LITESTAR 4D v. 3.00

OXL File Specifications

March 2015

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## Summary

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>General characteristics</td>
<td>3</td>
</tr>
<tr>
<td>Structure</td>
<td>4</td>
</tr>
<tr>
<td>Structure - Header</td>
<td>4</td>
</tr>
<tr>
<td>Structure - Data</td>
<td>5</td>
</tr>
<tr>
<td>Structure - Data - Luminaire: Product identity, BBoxDims, LuminousArea</td>
<td>6</td>
</tr>
<tr>
<td>Structure - Data - Luminaire: LampList</td>
<td>7</td>
</tr>
<tr>
<td>Structure - Data - Luminaire: Photometry</td>
<td>8</td>
</tr>
<tr>
<td>Structure - Data - Luminaire: MeshList, MaterialList</td>
<td>9</td>
</tr>
<tr>
<td>Structure - Hierarchy</td>
<td>10</td>
</tr>
<tr>
<td>Structure - Example of parent elements</td>
<td>11</td>
</tr>
<tr>
<td>Structure - TechSheet</td>
<td>12</td>
</tr>
<tr>
<td>OXL Mesh Specification</td>
<td>17</td>
</tr>
<tr>
<td>OXL Mesh Specification - Introduction</td>
<td>17</td>
</tr>
<tr>
<td>OXL Mesh Specification - Fields description</td>
<td>18</td>
</tr>
<tr>
<td>OXL Mesh Specification - Example of a polygonal cube with a single surface</td>
<td>20</td>
</tr>
<tr>
<td>Excel Bridge file</td>
<td>23</td>
</tr>
</tbody>
</table>
General characteristics

The OXL/OXC files are pure text files, containing information related to a lighting device in its entirety and technical complexity, and are designed to associate the simple and self-explanatory characteristics typical of the XML format.

Two types of file are foreseen:
- the first has .OXL extension and associates photometric data with technical-commercial information
- the second with .OXC extension contains exclusively technical-commercial information (to be used if no photometry has been associated with the product)

In both cases the files contain a copy of all information regarding a lighting device, including any external files in binary form. Therefore they provide commercial information, photometric curves, emitting surfaces, object geometries and all the technical details required, such as images, designs and texts.

The file is subdivided into four main parts:
- Header
- Data
- Hierarchy
- TechSheet

The inserted data has no particular limit, therefore the structure detail will define the individual fields.
Structure

Header

The **Header** section contains all elements that allow manufacturer and product identification:

- **CreatorInfo** and **LitepackVersion** contain the information related to the version and file creation modes.

**ProductIdentity**

- **Manufacturer**
  - **ProductName**: name of the manufacturer
  - **ManufacturerCode**: manufacturer's OxyTech code
  - **ManufacturerShortName**: manufacturer's short name contained in the Oxydata.MDB

- **ProductFamily**: product model
- **ProductCode**: product code
- **ProductName**: short product description

**Constraints**: this concerns the limits placed on the object/luminaire, i.e. the maximum rotations in space

**Flags**: this is the type of installation (ceiling, wall, floor etc.)

Notes

The version is not yet fully complete in all its details and notably those specific to the absolute values photometric curve, mainly used for LEDs.

Constraints and Flags are luminaire attributes, that have however not yet been activated.
Structure

Data

The Data section contains the product elements, such as technical, photometric and geometrical data:

- **Luminaire list - Luminaire**: this contains the details of the photometric curves connected to the product:
  - Id: this is the photometry identification code
  - ProductIdentity: photometry identification data (ManufacturerName, ManufacturerCode, ManufacturerShortName, ProductFamily, ProductCode, ProductName)
  - Shape: bounding box shape
  - BBoxDims: dimensions of the bounding box (WidthC0C180, LengthC90C270, Height)
  - LuminousArea: shape and dimensions of the luminous area (Shape, BBoxDims, LowerArea, C0Area, C90Area, C180Area, Area76)
  - Lamp List: data related to the connected lamps (ProductIdentity, Ilcos, Flux, Power, Socket, Dimensions, ColorTemperature, ColorRenderingIndexRa, LuminousEfficacy, Life, Source). The Quantity field shows the number of connected lamps of that type
  - Photometry: photometric data (PhotometryCode, PhotometryDescription, Operator, TestLab, Date, PhotometryType, SymmetryType, FluxUsed, MeasurementConditions, MeasurementMatrix). MeasurementConditions contains the data related to the measurement conditions, while MeasurementMatrix contains the actual photometric data in table form

- **MeshList**: this contains the data related to the product geometry (3D model). If this section is missing rectangular or cylindrical models will be created ad hoc according to the bounding box dimensions
  - Mesh (Id, Vertices, Normals, UVs, VertPerFace, Faces, SurfaceFaceID, Surfaces). Id is the mesh identification code.

- **MaterialList** – contains the data for identifying the materials used in the product
  - MaterialTypeLambert identifies the data related to the Lambert meshes (Id, Name, Global, Texture, Kd). Id is the material identification code.
  - MaterialTypeEmitter identifies the data related to the “emitting” meshes (luminous surfaces). (Id, Name, Global, Texture, Color).

Each of these parts can be repeated and, apart from LuminaireList which must contain at least one photometric curve to be valid, the others can be empty. Should the LuminaireList be empty the file would be a .OXC.
Structure

Data - Luminaire: Product identity, BBoxDims, LuminousArea

The \( id \) is used in the \textit{Hierarchy} section to link the various elements to each other (see the relative paragraph)
Structure

Data - Luminaire: LampList

- LampList
- Lamp
- quantity: 3
- Manufacturer
  - ManufacturerName: Osram
  - ManufacturerCode: 98
  - ManufacturerShr: OSRAM
- ProductCode: FC 55 W800
- ProductName: LUMILUX® TS FCB 55W FSC 2GX13 230V 50Hz
- Icon: FS
- Flux: 4200
- Power: 55
- Socket: 2GX13
- Dimensions: D=10, L=300
- ColorTemperature: 3000
- ColorRendering: 80
- LuminousEfficacy: 76
- Life: 10000
- Source: CAT

Notes
Structure

Data - Luminaire: MeshList, MaterialList

The id is used in the Hierarchy section to link the various elements to each other (see the relative paragraph).
The Hierarchy section contains the data that allows different file elements to be linked to each other:

- **Node**: contains details of the different links:
  - **Id**: identification code of the individual elements
  - **Parent**: parent level of the various elements
  - **Name**: name of the elements
  - **Transform**: regards the transformation matrix of the luminaire part
  - **Geom**: regards the mesh and materials present in the 3D model
  - **LuminaireData**: data related to the alternative photometries (e.g., luminaire with different lamp positions). *EmissionCenter* represents the position of the photometric center.

In the **MeshIdRef** field are inserted the mesh references shown in:

```xml
<Data>
<MeshList>
  <Id>
</Id>
</MeshList>
</Data>
```

In the **MaterialIdRef** field are inserted the materials references shown in:

```xml
<Data>
<MaterialList>
  <MaterialTypeLambert>
    <Id>
  </MaterialTypeLambert>
  <MaterialTypeEmitter>
    <Id>
  </MaterialTypeEmitter>
</MaterialList>
</Data>
```

In the **luminaireRef** field are inserted the codes related to the photometries shown in the section:

```xml
<Data>
<LuminaireList>
  <Luminaire>
    <Id>
  </Luminaire>
</LuminaireList>
</Data>
```
Structure

Example of parent elements

<table>
<thead>
<tr>
<th>id</th>
<th>parent</th>
<th>Name</th>
<th>Transform</th>
<th>Geom</th>
<th>LuminaireAlter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0000000</td>
<td>portone</td>
<td>Transform</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>200</td>
<td>sbraccio1</td>
<td>Transform</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>201</td>
<td>Emettitore1</td>
<td>Transform</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>200</td>
<td>sbraccio2</td>
<td>Transform</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>204</td>
<td>Emettitore2</td>
<td>Transform</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note
The TechSheet section contains the technical and commercial data of the product:

- **Ver**: indicates the file version
- **Product**: contains the technical-commercial information of the product
  - **ProductDescription**: product description in the various languages
  - **ProductType**: product type in the various languages
  - **GrossWeight**: gross weight
  - **NetWeight**: net weight
  - **Dimension**: dimensions
  - **Volume**: volume
  - **PcsForPack**: pack quantity
  - **WareHouseAvail**: warehouse availability
  - **Models**: models in the various languages
  - **Applications**: fields of application for the product
  - **Families**: families
  - **Colors**: colors
  - **Marks**: marks
  - **Norms**: norms
  - **ProductName1-2-3-4**: product name
  - **Images**: images (.JPG) linked to the product in base64 format
  - **Documents**: texts (.RTF) linked to the product in base64 format

- **Device**: contains the electrical information of the product
  - **Emergency**: emergency information
  - **Battery**: battery information
  - **BatteryLife**: battery life
  - **BatteryIsteresys**: battery isteresys
  - **InsulationClass**: insulation class
  - **EANCod**: EAN code
  - **Exposed_area**: exposed area
  - **Vdt - LuminCIE - LuminDIN**: voltage - luminous CIE - luminous DIN
  - **IP_supplier - IP_body - IP_box**: IP supplier - IP body - IP box
  - **CutOff**: cut-off
  - **IK**: IK value
  - **FireRes**: fire resistance
  - **SurfaceTemp**: surface temperature
  - **Optic**: optic information
  - **BallastLoss - BallastFactor**: ballast loss - ballast factor
  - **LED**: LED information
  - **SourceVoltage - SourceCurrent**: source voltage - source current
  - **BeamOpening**: beam opening
  - **IPEA - ClassificationCertificate**: IPEA - classification certificate
  - **Materials**: materials
  - **Ballasts**: ballasts

- **Lamps**: contains the reference lamps
- **Reliefs**: contains the photometric characteristics of the measurement

The OXC files do not have a photometric part, therefore TechSheet is the main section.

The Lamps field at the TechSheet section must be the same like the data-luminaire-lamplist-lamps area at the Data section.
The Description field contains the information divided in the 25 program function languages.
**Structure**

- **Colors**
  - **Color**
  - **Descriptions**

- **Marks**
  - **Mark (3)**
    - **Text**
      - 1: N/D
      - 2: CE
      - 3: F

- **Norms**
  - **Norm**
    - EN 60598 - 1

- **ProductNote1**
  - **Descriptions**
  - **Description (25)**

- **ProductNote2**
- **ProductNote3**
- **ProductNote4**

- **Images**
  - **Image (2)**
    - **Name**
      - 1: 2045_int.jpg
      - 2: bl_int_ambiente.jpg
    - **Type**
      - 1
    - **b64**
      - b64

**Notes**

- *Name*: name of linked file
- *Type*: type of linked file
- *b64*: files in binary format
**Structure**

- **Document - LinkedDocument**
  - **Name**: name of linked file
  - **Language**: language of linked file
  - **Type**: type of linked file
  - **b64**: file in binary format

<table>
<thead>
<tr>
<th>Name</th>
<th>Language</th>
<th>Type</th>
<th>b64</th>
</tr>
</thead>
<tbody>
<tr>
<td>Document (2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LinkedDocuments</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Document (6)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Device**

- Emergency: N
- Battery: 0
- BatteryLife: N
- BatteryIstresys: N
- InsulationClass: 1
- EAMCod: 8033383503372
- Exposed_area: 0
- vdt: 0
- LuminCE: 0
- LuminMIN: 0
- P_supp: 20
- P_body: 20
- P_box: 20
**Structure**

<table>
<thead>
<tr>
<th>Foldable</th>
<th>CutOff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foldable</td>
<td>IK</td>
</tr>
<tr>
<td>Foldable</td>
<td>FreRes</td>
</tr>
<tr>
<td>Foldable</td>
<td>SurfaceTemp</td>
</tr>
<tr>
<td>Foldable</td>
<td>Optic</td>
</tr>
<tr>
<td>Foldable</td>
<td>BallastLoss 0</td>
</tr>
<tr>
<td>Foldable</td>
<td>BallastFactor 0</td>
</tr>
<tr>
<td>Foldable</td>
<td>LED N</td>
</tr>
<tr>
<td>Foldable</td>
<td>SourceVoltage 0</td>
</tr>
<tr>
<td>Foldable</td>
<td>SourceCurrent 0</td>
</tr>
<tr>
<td>Foldable</td>
<td>BeamOpening 0</td>
</tr>
<tr>
<td>Foldable</td>
<td>IREA 0</td>
</tr>
<tr>
<td>Foldable</td>
<td>ClassificationCertificate</td>
</tr>
<tr>
<td>Foldable</td>
<td>Materials</td>
</tr>
<tr>
<td>Foldable</td>
<td>Ballasts</td>
</tr>
<tr>
<td>Foldable</td>
<td>Lamps</td>
</tr>
<tr>
<td>Foldable</td>
<td>Lamp Qty=3 Al=Flaso</td>
</tr>
<tr>
<td>Foldable</td>
<td>Reliefs</td>
</tr>
<tr>
<td>Foldable</td>
<td>Relief</td>
</tr>
<tr>
<td>Foldable</td>
<td>Reader</td>
</tr>
<tr>
<td>Foldable</td>
<td>TechSheet Ver=1</td>
</tr>
</tbody>
</table>
OXL Mesh Specification

Introduction

The OXL format supports polygonal meshes with an arbitrary number of vertices per face. The mesh is understood to be made up of a list of three-dimensional vertices connected to give faces. The necessary information for defining the meshes is:

- Verticals
- Normals
- Texture coordinates
- Face definition
- Surface definition

The surfaces identify groups of faces with the same characteristics (material).

Normals and texture coordinates are defined per face per vertex, therefore the cardinality of these arrays is \( n \)

\[
n = \sum_{f=0}^{numFaces-1} numVerticesPerFace(f)
\]

Face definition is effected by identifying the indices of the vertices that belong to them.

To this end an array utility VertPerFace is defined containing the vertex indices that form the faces of the mesh. The cardinality of VertPerFace is \( n \) also in this case.

Each individual face is then defined specifying the number of vertices forming it, the geometric normal to the face, the index of the associated surface and the offset of the index of the first vertex inside the VertPerFace.

Also for the surfaces an array utility SurfaceFaceID is defined, with cardinality equal to the number of faces, which contains the indices of the faces forming the mesh surface.

Each individual surface is then defined specifying the number of faces forming it and the offset of the index of the first vertex inside the SurfaceFaceID.
OXL Mesh Specification

Fields description

The mesh description is contained in the OXL file which is memorized in XML language. The structure of the section representing the mesh is as follows:

```xml
<Mesh>
  <Id> identification number </Id>
  <Vertices size="vertices number ">
    x y z; x y z; x y z; .....  
  </Vertices>
  <Normals size="normals number per face per vertex">
    x y z; x y z; x y z; .....  
  </Normals>
  <UVs size=" texture coordinates number per face per vertex">
    u v; u v; u v; 
  </UVs>
  <VertPerFace size="indices number per face per vertex">
    i; i; i; i; i; i; ...  
  </VertPerFace>
  <Faces>
    <Face>
      <NumVert> number of vertices of the face</NumVert>
      <VertOffset> index of the first vertex of the face in the array VertPerFace</VertOffset>
      <SurfaceID> index of the belonging surfaces</SurfaceID>
      <Normal> normal to the face</Normal>
    </Face>
    <Face>
      ...  
    </Face>
  </Faces>
</Mesh>
```
OXL Mesh Specification

```xml
<SurfaceFaceID size="number of faces">
    i; i; i; i; i; ....
</SurfaceFaceID>

<Surfaces>
    <Surface>
        <NumFaces> number of faces belonging to this surface</NumFaces>
        <Offset> index of the first face belonging to this surface in the array</Offset>
    </Surface>
    ....
    <Surface>
        ....
    </Surface>
    ....
</Surfaces>
```

</Mesh>
Example of a polygonal cube with a single surface

```xml
<MeshData>
<br>158033560</br>
<Vertices size="8">
-0.500000 -0.500000 0.000000; 0.500000 -0.500000 0.000000;
-0.500000 -0.500000 1.000000; 0.500000 -0.500000 1.000000;
-0.500000 0.500000 1.000000; 0.500000 0.500000 1.000000;
-0.500000 0.500000 0.000000; 0.500000 0.500000 0.000000
</Vertices>
<Normals size="24">
0.000000 -1.000000 0.000000; 0.000000 -1.000000 0.000000;
0.000000 -1.000000 0.000000; 0.000000 -1.000000 0.000000;
0.000000 1.000000 0.000000; 0.000000 1.000000 0.000000;
0.000000 1.000000 0.000000; 0.000000 1.000000 0.000000;
0.000000 0.000000 -1.000000; 0.000000 0.000000 -1.000000;
0.000000 0.000000 -1.000000; 0.000000 0.000000 -1.000000;
1.000000 -0.000000 0.000000; 1.000000 -0.000000 0.000000;
1.000000 -0.000000 0.000000; 1.000000 -0.000000 0.000000;
-1.000000 -0.000000 0.000000; -1.000000 -0.000000 0.000000;
-1.000000 -0.000000 0.000000; -1.000000 -0.000000 0.000000;
</Normals>
<UVs size="24">
0.000000 0.000000; 1.000000 0.000000; 1.000000 1.000000;
0.000000 1.000000; 0.000000 1.000000; 1.000000 1.000000;
1.000000 2.000000; 0.000000 2.000000; 0.000000 2.000000;
1.000000 3.000000; 1.000000 3.000000; 0.000000 3.000000;
0.000000 3.000000; 1.000000 3.000000; 1.000000 4.000000;
</UVs>
</MeshData>
```
OXL Mesh Specification

0.000000 4.000000; 1.000000 0.000000; 2.000000 0.000000;
2.000000 1.000000; 1.000000 1.000000; -1.000000 0.000000;
0.000000 0.000000; 0.000000 1.000000; -1.000000 1.000000
</UVs>
<VertPerFace size="24">
  0; 1; 3; 2; 3; 5; 4; 5; 7; 6; 7; 1; 0; 1; 7;
  5; 3; 6; 0; 2; 4
</VertPerFace>
<Faces>
  <Face>
    <NumVert>4</NumVert>
    <VertOffset>0</VertOffset>
    <SurfaceID>0</SurfaceID>
    <Normal>0.000000 -1.000000 0.000000</Normal>
  </Face>
  <Face>
    <NumVert>4</NumVert>
    <VertOffset>4</VertOffset>
    <SurfaceID>0</SurfaceID>
    <Normal>0.000000 0.000000 1.000000</Normal>
  </Face>
  <Face>
    <NumVert>4</NumVert>
    <VertOffset>8</VertOffset>
    <SurfaceID>0</SurfaceID>
    <Normal>0.000000 1.000000 0.000000</Normal>
  </Face>
</Faces>
OXL Mesh Specification

```
<Face>
  <NumVert>4</NumVert>
  <VertOffset>12</VertOffset>
  <SurfaceID>0</SurfaceID>
  <Normal>0.000000 0.000000 -1.000000</Normal>
</Face>

<Face>
  <NumVert>4</NumVert>
  <VertOffset>16</VertOffset>
  <SurfaceID>0</SurfaceID>
  <Normal>1.000000 0.000000 0.000000</Normal>
</Face>

<Face>
  <NumVert>4</NumVert>
  <VertOffset>20</VertOffset>
  <SurfaceID>0</SurfaceID>
  <Normal>-1.000000 0.000000 0.000000</Normal>
</Face>

<Face>
</Faces>

<SurfaceFaceID size="6">0; 1; 2; 3; 4; 5</SurfaceFaceID>

<Surfaces>
  <Surface>
    <NumFaces>6</NumFaces>
    <Offset>0</Offset>
  </Surface>
</Surfaces>

<MeshData>
```
Excel Bridge file

This file allows insertion of catalog data directly into Excel, and then to import them into LITESTAR 4D. The file is composed of the same sections as the OxyData.MDB database and the OXC/OXL file, and in particular by the following:

- Commercial Parameters in which to enter the commercial product data such as code, description, price list references etc.
- Mechanical Parameters in which to enter the mechanical parameters such as weight, insulation class, IP etc.
- Electrical Parameters in which to insert the electrical parameters such as lamp code (inserting the lamp code shown in the Liswin catalog, the program automatically associates all the electrical parameters to the product), etc.
- Norms and Marks in which to enter the Norms the product complies with and the conformity Marks
- Images (JPG or BMP) and Text (RTF) in which to enter the name and extension of the image or text file to be associated to the product
- Photometric Data with which to define name and extension of the photometric files or file to be associated to the product
- Accessory File with which to define name and extension of the accessory files or file (instruction sheets, assembly details ...) to be associated to the product. The files can be in different formats

Each field (column) of the Excel Bridge file shows both the field description and comments on the field itself where are defined:
- field description
- type
- format (number of characters)
- an example
- the field name (variable) as defined in the OxyData.MDB database

Multiple Insertions
There can be cases in which a product has more than one value for the same field: in these cases just insert as many columns as the values to be inserted.

Example: if the product has two colors there will have to be two color columns and the reference of the two colors will have to be inserted on the same product line.

Different languages text
The system allows management of files in different languages. To link them just insert the name of the file (the same in all the languages) in the Excel Bridge file and save the file in a language, inside a folder with the name of the language (example: ITA for Italian, ENG for English etc.).

Images and Accessory Files
Just save the file in a folder named as the archive to be inserted and type the full name in the Excel file.

Conversion from Excel >> Oxydata.MDB
The conversion of Excel Bridge files into OxyData.MDB is effected by OxyTech and is included in the license conditions of the program maintenance Contract, if active.

Example of field.
The comment is available if a red triangle appears in the upper right area of the field itself. Just place the mouse button on the triangle to reveal the comment.

Example of comment in the field.

Example of comment in the field.

Some fields (present in Lisdat as dropdown fields) have numerical references and can be defined using the corresponding tables which can be selected in the lower part of the window.

It is necessary to insert the code (id) that corresponds to the chosen value (color, type, etc.).