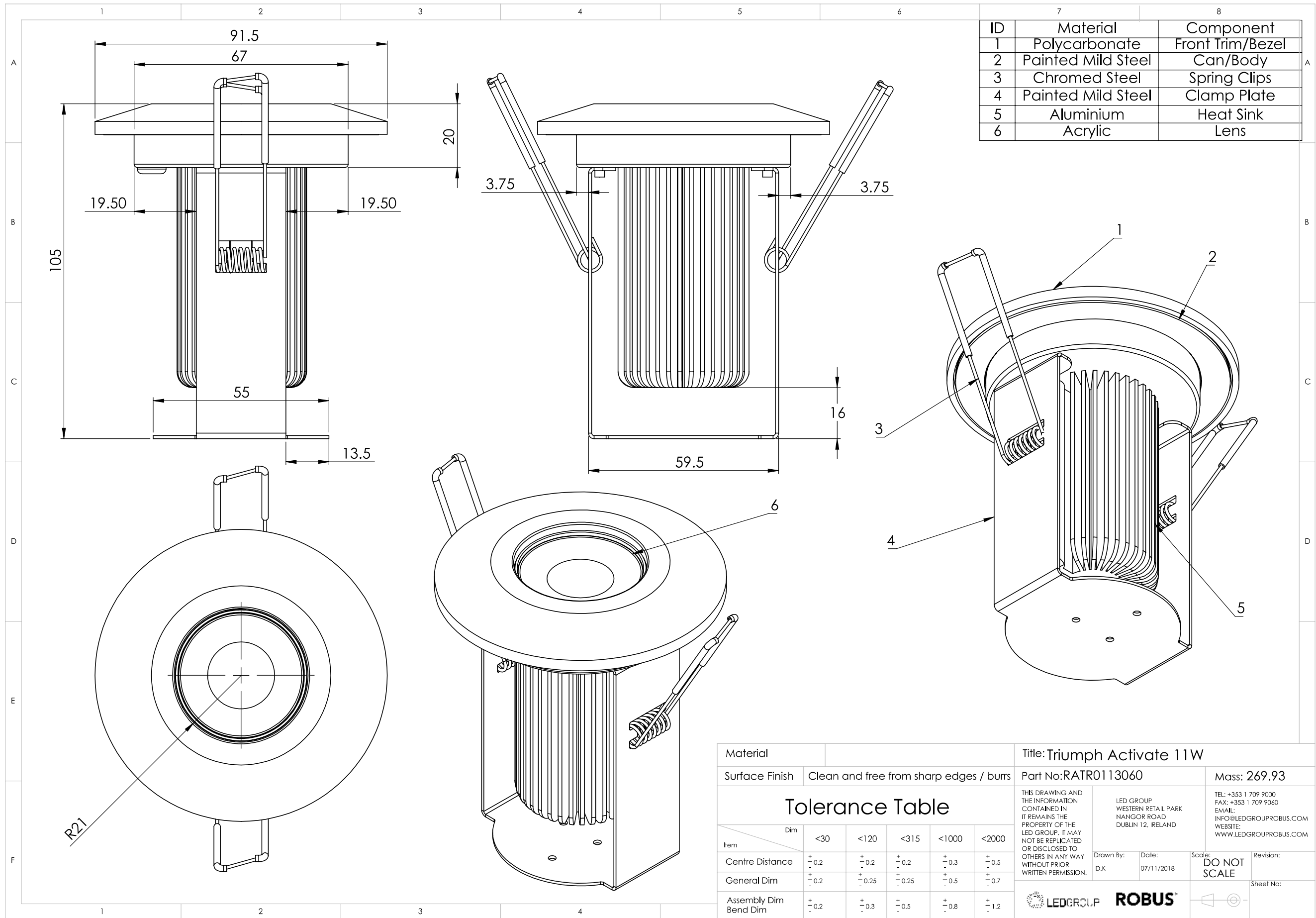
Drawn By: D.K. Date: 07/11/2018

Scale: **DO NOT SCALE**

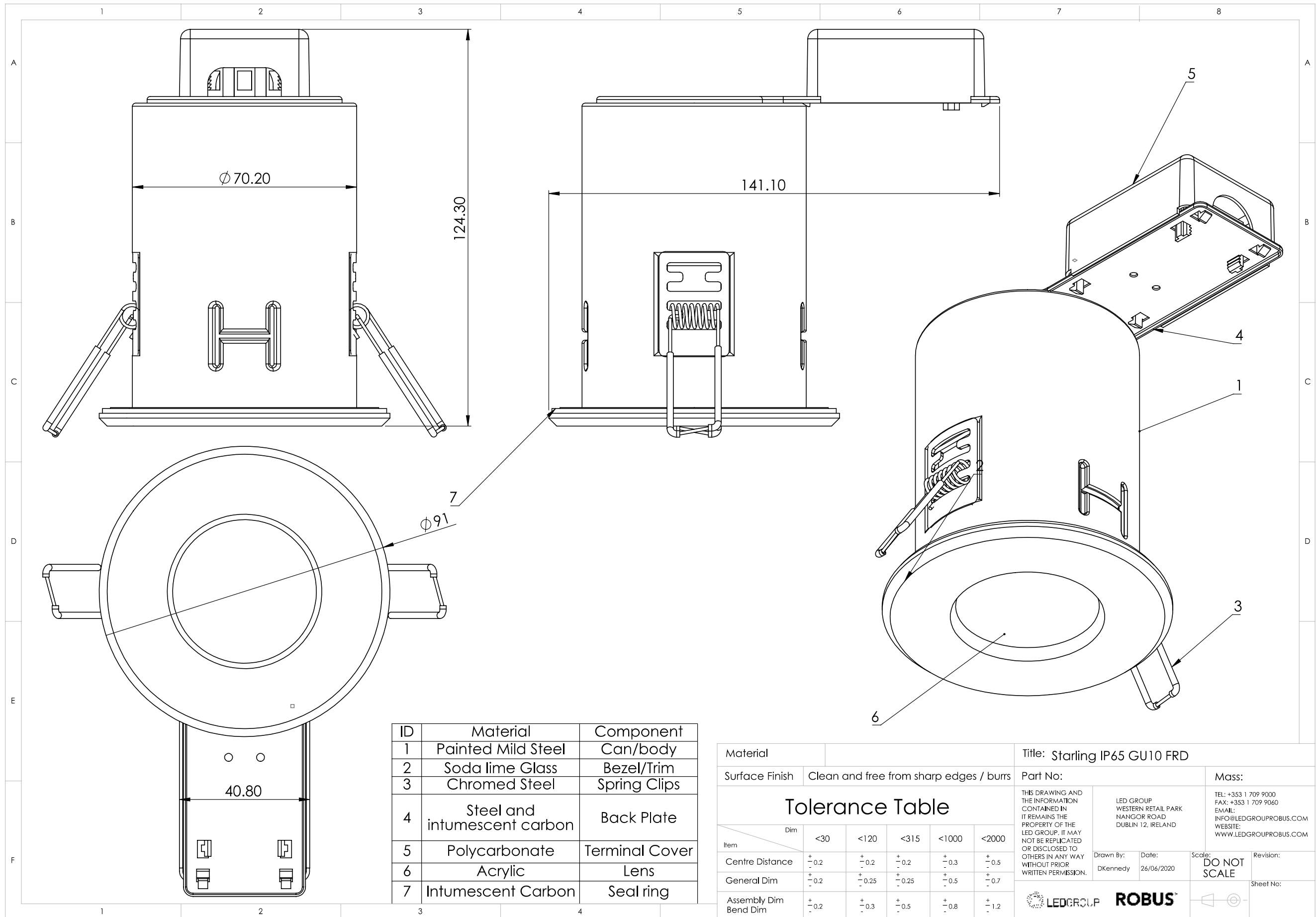
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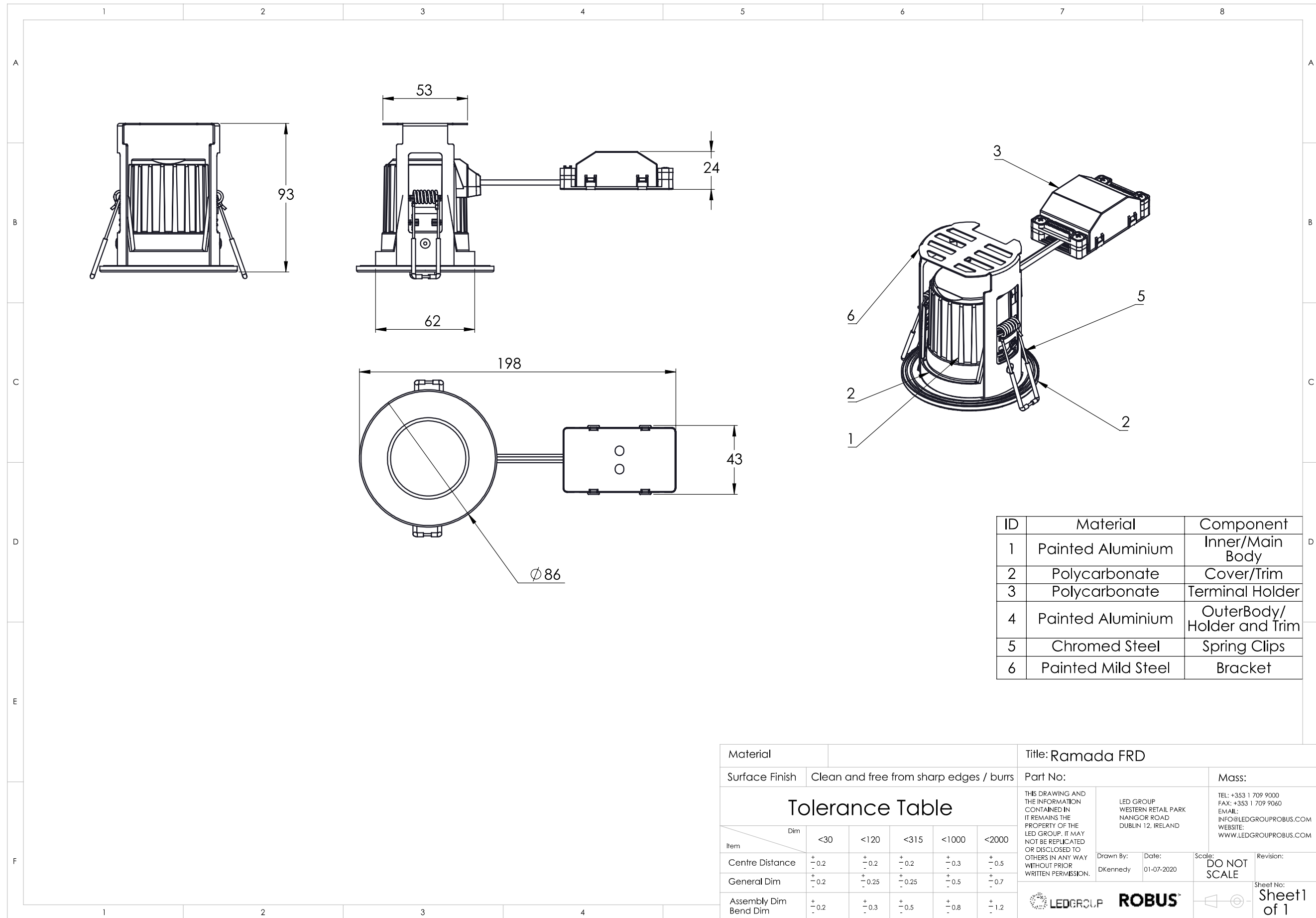
Sheet No:



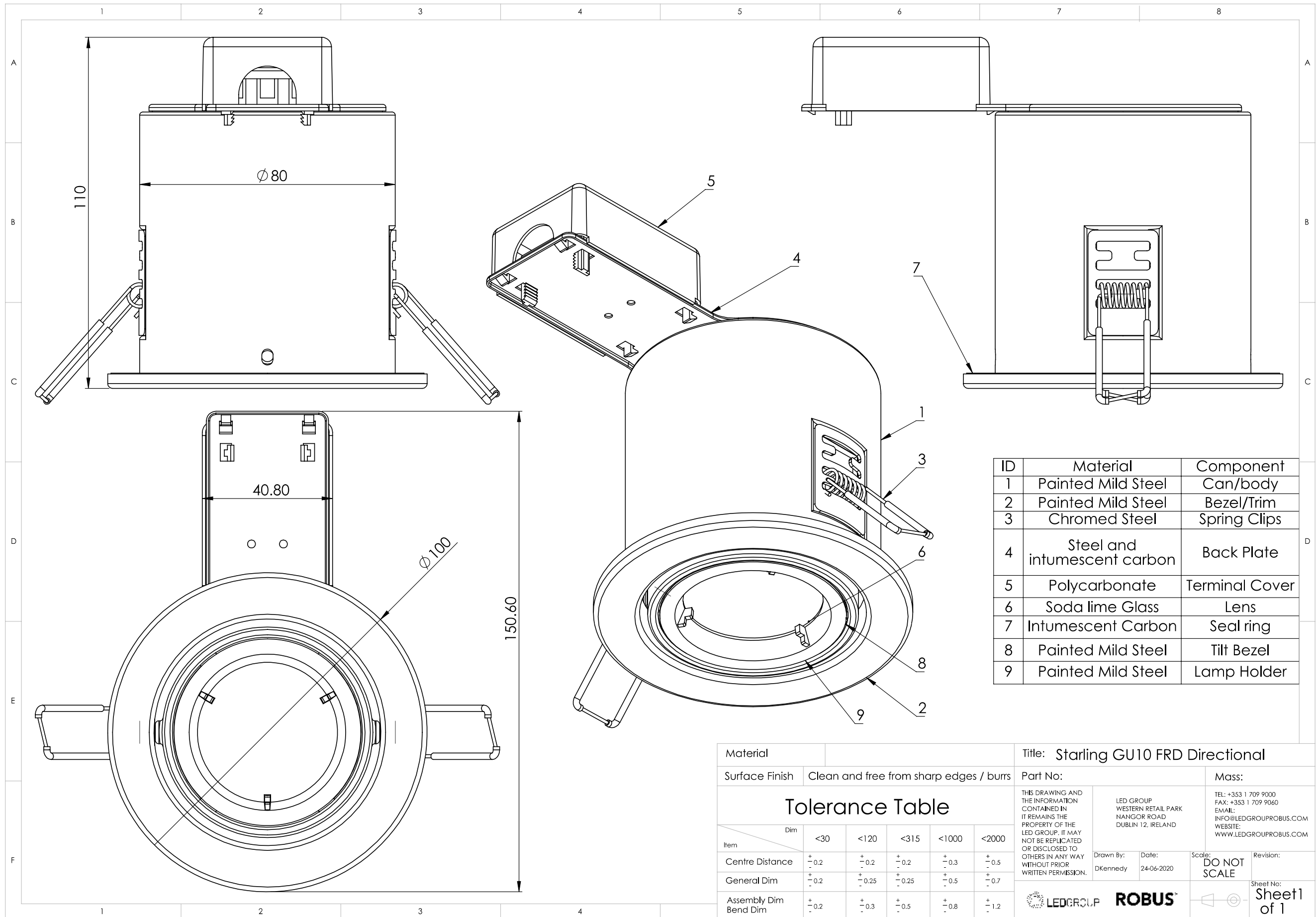








Material		Title: Ramada FRD																										
Surface Finish	Clean and free from sharp edges / burrs	Part No:	Mass:																									
<p style="text-align: center;"><b>Tolerance Table</b></p> <table border="1"> <thead> <tr> <th>Dim</th> <th>&lt;30</th> <th>&lt;120</th> <th>&lt;315</th> <th>&lt;1000</th> <th>&lt;2000</th> </tr> </thead> <tbody> <tr> <td>Centre Distance</td> <td><math>\begin{smallmatrix} + \\ - \end{smallmatrix} 0.2</math></td> <td><math>\begin{smallmatrix} + \\ - \end{smallmatrix} 0.2</math></td> <td><math>\begin{smallmatrix} + \\ - \end{smallmatrix} 0.2</math></td> <td><math>\begin{smallmatrix} + \\ - \end{smallmatrix} 0.3</math></td> <td><math>\begin{smallmatrix} + \\ - \end{smallmatrix} 0.5</math></td> </tr> <tr> <td>General Dim</td> <td><math>\begin{smallmatrix} + \\ - \end{smallmatrix} 0.2</math></td> <td><math>\begin{smallmatrix} + \\ - \end{smallmatrix} 0.25</math></td> <td><math>\begin{smallmatrix} + \\ - \end{smallmatrix} 0.25</math></td> <td><math>\begin{smallmatrix} + \\ - \end{smallmatrix} 0.5</math></td> <td><math>\begin{smallmatrix} + \\ - \end{smallmatrix} 0.7</math></td> </tr> <tr> <td>Assembly Dim</td> <td><math>\begin{smallmatrix} + \\ - \end{smallmatrix} 0.2</math></td> <td><math>\begin{smallmatrix} + \\ - \end{smallmatrix} 0.3</math></td> <td><math>\begin{smallmatrix} + \\ - \end{smallmatrix} 0.5</math></td> <td><math>\begin{smallmatrix} + \\ - \end{smallmatrix} 0.8</math></td> <td><math>\begin{smallmatrix} + \\ - \end{smallmatrix} 1.2</math></td> </tr> </tbody> </table>		Dim	<30	<120	<315	<1000	<2000	Centre Distance	$\begin{smallmatrix} + \\ - \end{smallmatrix} 0.2$	$\begin{smallmatrix} + \\ - \end{smallmatrix} 0.2$	$\begin{smallmatrix} + \\ - \end{smallmatrix} 0.2$	$\begin{smallmatrix} + \\ - \end{smallmatrix} 0.3$	$\begin{smallmatrix} + \\ - \end{smallmatrix} 0.5$	General Dim	$\begin{smallmatrix} + \\ - \end{smallmatrix} 0.2$	$\begin{smallmatrix} + \\ - \end{smallmatrix} 0.25$	$\begin{smallmatrix} + \\ - \end{smallmatrix} 0.25$	$\begin{smallmatrix} + \\ - \end{smallmatrix} 0.5$	$\begin{smallmatrix} + \\ - \end{smallmatrix} 0.7$	Assembly Dim	$\begin{smallmatrix} + \\ - \end{smallmatrix} 0.2$	$\begin{smallmatrix} + \\ - \end{smallmatrix} 0.3$	$\begin{smallmatrix} + \\ - \end{smallmatrix} 0.5$	$\begin{smallmatrix} + \\ - \end{smallmatrix} 0.8$	$\begin{smallmatrix} + \\ - \end{smallmatrix} 1.2$	<p>THIS DRAWING AND THE INFORMATION CONTAINED IN IT REMAINS THE PROPERTY OF THE LED GROUP. IT MAY NOT BE REPLICATED OR DISCLOSED TO OTHERS IN ANY WAY WITHOUT PRIOR WRITTEN PERMISSION.</p>	<p>LED GROUP WESTERN RETAIL PARK NANGOR ROAD DUBLIN 12, IRELAND</p>	<p>TEL: +353 1 709 9000 FAX: +353 1 709 9060 EMAIL: INFO@LEDGROUPROBUS.COM WEBSITE: WWW.LEDGROUPROBUS.COM</p>
		Dim	<30	<120	<315	<1000	<2000																					
Centre Distance	$\begin{smallmatrix} + \\ - \end{smallmatrix} 0.2$	$\begin{smallmatrix} + \\ - \end{smallmatrix} 0.2$	$\begin{smallmatrix} + \\ - \end{smallmatrix} 0.2$	$\begin{smallmatrix} + \\ - \end{smallmatrix} 0.3$	$\begin{smallmatrix} + \\ - \end{smallmatrix} 0.5$																							
General Dim	$\begin{smallmatrix} + \\ - \end{smallmatrix} 0.2$	$\begin{smallmatrix} + \\ - \end{smallmatrix} 0.25$	$\begin{smallmatrix} + \\ - \end{smallmatrix} 0.25$	$\begin{smallmatrix} + \\ - \end{smallmatrix} 0.5$	$\begin{smallmatrix} + \\ - \end{smallmatrix} 0.7$																							
Assembly Dim	$\begin{smallmatrix} + \\ - \end{smallmatrix} 0.2$	$\begin{smallmatrix} + \\ - \end{smallmatrix} 0.3$	$\begin{smallmatrix} + \\ - \end{smallmatrix} 0.5$	$\begin{smallmatrix} + \\ - \end{smallmatrix} 0.8$	$\begin{smallmatrix} + \\ - \end{smallmatrix} 1.2$																							
		Drawn By: DKennedy	Date: 01-07-2020	Scale: <b>DO NOT SCALE</b>	Revision:																							
				Sheet No: <b>Sheet 1 of 1</b>																								



Material		Title: Stirling GU10 FRD Directional			
Surface Finish	Clean and free from sharp edges / burrs	Part No:	Mass:		
<b>Tolerance Table</b>					
Dim	<30	<120	<315	<1000	<2000
Item					
Centre Distance	+0.2	+0.2	+0.2	+0.3	+0.5
General Dim	+0.2	+0.25	+0.25	+0.5	+0.7
Assembly Dim	+0.2	+0.3	+0.5	+0.8	+1.2
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Drawn By: DKennedy

Date: 24-06-2020

Scale: **DO NOT SCALE**

Revision:

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**Sheet1 of 1**





