

## Non-Metallic Systems

### FL45 – 45° Elbow Connector Panel Mount Swivel with Seal

#### Technical Characteristics

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                             |                                                                                                                     |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Conforms to                        | BSI Kitemark KM-35161<br>Low voltage directive<br>Lloyd's Register of Shipping (Type Approval)<br>NFF 16-10/12 I4,F2<br>UL1696 Recognition (Dry Indoor locations only)                                                                                                                                                                                                                                                              |                                                                                             |                                                                                                                     |
| Approvals and Standards            | <div></div> |                                                                                             |                                                                                                                     |
| Degree of mechanical protection    | High impact resistance                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                             |                                                                                                                     |
| Degree of protection               | IP66 - As standard<br>IP67 - When fitted with ALS Seal<br>IP68 - When fitted with ALS Seal (1.1 Bar 35 mins)<br>IP69k - When fitted with ALS Seal                                                                                                                                                                                                                                                                                   |                                                                                             | <div>ALS Seal</div> <div></div> |
| UV protection                      | Very High                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                             |                                                                                                                     |
| Fitting Characteristics            | <div></div>                                                                                                                                                                                                                                                                                                                                      | 45° Swivel flange with integral face seal<br>Black (BL) as standard or Grey (GR) - RAL 7031 |                                                                                                                     |
| Application                        | Flanged fittings for bulk head or panel mounting sealing with integral face seal                                                                                                                                                                                                                                                                                                                                                    |                                                                                             |                                                                                                                     |
| Normal operating temperature range | Application                                                                                                                                                                                                                                                                                                                                                                                                                         | Min Temp                                                                                    | Max Temp                                                                                                            |
|                                    | Static                                                                                                                                                                                                                                                                                                                                                                                                                              | - 50°C                                                                                      | +120°C                                                                                                              |
|                                    | Dynamic                                                                                                                                                                                                                                                                                                                                                                                                                             | - 45°C                                                                                      | +120 °C                                                                                                             |
| For use with - Conduit Series      | Light, Standard and Heavyweight variants of <a href="#">PA</a> , <a href="#">PI</a> , <a href="#">CP</a> , <a href="#">PR</a> , <a href="#">PADL</a> & <a href="#">PF</a>                                                                                                                                                                                                                                                           |                                                                                             |                                                                                                                     |
| Fire performance                   | Test Standard                                                                                                                                                                                                                                                                                                                                                                                                                       | Performance Rating                                                                          |                                                                                                                     |
|                                    | BS EN 61386-1 & 23                                                                                                                                                                                                                                                                                                                                                                                                                  | Approved                                                                                    |                                                                                                                     |
|                                    | NFF16-101                                                                                                                                                                                                                                                                                                                                                                                                                           | I4 F2                                                                                       |                                                                                                                     |
|                                    | ISO 4589-2                                                                                                                                                                                                                                                                                                                                                                                                                          | 24%                                                                                         |                                                                                                                     |
|                                    | BS EN 60695-2-11                                                                                                                                                                                                                                                                                                                                                                                                                    | 850°C                                                                                       |                                                                                                                     |
|                                    | UL94                                                                                                                                                                                                                                                                                                                                                                                                                                | V2                                                                                          |                                                                                                                     |
| Testing data                       | Click or See pages <a href="#">3</a> & <a href="#">4</a>                                                                                                                                                                                                                                                                                                                                                                            |                                                                                             |                                                                                                                     |
| Type of material                   | Polyamide (Nylon) 66 Body - NBR Face Seal                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                             |                                                                                                                     |

Image

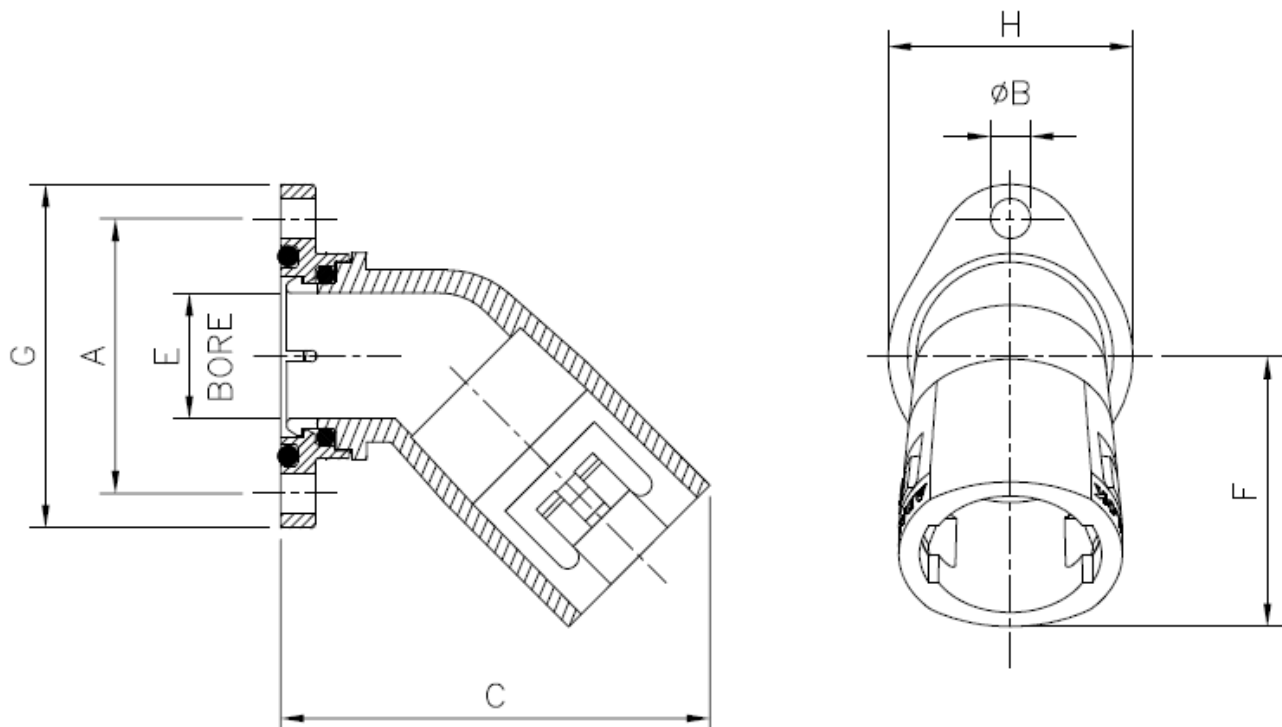


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#### Dimensional Data

| Part No<br>Black Body<br>Metric Threads | Part No<br>Grey Body<br>Metric Threads | Nominal Dimensions (mm) |     |      |      |      |      |      |      | Weight in<br>grams<br>(Each) |
|-----------------------------------------|----------------------------------------|-------------------------|-----|------|------|------|------|------|------|------------------------------|
|                                         |                                        | A                       | B   | C    | D    | E    | F    | G    | H    |                              |
| TAL16/FL/45/BL                          | TAL16/FL/45/GR                         | 36.0                    | 5.2 | 50.0 | 29.1 | 11.5 | 31.0 | 45.0 | 32.0 | 14                           |
| TAL21/FL/45/BL                          | TAL21/FL/45/GR                         | 36.0                    | 5.2 | 56.2 | 29.1 | 16.0 | 35.4 | 45.0 | 32.0 | 15                           |
| TAL28/FL/45/BL                          | TAL28/FL/45/GR                         | 53.0                    | 6.2 | 68.0 | 36.7 | 22.5 | 41.2 | 64.0 | 43.0 | 25                           |



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#### BS EN 61386 Classification

|  | Fitting | Compression | Impact | Min temp | Max temp | bending | electrical | IP solids | IP water | Corrosion | Tensile | Non-flame Propogating | Suspended load |
|--|---------|-------------|--------|----------|----------|---------|------------|-----------|----------|-----------|---------|-----------------------|----------------|
|  | TAL     | N/A         | 4      | 2        | 4        | N/A     | 0          | 6         | 6        | 0         | 1       | 1                     | 0              |

#### Mechanical Properties

| Test Type               | Methods / Standards | Requirements                                        | Value   |
|-------------------------|---------------------|-----------------------------------------------------|---------|
| Tensile Strength        | IEC61386-1          | 2 mins at Specified Value ( <i>PAFS21 Conduit</i> ) | Class 1 |
| Tensile Strength        |                     | Ultimate Pullout ( <i>PAFS21 Conduit</i> )          | 240N    |
| Impact Strength @ -45°C | IEC61386-1          | No visible damage                                   | Class 1 |
| Impact Strength @ -5°C  | IEC61386-1          | No visible damage                                   | Class 3 |
| Impact Strength @ 23°C  | IEC61386-1          | No visible damage                                   | Class 5 |

Tensile Tests to IEC 61386 gives the minimum classification value only. Actual values will depend on the type and size of the fittings used and will always be greater than the minimum – Impact strength is the minimum classification value at the minimum temperature – actual values will depend on size and temperature. Specific values available on request.

#### Thermal Properties

| Test Type              | Methods / Standards | Requirements                 | Value           |
|------------------------|---------------------|------------------------------|-----------------|
| Dynamic Applications   | IEC 61386-23        | 5000 Operations at MBR 2hrs  | -45°C to +120°C |
| Static Short Term Temp |                     | Temporary Use (3000hrs)      | -50°C to +120°C |
| Static Long Term Temp  |                     | Permanent Use (30,000) Hours | -45°C to +105°C |

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#### Flammability

| Test Type       | Method / Standard | Requirement                         | Result | Unit      |
|-----------------|-------------------|-------------------------------------|--------|-----------|
| Glow Wire       | BS EN 60695-2-11  | Extinguish within 30s               | 850°C  | °C        |
| Flammability    | IEC 61386-1-12    | 1Kw Burner Flame to Self Extinguish | Pass   | Pass/Fail |
| Oxygen Index    | ISO 4589-2        |                                     | 24.1   | %         |
| Ignition Rating | NF F16-101        | I Rating                            | I4     | -         |

#### Smoke

| Test Type   | Method / Standard | Requirement | Result | Unit |
|-------------|-------------------|-------------|--------|------|
| Fume Rating | NF F16-101        | F Rating    | F2     | -    |

#### Toxicity

| Test Type    | Method / Standard | Requirement | Result | Unit      |
|--------------|-------------------|-------------|--------|-----------|
| Halogen Free | NFX 70-100        | < 0.5%      | Pass   | Pass/Fail |

#### Pre Test Conditions

| Duration    | Standard | Temperature | Relative Humidity |
|-------------|----------|-------------|-------------------|
| 168 (Hours) | IEC61386 | 23 (°C)     | 50 (%)            |

#### Chemical Resistance Chart

##### Key:

Suitable :



Limited Suitability :



Unsuitable :



Not Tested :



|                      |                         |                        |                       |
|----------------------|-------------------------|------------------------|-----------------------|
| Astm No.1            | Diesel oil              | Methyl Bromide         | Sulphur Dioxide (Gas) |
| Astm No.2            | Diethylamine            | MEK                    | Sulphuric Acid (10%)  |
| Astm No.3            | Ethanol                 | Nitric Acid (10%)      | Sulphuric Acid (70%)  |
| Acetic Acid (10%)    | Ether                   | Nitric Acid (70%)      | Toluene               |
| Acetone              | Ethylamine              | Oxalic Acid            | Transformer Oil       |
| Aluminium Chloride   | Ethylene Glycol         | Ozone (Gas)            | 1,1,1-Trichloroethane |
| Aniline              | Ethyl Ethanoate         | Paraffin oil           | Trichloroethylene     |
| Benzaldehyde         | Freon 32                | Petrol                 | Turpentine            |
| Benzene              | Hydrochloric Acid (10%) | Phenol                 | Vegetable Oil         |
| Carbon tetrachloride | Hydrochloric Acid (36%) | Sea Water              | Vinyl Acetate         |
| Chlorine water       | Hydrogen Peroxide (35%) | Silver Nitrate         | Water                 |
| Chloroform           | Hydrogen Peroxide (87%) | Skydrol                | White Spirit          |
| Citric Acid          | Lactic Acid             | Sodium Chloride        | Zinc Chloride         |
| Copper Sulphate      | Lubricating oil         | Sodium Hydroxide (10%) |                       |
| Cresol               | Methanol                | Sodium Hydroxide (60%) |                       |

The information above is given as a guide only and is based on published technical data and experience. The chemical resistance of the above products is dependant on factors such as chemical exposure, concentration of the chemical and temperature. The above chemicals are valid for a temperature of 23°C. Use of the above table is at the users own discretion and risk. Those using it must satisfy themselves that their application presents no health and safety risks. The end user should assess compatibility with their application and contact TTS for further information.

ADHERENCE TO THE CURRENT WIRING REGULATIONS BS7671 OR NEC WIRING REGULATIONS (FOR USA) IS STRONGLY ADVISED.  
MINIMUM BEND RADIUS FOR FLEXING IS DEPENDANT UPON MINIMUM TEMPERATURE, BENDING FREQUENCY AND CHEMICAL ENVIRONMENT.