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**lib3mf**

***Release v2.0.1***

**3MF Consortium**

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Welcome! This is the documentation for lib3mf v2.0.1.

lib3mf is an implementation of the 3D Manufacturing Format file standard.

It provides 3MF reading and writing capabilities, as well as conversion and validation tools for input and output data. lib3mf runs on Windows, Linux and MacOS and offers a clean and easy-to-use API in various programming languages to speed up the development and keep integration costs at a minimum.

As 3MF shall become an universal 3D Printing standard, its quick adoption is very important. This library shall lower all barriers of adoption to any possible user, let it be software providers, hardware providers, service providers or middleware tools.



## API DOCUMENTATION

- *C++*
- *C*
- *Python*
- *Pascal*
- *C#*
- *Golang*
- *NodeJS*

## 1.1 C++-language bindings

This space describes the usage of lib3mf in a C++ host application.

The C++-language bindings come in two different flavors:

Cpp

CppDynamic

If you include the header `Cpp/lib3mf_implicit.hpp`, lib3mf will be loaded dynamically during *load-time* of your host application through your operating system's mechanism for loading libraries.

```
Lib3MF::PWrapper wrapper = CWrapper::loadLibrary();
```

The shared library file `lib3mf.*` needs to reside in a path that your operating systems checks when loading libraries.

If you include the header `CppDynamic/lib3mf_dynamic.hpp`, Lib3MF will be loaded dynamically during *run-time* of your host application through an explicit call to

Linux

Mac OSX

Windows

```
Lib3MF::PWrapper wrapper = Lib3MF::CWrapper::loadLibrary("LibraryLocation/lib3mf.so");
```

```
Lib3MF::PWrapper wrapper = Lib3MF::CWrapper::loadLibrary("LibraryLocation/lib3mf.dylib  
↪");
```

```
Lib3MF::PWrapper wrapper = Lib3MF::CWrapper::loadLibrary("LibraryLocation/lib3mf.dll↵");
```

i.e. you need to explicitly provide the location of the shared library file `lib3mf.*`.

The `Lib3MF::PWrapper` object provides access to all functionality within `lib3mf`.

Both flavors of the C++-bindings are header-only which makes it extremely easy to include them into existing projects:

## 1.1.1 Minimal Example Project

Minimal application code:

Cpp

CppDynamic

```
#include <iostream>
#include "lib3mf_implicit.hpp"

int main()
{
    try
    {
        auto wrapper = Lib3MF::CWrapper::loadLibrary();
        Lib3MF_uint32 nMajor, nMinor, nMicro;
        wrapper->GetLibraryVersion(nMajor, nMinor, nMicro);
        std::cout << "Lib3MF.Version = " << nMajor << "." << nMinor << "." << nMicro;
        std::string sPreReleaseInfo;
        if (wrapper->GetPrereleaseInformation(sPreReleaseInfo)) {
            std::cout << "-" << sPreReleaseInfo;
        }
        std::string sBuildInfo;
        if (wrapper->GetBuildInformation(sBuildInfo)) {
            std::cout << "+" << sBuildInfo;
        }
        std::cout << std::endl;
    }
    catch (std::exception &e)
    {
        std::cout << e.what() << std::endl;
        return 1;
    }
    return 0;
}
```

```
#include <iostream>
#include "lib3mf_dynamic.hpp"

int main()
{
    try
    {
        std::string libpath = (""); // TODO: put the location of the Lib3MF-library file↵
        ↵here.
```

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```

    auto wrapper = Lib3MF::CWrapper::loadLibrary(libpath + "/lib3mf."); // TODO: add ↵
    ↵correct suffix of the library
    Lib3MF_uint32 nMajor, nMinor, nMicro;
    wrapper->GetLibraryVersion(nMajor, nMinor, nMicro);
    std::cout << "Lib3MF.Version = " << nMajor << "." << nMinor << "." << nMicro;
    std::string sPreReleaseInfo;
    if (wrapper->GetPrereleaseInformation(sPreReleaseInfo)) {
        std::cout << "-" << sPreReleaseInfo;
    }
    std::string sBuildInfo;
    if (wrapper->GetBuildInformation(sBuildInfo)) {
        std::cout << "+" << sBuildInfo;
    }
    std::cout << std::endl;
}
catch (std::exception &e)
{
    std::cout << e.what() << std::endl;
    return 1;
}
return 0;
}

```

CMakeLists.txt for minimal project:

Cpp

CppDynamic

```

cmake_minimum_required(VERSION 3.5)

set(CMAKE_CURRENT_BINDING_DIR ${CMAKE_CURRENT_SOURCE_DIR}/.)
project(Lib3MFExample_CPPImplicit)
set(CMAKE_CXX_STANDARD 11)
add_executable(Lib3MFExample_CPPImplicit "${CMAKE_CURRENT_SOURCE_DIR}/Lib3MF_example.
    ↵cpp")
find_library(LIB3MFLLOCATION lib3mf "${CMAKE_CURRENT_SOURCE_DIR}/../..../Implementations/
    ↵*/**/*")
target_link_libraries(Lib3MFExample_CPPImplicit ${LIB3MFLLOCATION})
target_include_directories(Lib3MFExample_CPPImplicit PRIVATE "${CMAKE_CURRENT_BINDING_
    ↵DIR}")

```

```

cmake_minimum_required(VERSION 3.5)

set(CMAKE_CURRENT_BINDING_DIR ${CMAKE_CURRENT_SOURCE_DIR}/.)
project(Lib3MFExample_CPPDynamic)
set(CMAKE_CXX_STANDARD 11)
add_executable(Lib3MFExample_CPPDynamic "${CMAKE_CURRENT_SOURCE_DIR}/Lib3MF_example.
    ↵cpp")
if (UNIX)
    target_link_libraries(Lib3MFExample_CPPDynamic ${CMAKE_DL_LIBS})
endif (UNIX)
target_include_directories(Lib3MFExample_CPPDynamic PRIVATE "${CMAKE_CURRENT_BINDING_
    ↵DIR}")

```

The examples in the Cpp/CppDynamic-folders of the binary SDK follow exactly this pattern.

The remainder of this space is an in-depth API-reference for the functionality of lib3mf.

## 1.1.2 General Information

### The wrapper class CWrapper

#### **class** Lib3MF::CWrapper

All types of the 3MF Library reside in the namespace Lib3MF and all functionality of the 3MF Library resides in Lib3MF::CWrapper.

A suitable way to use Lib3MF::CWrapper is as a singleton.

void **GetLibraryVersion** (*Lib3MF\_uint32* &nMajor, *Lib3MF\_uint32* &nMinor, *Lib3MF\_uint32* &nMicro)  
retrieves the binary version of this library.

#### **Parameters**

- **nMajor** – returns the major version of this library
- **nMinor** – returns the minor version of this library
- **nMicro** – returns the micro version of this library

bool **GetPrereleaseInformation** (std::string &sPrereleaseInfo)  
retrieves prerelease information of this library.

**Returns** Does the library provide prerelease version?

**Parameters** **sPrereleaseInfo** – retrieves prerelease information of this library.

bool **GetBuildInformation** (std::string &sBuildInformation)  
retrieves build information of this library.

**Returns** Does the library provide build version?

**Parameters** **sBuildInformation** – retrieves build information of this library.

void **GetSpecificationVersion** (const std::string &sSpecificationURL, bool &bIsSupported, *Lib3MF\_uint32* &nMajor, *Lib3MF\_uint32* &nMinor, *Lib3MF\_uint32* &nMicro)  
retrieves whether a specification is supported, and if so, which version.

#### **Parameters**

- **sSpecificationURL** – URL of extension to check
- **bIsSupported** – returns whether this specification is supported
- **nMajor** – returns the major version of the extension (if IsSupported)
- **nMinor** – returns the minor version of the extension (if IsSupported)
- **nMicro** – returns the micro version of the extension (if IsSupported)

*PModel* **CreateModel** ()  
creates an empty model instance.

**Returns** returns an empty model instance

void **Release** (*CBase* \*pInstance)  
releases shared ownership of an object instance

**Parameters** **pInstance** – the object instance to release

void **Acquire** (*CBase* \*pInstance)  
acquires shared ownership of an object instance

**Parameters** **pInstance** – the object instance to acquire

void **SetJournal** (const std::string &*sJournalPath*)  
Sets the journal file path

**Parameters** *sJournalPath* – File name of the journal file

bool **GetLastError** (*CBase \*pInstance*, std::string &*sLastErrorMessage*)  
Retrieves the last error string of an instance

**Parameters**

- **pInstance** – Object where the error occurred.
- **sLastErrorMessage** – Last Error String

**Returns** Returns if the instance has a last error.

void **RetrieveProgressMessage** (const *eProgressIdentifier* *eTheProgressIdentifier*, std::string &*sProgressMessage*)

Return an English text for a progress identifier. Note: this is the only function you can call from your callback function.

**Parameters**

- **eTheProgressIdentifier** – the progress identifier that is passed to the callback function
- **sProgressMessage** – English text for the progress identifier

*sColor* **RGBAToColor** (const *Lib3MF\_uint8* *nRed*, const *Lib3MF\_uint8* *nGreen*, const *Lib3MF\_uint8* *nBlue*, const *Lib3MF\_uint8* *nAlpha*)

Creates a Color from uint8 RGBA values

**Parameters**

- **nRed** – Red value of color (0-255)
- **nGreen** – Green value of color (0-255)
- **nBlue** – Blue value of color (0-255)
- **nAlpha** – Alpha value of color (0-255)

**Returns** Assembled color

*sColor* **FloatRGBAToColor** (const *Lib3MF\_single* *fRed*, const *Lib3MF\_single* *fGreen*, const *Lib3MF\_single* *fBlue*, const *Lib3MF\_single* *fAlpha*)

Creates a Color from uint8 RGBA values

**Parameters**

- **fRed** – Red value of color (0-1)
- **fGreen** – Green value of color (0-1)
- **fBlue** – Blue value of color (0-1)
- **fAlpha** – Alpha value of color (0-1)

**Returns** Assembled color

void **ColorToRGBA** (const *sColor* &*TheColor*, *Lib3MF\_uint8* &*nRed*, *Lib3MF\_uint8* &*nGreen*, *Lib3MF\_uint8* &*nBlue*, *Lib3MF\_uint8* &*nAlpha*)

Calculates uint8-RGBA-values from a Color

**Parameters**

- **TheColor** – Color to handle
- **nRed** – Red value of color (0-255)

- **nGreen** – Green value of color (0-255)
- **nBlue** – Blue value of color (0-255)
- **nAlpha** – Alpha value of color (0-255)

void **ColorToFloatRGBA**(const *sColor* &TheColor, *Lib3MF\_single* &fRed, *Lib3MF\_single* &fGreen, *Lib3MF\_single* &fBlue, *Lib3MF\_single* &fAlpha)

Calculates float-RGBA-values from a Color

**Parameters**

- **TheColor** – Color to handle
- **fRed** – Red value of color (0-1)
- **fGreen** – Green value of color (0-1)
- **fBlue** – Blue value of color (0-1)
- **fAlpha** – Alpha value of color (0-1)

*sTransform* **GetIdentityTransform**()

Creates an identity transform

**Returns** Transformation matrix.

*sTransform* **GetUniformScaleTransform**(const *Lib3MF\_single* fFactor)

Creates a uniform scale transform

**Parameters** **fFactor** – Factor in X, Y and Z

**Returns** Transformation matrix.

*sTransform* **GetScaleTransform**(const *Lib3MF\_single* fFactorX, const *Lib3MF\_single* fFactorY, const *Lib3MF\_single* fFactorZ)

Creates a scale transform

**Parameters**

- **fFactorX** – Factor in X
- **fFactorY** – Factor in Y
- **fFactorZ** – Factor in Z

**Returns** Transformation matrix.

*sTransform* **GetTranslationTransform**(const *Lib3MF\_single* fVectorX, const *Lib3MF\_single* fVectorY, const *Lib3MF\_single* fVectorZ)

Creates an translation transform

**Parameters**

- **fVectorX** – Translation in X
- **fVectorY** – Translation in Y
- **fVectorZ** – Translation in Z

**Returns** Transformation matrix.

**typedef** std::shared\_ptr<*CWrapper*> **Lib3MF::PWrapper**

## Types used in the 3MF Library

### Simple types

```
typedef uint8_t Lib3MF_uint8
typedef uint16_t Lib3MF_uint16
typedef uint32_t Lib3MF_uint32
typedef uint64_t Lib3MF_uint64
typedef int8_t Lib3MF_int8
typedef int16_t Lib3MF_int16
typedef int32_t Lib3MF_int32
typedef int64_t Lib3MF_int64
typedef float Lib3MF_single
typedef double Lib3MF_double
using Lib3MF_pvoid = void*
using Lib3MFResult = Lib3MF_int32
```

### Enumerations

```
enum class ePropertyType : Lib3MF_int32

    enumerator NoPropertyType = 0
    enumerator BaseMaterial = 1
    enumerator TexCoord = 2
    enumerator Colors = 3
    enumerator Composite = 4
    enumerator Multi = 5

enum class eSlicesMeshResolution : Lib3MF_int32

    enumerator Fullres = 0
    enumerator Lowres = 1

enum class eModelUnit : Lib3MF_int32

    enumerator MicroMeter = 0
    enumerator MilliMeter = 1
    enumerator CentiMeter = 2
    enumerator Inch = 3
    enumerator Foot = 4
    enumerator Meter = 5
```

```
enum class eObjectType: Lib3MF_int32

    enumerator Other = 0
    enumerator Model = 1
    enumerator Support = 2
    enumerator SolidSupport = 3
enum class eTextureType: Lib3MF_int32

    enumerator Unknown = 0
    enumerator PNG = 1
    enumerator JPEG = 2
enum class eTextureTileStyle: Lib3MF_int32

    enumerator Wrap = 0
    enumerator Mirror = 1
    enumerator Clamp = 2
    enumerator NoTileStyle = 3
enum class eTextureFilter: Lib3MF_int32

    enumerator Auto = 0
    enumerator Linear = 1
    enumerator Nearest = 2
enum class eBeamLatticeCapMode: Lib3MF_int32

    enumerator Sphere = 0
    enumerator HemiSphere = 1
    enumerator Butt = 2
enum class eBeamLatticeClipMode: Lib3MF_int32

    enumerator NoClipMode = 0
    enumerator Inside = 1
    enumerator Outside = 2
enum class eProgressIdentifier: Lib3MF_int32

    enumerator QUERCANCELED = 0
    enumerator DONE = 1
    enumerator CLEANUP = 2
    enumerator READSTREAM = 3
```

```

    enumerator EXTRACTOPCPACKAGE = 4
    enumerator READNONROOTMODELS = 5
    enumerator READROOTMODEL = 6
    enumerator READRESOURCES = 7
    enumerator READMESH = 8
    enumerator READSLICES = 9
    enumerator READBUILD = 10
    enumerator READCUSTOMATTACHMENT = 11
    enumerator READTEXTURETACHMENTS = 12
    enumerator CREATEOPCPACKAGE = 13
    enumerator WRITEMODELSTOSTREAM = 14
    enumerator WRITEROOTMODEL = 15
    enumerator WRITENONROOTMODELS = 16
    enumerator WRITEATTACHMENTS = 17
    enumerator WRITECONTENTTYPES = 18
    enumerator WRITENOBJECTS = 19
    enumerator WRITENODES = 20
    enumerator WRITETRIANGLES = 21
    enumerator WRITESLICES = 22

enum class eBlendMethod: Lib3MF_int32

    enumerator NoBlendMethod = 0
    enumerator Mix = 1
    enumerator Multiply = 2

```

## Structs

All structs are defined as *packed*, i.e. with the

```
#pragma pack (1)
```

```

struct sTriangle

    Lib3MF_uint32 m_Indices[3]

struct sTriangleProperties

    Lib3MF_uint32 m_ResourceID
    Lib3MF_uint32 m_PropertyIDs[3]

struct sPosition

```

```
Lib3MF_single m_Coordinates[3]
struct sPosition2D

Lib3MF_single m_Coordinates[2]
struct sCompositeConstituent

Lib3MF_uint32 m_PropertyID
Lib3MF_double m_MixingRatio
struct sMultiPropertyLayer

Lib3MF_uint32 m_ResourceID
eBlendMethod m_TheBlendMethod
struct sTex2Coord

Lib3MF_double m_U
Lib3MF_double m_V
struct sTransform

Lib3MF_single m_Fields[4][3]
struct sBox

Lib3MF_single m_MinCoordinate[3]
Lib3MF_single m_MaxCoordinate[3]
struct sColor

Lib3MF_uint8 m_Red
Lib3MF_uint8 m_Green
Lib3MF_uint8 m_Blue
Lib3MF_uint8 m_Alpha
struct sBeam

Lib3MF_uint32 m_Indices[2]
Lib3MF_double m_Radii[2]
eBeamLatticeCapMode m_CapModes[2]
```



## Function types

**using ProgressCallback** = void (\*) (bool\*, *Lib3MF\_double*, Lib3MF::eProgressIdentifier, *Lib3MF\_pvoid*)

A callback function

**Returns** Returns whether the calculation should be aborted

### Parameters

- **dProgressValue** – The value of the progress function: values in the interval [0,1] are progress; < mean no progress update
- **eProgressIdentifier** – An identifier of progress
- **pUserData** – Userdata that is passed to the callback function

**using WriteCallback** = void (\*) (*Lib3MF\_uint64*, *Lib3MF\_uint64*, *Lib3MF\_pvoid*)

Callback to call for writing a data chunk

### Parameters

- **nByteData** – Pointer to the data to be written
- **nNumBytes** – Number of bytes to write
- **pUserData** – Userdata that is passed to the callback function

**using ReadCallback** = void (\*) (*Lib3MF\_uint64*, *Lib3MF\_uint64*, *Lib3MF\_pvoid*)

Callback to call for reading a data chunk

### Parameters

- **nByteData** – Pointer to a buffer to read data into
- **nNumBytes** – Number of bytes to read
- **pUserData** – Userdata that is passed to the callback function

**using SeekCallback** = void (\*) (*Lib3MF\_uint64*, *Lib3MF\_pvoid*)

Callback to call for seeking in the stream

### Parameters

- **nPosition** – Position in the stream to move to
- **pUserData** – Userdata that is passed to the callback function

## ELib3MFException: The standard exception class of the 3MF Library

Errors in the 3MF Library are reported as Exceptions. It is recommended to not throw these exceptions in your client code.

**class** Lib3MF::ELib3MFException

**void** ELib3MFException::what() **const noexcept**

Returns error message

**Returns** the error message of this exception

*Lib3MFResult* ELib3MFException::getErrorCode() **const noexcept**

Returns error code

**Returns** the error code of this exception

### CInputVector: Adapter for passing arrays as input for functions

Several functions of the 3MF Library expect arrays of integral types or structs as input parameters. To not restrict the interface to, say, `std::vector<type>`, and to have a more abstract interface than a location in memory and the number of elements to input to a function the 3MF Library provides a templated adapter class to pass arrays as input for functions.

Usually, instances of `CInputVector` are generated anonymously (or even implicitly) in the call to a function that expects an input array.

```
template<typename T>
class Lib3MF::CInputVector

    CInputVector (const std::vector<T> &vec)
        Constructs of a CInputVector from a std::vector<T>

    CInputVector (const T *in_data, size_t in_size)
        Constructs of a CInputVector from a memory address and a given number of elements

    const T *CInputVector::data () const
        returns the start address of the data captured by this CInputVector

    size_t CInputVector::size () const
        returns the number of elements captured by this CInputVector
```

### 1.1.3 API-Classes

#### CAttachment

```
class Lib3MF::CAttachment : public CBase

    std::string GetPath ()
        Retrieves an attachment's package path.

        Returns returns the attachment's package path string

    void SetPath (const std::string &sPath)
        Sets an attachment's package path.

        Parameters sPath – new path of the attachment.

    std::string GetRelationshipType ()
        Retrieves an attachment's relationship type

        Returns returns the attachment's package relationship type string

    void SetRelationshipType (const std::string &sPath)
        Sets an attachment's relationship type.

        Parameters sPath – new relationship type string.

    void WriteToFile (const std::string &sFileName)
        Writes out the attachment as file.

        Parameters sFileName – file to write into.

    void ReadFromFile (const std::string &sFileName)
        Reads an attachment from a file.

        Parameters sFileName – file to read from.
```

*Lib3MF\_uint64* **GetStreamSize** ()

Retrieves the size of the attachment stream

**Returns** the stream size

void **WriteToBuffer** (std::vector<*Lib3MF\_uint8*> &*BufferBuffer*)

Writes out the attachment into a buffer

**Parameters** *BufferBuffer* – Buffer to write into

void **ReadFromBuffer** (const *CInputVector*<*Lib3MF\_uint8*> &*BufferBuffer*)

Reads an attachment from a memory buffer

**Parameters** *BufferBuffer* – Buffer to read from

**typedef** std::shared\_ptr<*CAttachment*> *Lib3MF::PAttachment*

Shared pointer to *CAttachment* to easily allow reference counting.

## CBase

**class** *Lib3MF::CBase*

**typedef** std::shared\_ptr<*CBase*> *Lib3MF::PBase*

Shared pointer to *CBase* to easily allow reference counting.

## CBaseMaterialGroup

**class** *Lib3MF::CBaseMaterialGroup* : public *CResource*

The *BaseMaterialGroup* corresponds to a *basematerials*-element within a 3MF document

*Lib3MF\_uint32* **GetCount** ()

Retrieves the count of base materials in the material group.

**Returns** returns the count of base materials.

void **GetPropertyIDs** (std::vector<*Lib3MF\_uint32*> &*PropertyIDsBuffer*)

returns all the *PropertyIDs* of all materials in this group

**Parameters** *PropertyIDsBuffer* – *PropertyID* of the material in the material group.

*Lib3MF\_uint32* **AddMaterial** (const std::string &*sName*, const *sColor* &*DisplayColor*)

Adds a new material to the material group

**Parameters**

- **sName** – new name of the base material.
- **DisplayColor** – Display color of the material

**Returns** returns new *PropertyID* of the new material in the material group.

void **RemoveMaterial** (const *Lib3MF\_uint32* *nPropertyID*)

Removes a material from the material group.

**Parameters** *nPropertyID* – *PropertyID* of the material in the material group.

std::string **GetName** (const *Lib3MF\_uint32* *nPropertyID*)

Returns the base material's name

**Parameters** *nPropertyID* – *PropertyID* of the material in the material group.

**Returns** returns the name of the base material.

void **SetName** (const *Lib3MF\_uint32* *nPropertyID*, const std::string &*sName*)  
Sets a base material's name

**Parameters**

- **nPropertyID** – PropertyID of the material in the material group.
- **sName** – new name of the base material.

void **SetDisplayColor** (const *Lib3MF\_uint32* *nPropertyID*, const *sColor* &*TheColor*)  
Sets a base material's display color.

**Parameters**

- **nPropertyID** – PropertyID of the material in the material group.
- **TheColor** – The base material's display color

*sColor* **GetDisplayColor** (const *Lib3MF\_uint32* *nPropertyID*)  
Returns a base material's display color.

**Parameters** **nPropertyID** – PropertyID of the material in the material group.

**Returns** The base material's display color

**typedef** std::shared\_ptr<*CBaseMaterialGroup*> *Lib3MF::PBaseMaterialGroup*  
Shared pointer to *CBaseMaterialGroup* to easily allow reference counting.

## **CBaseMaterialGroupIterator**

**class** *Lib3MF::CBaseMaterialGroupIterator* : public *CResourceIterator*

*PBaseMaterialGroup* **GetCurrentBaseMaterialGroup** ()  
Returns the MaterialGroup the iterator points at.

**Returns** returns the BaseMaterialGroup instance.

**typedef** std::shared\_ptr<*CBaseMaterialGroupIterator*> *Lib3MF::PBaseMaterialGroupIterator*  
Shared pointer to *CBaseMaterialGroupIterator* to easily allow reference counting.

## **CBeamLattice**

**class** *Lib3MF::CBeamLattice* : public *CBase*

*Lib3MF\_double* **GetMinLength** ()  
Returns the minimal length of beams for the beamlattice.

**Returns** minimal length of beams for the beamlattice

void **SetMinLength** (const *Lib3MF\_double* *dMinLength*)  
Sets the minimal length of beams for the beamlattice.

**Parameters** **dMinLength** – minimal length of beams for the beamlattice

void **GetClipping** (*eBeamLatticeClipMode* &*eClipMode*, *Lib3MF\_uint32* &*nResourceID*)  
Returns the clipping mode and the clipping-mesh for the beamlattice of this mesh.

**Parameters**

- **eClipMode** – contains the clip mode of this mesh

- **nResourceID** – filled with the resourceID of the clipping mesh-object or an undefined value if pClipMode is MODELBEAMLATTICECLIPMODE\_NONE

void **SetClipping** (const *eBeamLatticeClipMode* eClipMode, const *Lib3MF\_uint32* nResourceID)

Sets the clipping mode and the clipping-mesh for the beamlattice of this mesh.

**Parameters**

- **eClipMode** – contains the clip mode of this mesh
- **nResourceID** – the resourceID of the clipping mesh-object. This mesh-object has to be defined before setting the Clipping.

bool **GetRepresentation** (*Lib3MF\_uint32* &nResourceID)

Returns the representation-mesh for the beamlattice of this mesh.

**Returns** flag whether the beamlattice has a representation mesh.

**Parameters** **nResourceID** – filled with the resourceID of the clipping mesh-object.

void **SetRepresentation** (const *Lib3MF\_uint32* nResourceID)

Sets the representation-mesh for the beamlattice of this mesh.

**Parameters** **nResourceID** – the resourceID of the representation mesh-object. This mesh-object has to be defined before setting the representation.

*Lib3MF\_uint32* **GetBeamCount** ()

Returns the beam count of a mesh object.

**Returns** filled with the beam count.

*sBeam* **GetBeam** (const *Lib3MF\_uint32* nIndex)

Returns indices, radii and capmodes of a single beam of a mesh object.

**Parameters** **nIndex** – Index of the beam (0 to beamcount - 1).

**Returns** filled with the beam indices, radii and capmodes.

*Lib3MF\_uint32* **AddBeam** (const *sBeam* &BeamInfo)

Adds a single beam to a mesh object.

**Parameters** **BeamInfo** – contains the node indices, radii and capmodes.

**Returns** filled with the new Index of the beam.

void **SetBeam** (const *Lib3MF\_uint32* nIndex, const *sBeam* &BeamInfo)

Sets the indices, radii and capmodes of a single beam of a mesh object.

**Parameters**

- **nIndex** – Index of the beam (0 to beamcount - 1).
- **BeamInfo** – filled with the beam indices, radii and capmodes.

void **SetBeams** (const *CInputVector*<*sBeam*> &BeamInfoBuffer)

Sets all beam indices, radii and capmodes of a mesh object.

**Parameters** **BeamInfoBuffer** – contains information of a number of beams

void **GetBeams** (std::vector<*sBeam*> &BeamInfoBuffer)

obtains all beam indices, radii and capmodes of a mesh object.

**Parameters** **BeamInfoBuffer** – contains information of all beams

*Lib3MF\_uint32* **GetBeamSetCount** ()

Returns the number of beamsets of a mesh object.

**Returns** filled with the beamset count.

*PBeamSet* **AddBeamSet** ()

Adds an empty beamset to a mesh object

**Returns** the new beamset

*PBeamSet* **GetBeamSet** (const *Lib3MF\_uint32* nIndex)

Returns a beamset of a mesh object

**Parameters** **nIndex** – index of the requested beamset (0 ... beamsetcount-1).

**Returns** the requested beamset

**typedef** std::shared\_ptr<*CBeamLattice*> *Lib3MF*::**PBeamLattice**

Shared pointer to CBeamLattice to easily allow reference counting.

## CBeamSet

**class** *Lib3MF*::**CBeamSet** : public *CBase*

void **SetName** (const std::string &*sName*)

Sets a beamset's name string

**Parameters** **sName** – new name of the beamset.

std::string **GetName** ()

Retrieves a beamset's name string

**Returns** returns the name of the beamset.

void **SetIdentifier** (const std::string &*sIdentifier*)

Sets a beamset's identifier string

**Parameters** **sIdentifier** – new name of the beamset.

std::string **GetIdentifier** ()

Retrieves a beamset's identifier string

**Returns** returns the identifier of the beamset.

*Lib3MF\_uint32* **GetReferenceCount** ()

Retrieves the reference count of a beamset

**Returns** returns the reference count

void **SetReferences** (const *CInputVector*<*Lib3MF\_uint32*> &*ReferencesBuffer*)

Sets the references of a beamset

**Parameters** **ReferencesBuffer** – the new indices of all beams in this beamset

void **GetReferences** (std::vector<*Lib3MF\_uint32*> &*ReferencesBuffer*)

Retrieves the references of a beamset

**Parameters** **ReferencesBuffer** – retrieves the indices of all beams in this beamset

**typedef** std::shared\_ptr<*CBeamSet*> *Lib3MF*::**PBeamSet**

Shared pointer to CBeamSet to easily allow reference counting.

**CBuildItem**

```
class Lib3MF::CBuildItem: public CBase
```

```
    PObject GetObjectResource ()
```

Retrieves the object resource associated to a build item

**Returns** returns the associated resource instance

```
std::string GetUUID (bool &bHasUUID)
```

returns, whether a build item has a UUID and, if true, the build item's UUID

**Parameters** **bHasUUID** – flag whether the build item has a UUID

**Returns** the UUID as string of the form 'xxxxxxxx-xxxx-xxxx-xxxxxxxxxxxxxxxx'

```
void SetUUID (const std::string &sUUID)
```

sets the build item's UUID

**Parameters** **sUUID** – the UUID as string of the form 'xxxxxxxx-xxxx-xxxx-xxxxxxxxxxxxxxxx'

```
    Lib3MF_uint32 GetObjectResourceID ()
```

Retrieves the object resource id associated to a build item

**Returns** returns the ID of the object

```
bool HasObjectTransform ()
```

Checks, if a build item has a non-identity transformation matrix

**Returns** returns true, if the transformation matrix is not the identity

```
    sTransform GetObjectTransform ()
```

Retrieves a build item's transformation matrix.

**Returns** returns the transformation matrix

```
void SetObjectTransform (const sTransform &Transform)
```

Sets a build item's transformation matrix.

**Parameters** **Transform** – new transformation matrix

```
std::string GetPartNumber ()
```

Retrieves a build item's part number string

**Returns** Returns a build item's part number string

```
void SetPartNumber (const std::string &sSetPartnumber)
```

Sets a build item's part number string

**Parameters** **sSetPartnumber** – new part number string for referencing parts from the outside world

```
    PMetaDataGroup GetMetaDataGroup ()
```

Returns the metadatagroup of this build item

**Returns** returns an Instance of the metadatagroup of this build item

```
    sBox GetOutbox ()
```

Returns the outbox of a build item

**Returns** Outbox of this build item

```
typedef std::shared_ptr<CBuildItem> Lib3MF::PBuildItem
```

Shared pointer to CBuildItem to easily allow reference counting.

## CBuildItemIterator

```
class Lib3MF::CBuildItemIterator : public CBase
```

bool **MoveNext** ()

Iterates to the next build item in the list.

**Returns** Iterates to the next build item in the list.

bool **MovePrevious** ()

Iterates to the previous build item in the list.

**Returns** Iterates to the previous build item in the list.

*PBuildItem* **GetCurrent** ()

Returns the build item the iterator points at.

**Returns** returns the build item instance.

*PBuildItemIterator* **Clone** ()

Creates a new build item iterator with the same build item list.

**Returns** returns the cloned Iterator instance

*Lib3MF\_uint64* **Count** ()

Returns the number of build items the iterator captures.

**Returns** returns the number of build items the iterator captures.

```
typedef std::shared_ptr<CBuildItemIterator> Lib3MF::PBuildItemIterator
```

Shared pointer to CBuildItemIterator to easily allow reference counting.

## CColorGroup

```
class Lib3MF::CColorGroup : public CResource
```

*Lib3MF\_uint32* **GetCount** ()

Retrieves the count of base materials in this Color Group.

**Returns** returns the count of colors within this color group.

void **GetAllPropertyIDs** (std::vector<*Lib3MF\_uint32*> &*PropertyIDsBuffer*)

returns all the PropertyIDs of all colors within this group

**Parameters** *PropertyIDsBuffer* – PropertyID of the color in the color group.

*Lib3MF\_uint32* **AddColor** (const *sColor* &*TheColor*)

Adds a new value.

**Parameters** *TheColor* – The new color

**Returns** PropertyID of the new color within this color group.

void **RemoveColor** (const *Lib3MF\_uint32* *nPropertyID*)

Removes a color from the color group.

**Parameters** *nPropertyID* – PropertyID of the color to be removed from the color group.

void **SetColor** (const *Lib3MF\_uint32* *nPropertyID*, const *sColor* &*TheColor*)

Sets a color value.

**Parameters**



- **nPropertyID** – PropertyID of a color within this color group.
- **TheColor** – The color

*sColor* **GetColor** (**const** *Lib3MF\_uint32* *nPropertyID*)

Sets a color value.

**Parameters** **nPropertyID** – PropertyID of a color within this color group.

**Returns** The color

**typedef** `std::shared_ptr<CColorGroup>` *Lib3MF::PColorGroup*

Shared pointer to CColorGroup to easily allow reference counting.

## CColorGroupIterator

**class** *Lib3MF::CColorGroupIterator* : **public** *CResourceIterator*

*PColorGroup* **GetCurrentColorGroup** ()

Returns the ColorGroup the iterator points at.

**Returns** returns the ColorGroup instance.

**typedef** `std::shared_ptr<CColorGroupIterator>` *Lib3MF::PColorGroupIterator*

Shared pointer to CColorGroupIterator to easily allow reference counting.

## CComponent

**class** *Lib3MF::CComponent* : **public** *CBase*

*PObject* **GetObjectResource** ()

Returns the Resource Instance of the component..

**Returns** filled with the Resource Instance.

*Lib3MF\_uint32* **GetObjectResourceID** ()

Returns the Resource ID of the component.

**Returns** returns the Resource ID.

`std::string` **GetUUID** (**bool** &*bHasUUID*)

returns, whether a component has a UUID and, if true, the component's UUID

**Parameters** **bHasUUID** – flag whether the component has a UUID

**Returns** the UUID as string of the form 'xxxxxxxx-xxxx-xxxx-xxxxxxxxxxxxxxxx'

**void** **SetUUID** (**const** `std::string` &*sUUID*)

sets the component's UUID

**Parameters** **sUUID** – the UUID as string of the form 'xxxxxxxx-xxxx-xxxx-xxxxxxxxxxxxxxxx'

**bool** **HasTransform** ()

Returns, if the component has a different transformation than the identity matrix

**Returns** if true is returned, the transformation is not equal than the identity

*sTransform* **GetTransform** ()

Returns the transformation matrix of the component.

**Returns** filled with the component transformation matrix

void **SetTransform** (**const** *sTransform* &Transform)  
Sets the transformation matrix of the component.

**Parameters** **Transform** – new transformation matrix

**typedef** std::shared\_ptr<*CComponent*> Lib3MF::PComponent  
Shared pointer to CComponent to easily allow reference counting.

## CComponentsObject

**class** Lib3MF::CComponentsObject : public *CObject*

*PComponent* **AddComponent** (*CObject* \*pObjectResource, **const** *sTransform* &Transform)  
Adds a new component to a components object.

**Parameters**

- **pObjectResource** – object to add as component. Must not lead to circular references!
- **Transform** – optional transform matrix for the component.

**Returns** new component instance

*PComponent* **GetComponent** (**const** *Lib3MF\_uint32* nIndex)  
Retrieves a component from a component object.

**Parameters** **nIndex** – index of the component to retrieve (0 to componentcount - 1)

**Returns** component instance

*Lib3MF\_uint32* **GetComponentCount** ()  
Retrieves a component count of a component object.

**Returns** returns the component count

**typedef** std::shared\_ptr<*CComponentsObject*> Lib3MF::PComponentsObject  
Shared pointer to CComponentsObject to easily allow reference counting.

## CComponentsObjectIterator

**class** Lib3MF::CComponentsObjectIterator : public *CResourceIterator*

*PComponentsObject* **GetCurrentComponentsObject** ()  
Returns the ComponentsObject the iterator points at.

**Returns** returns the ComponentsObject instance.

**typedef** std::shared\_ptr<*CComponentsObjectIterator*> Lib3MF::PComponentsObjectIterator  
Shared pointer to CComponentsObjectIterator to easily allow reference counting.

## CCompositeMaterials

```
class Lib3MF::CCompositeMaterials : public CResource
```

*Lib3MF\_uint32* **GetCount** ()

Retrieves the count of Composite-s in the CompositeMaterials.

**Returns** returns the count of Composite-s

void **GetAllPropertyIDs** (std::vector<*Lib3MF\_uint32*> &*PropertyIDsBuffer*)

returns all the PropertyIDs of all Composite-Mixing Values in this CompositeMaterials

**Parameters** **PropertyIDsBuffer** – PropertyID of the Composite-Mixing Values in the CompositeMaterials.

*PBaseMaterialGroup* **GetBaseMaterialGroup** ()

Obtains the BaseMaterialGroup instance of this CompositeMaterials.

**Returns** returns the BaseMaterialGroup instance of this CompositeMaterials

*Lib3MF\_uint32* **AddComposite** (const *CInputVector*<*sCompositeConstituent*> &*CompositeBuffer*)

Adds a new Composite-Mixing Values to the CompositeMaterials.

**Parameters** **CompositeBuffer** – The Composite Constituents to be added as composite

**Returns** returns new PropertyID of the new Composite in the CompositeMaterials.

void **RemoveComposite** (const *Lib3MF\_uint32* *nPropertyID*)

Removes a Composite-Maxing Ratio from the CompositeMaterials.

**Parameters** **nPropertyID** – PropertyID of the Composite-Mixing Values in the Composite-Materials to be removed.

void **GetComposite** (const *Lib3MF\_uint32* *nPropertyID*, std::vector<*sCompositeConstituent*> &*CompositeBuffer*)

Obtains a Composite-Maxing Ratio of this CompositeMaterials.

**Parameters**

- **nPropertyID** – the PropertyID of the Composite-Maxing Ratio in the CompositeMaterials.
- **CompositeBuffer** – The Composite-Mixing Values with the given PropertyID

```
typedef std::shared_ptr<CCompositeMaterials> Lib3MF::PCompositeMaterials
```

Shared pointer to CCompositeMaterials to easily allow reference counting.

## CCompositeMaterialsIterator

```
class Lib3MF::CCompositeMaterialsIterator : public CResourceIterator
```

*PCompositeMaterials* **GetCurrentCompositeMaterials** ()

Returns the CompositeMaterials the iterator points at.

**Returns** returns the CompositeMaterials instance.

```
typedef std::shared_ptr<CCompositeMaterialsIterator> Lib3MF::PCompositeMaterialsIterator
```

Shared pointer to CCompositeMaterialsIterator to easily allow reference counting.

## CMeshObject

```
class Lib3MF::CMeshObject : public CObject
```

```
Lib3MF_uint32 GetVertexCount ()
```

Returns the vertex count of a mesh object.

**Returns** filled with the vertex count.

```
Lib3MF_uint32 GetTriangleCount ()
```

Returns the triangle count of a mesh object.

**Returns** filled with the triangle count.

```
sPosition GetVertex (const Lib3MF_uint32 nIndex)
```

Returns the vertex count of a mesh object.

**Parameters** **nIndex** – Index of the vertex (0 to vertexcount - 1)

**Returns** filled with the vertex coordinates.

```
void SetVertex (const Lib3MF_uint32 nIndex, const sPosition &Coordinates)
```

Sets the coordinates of a single vertex of a mesh object

**Parameters**

- **nIndex** – Index of the vertex (0 to vertexcount - 1)
- **Coordinates** – contains the vertex coordinates.

```
Lib3MF_uint32 AddVertex (const sPosition &Coordinates)
```

Adds a single vertex to a mesh object

**Parameters** **Coordinates** – contains the vertex coordinates.

**Returns** Index of the new vertex

```
void GetVertices (std::vector<sPosition> &VerticesBuffer)
```

Obtains all vertex positions of a mesh object

**Parameters** **VerticesBuffer** – contains the vertex coordinates.

```
sTriangle GetTriangle (const Lib3MF_uint32 nIndex)
```

Returns indices of a single triangle of a mesh object.

**Parameters** **nIndex** – Index of the triangle (0 to trianglecount - 1)

**Returns** filled with the triangle indices.

```
void SetTriangle (const Lib3MF_uint32 nIndex, const sTriangle &Indices)
```

Sets the indices of a single triangle of a mesh object.

**Parameters**

- **nIndex** – Index of the triangle (0 to trianglecount - 1)
- **Indices** – contains the triangle indices.

```
Lib3MF_uint32 AddTriangle (const sTriangle &Indices)
```

Adds a single triangle to a mesh object

**Parameters** **Indices** – contains the triangle indices.

**Returns** Index of the new triangle

void **GetTriangleIndices** (std::vector<*sTriangle*> &*IndicesBuffer*)  
Get all triangles of a mesh object

**Parameters** *IndicesBuffer* – contains the triangle indices.

void **SetObjectLevelProperty** (const *Lib3MF\_uint32* *nResourceID*, const *Lib3MF\_uint32* *nPropertyID*)

Sets the property at the object-level of the mesh object.

**Parameters**

- *nResourceID* – the object-level Property Resource ID.
- *nPropertyID* – the object-level PropertyID.

bool **GetObjectLevelProperty** (*Lib3MF\_uint32* &*nResourceID*, *Lib3MF\_uint32* &*nPropertyID*)

Gets the property at the object-level of the mesh object.

**Parameters**

- *nResourceID* – the object-level Property Resource ID.
- *nPropertyID* – the object-level PropertyID.

**Returns** Has an object-level property been specified?

void **SetTriangleProperties** (const *Lib3MF\_uint32* *nIndex*, const *sTriangleProperties* &*Properties*)

Sets the properties of a single triangle of a mesh object.

**Parameters**

- *nIndex* – Index of the triangle (0 to trianglecount - 1)
- *Properties* – contains the triangle properties.

void **GetTriangleProperties** (const *Lib3MF\_uint32* *nIndex*, *sTriangleProperties* &*Property*)

Gets the properties of a single triangle of a mesh object.

**Parameters**

- *nIndex* – Index of the triangle (0 to trianglecount - 1)
- *Property* – returns the triangle properties.

void **SetAllTriangleProperties** (const *CInputVector*<*sTriangleProperties*> &*PropertiesArrayBuffer*)

Sets the properties of all triangles of a mesh object. Sets the object level property to the first entry of the passed triangle properties, if not yet specified.

**Parameters** *PropertiesArrayBuffer* – contains the triangle properties array. Must have trianglecount elements.

void **GetAllTriangleProperties** (std::vector<*sTriangleProperties*> &*PropertiesArrayBuffer*)

Gets the properties of all triangles of a mesh object.

**Parameters** *PropertiesArrayBuffer* – returns the triangle properties array. Must have trianglecount elements.

void **ClearAllProperties** ()

Clears all properties of this mesh object (triangle and object-level).

void **SetGeometry** (const *CInputVector*<*sPosition*> &*VerticesBuffer*, const *CInputVector*<*sTriangle*> &*IndicesBuffer*)

Set all triangles of a mesh object

**Parameters**

- **VerticesBuffer** – contains the positions.
- **IndicesBuffer** – contains the triangle indices.

bool **IsManifoldAndOriented** ()

Retrieves, if an object describes a topologically oriented and manifold mesh, according to the core spec.

**Returns** returns, if the object is oriented and manifold.

*PBeamLattice* **BeamLattice** ()

Retrieves the BeamLattice within this MeshObject.

**Returns** the BeamLattice within this MeshObject

typedef std::shared\_ptr<*CMeshObject*> Lib3MF::P**MeshObject**

Shared pointer to CMeshObject to easily allow reference counting.

## CMeshObjectIterator

class Lib3MF::C**MeshObjectIterator** : public *CResourceIterator*

*PMeshObject* **GetCurrentMeshObject** ()

Returns the MeshObject the iterator points at.

**Returns** returns the MeshObject instance.

typedef std::shared\_ptr<*CMeshObjectIterator*> Lib3MF::P**MeshObjectIterator**

Shared pointer to CMeshObjectIterator to easily allow reference counting.

## CMetaData

class Lib3MF::C**MetaData** : public *CBase*

std::string **GetNamespace** ()

returns the namespace URL of the metadata

**Returns** the namespace URL of the metadata

void **SetNamespace** (const std::string &*sNamespace*)

sets a new namespace URL of the metadata

**Parameters** *sNamespace* – the new namespace URL of the metadata

std::string **GetName** ()

returns the name of a metadata

**Returns** the name of the metadata

void **SetName** (const std::string &*sName*)

sets a new name of a metadata

**Parameters** *sName* – the new name of the metadata

std::string **GetKey** ()

returns the (namespace+name) of a metadata

**Returns** the key (namespace+name) of the metadata

bool **GetMustPreserve** ()

returns, whether a metadata must be preserved

**Returns** returns, whether a metadata must be preserved

void **SetMustPreserve** (**const** bool *bMustPreserve*)  
sets whether a metadata must be preserved

**Parameters** **bMustPreserve** – a new value whether a metadata must be preserved

std::string **GetType** ()  
returns the type of a metadata

**Returns** the type of the metadata

void **SetType** (**const** std::string &*sType*)  
sets a new type of a metadata. This must be a simple XML type

**Parameters** **sType** – a new type of the metadata

std::string **GetValue** ()  
returns the value of the metadata

**Returns** the value of the metadata

void **SetValue** (**const** std::string &*sValue*)  
sets a new value of the metadata

**Parameters** **sValue** – a new value of the metadata

**typedef** std::shared\_ptr<*CMetaData*> Lib3MF::P**MetaData**  
Shared pointer to CMetaData to easily allow reference counting.

## CMetaDataGroup

**class** Lib3MF::CMetaDataGroup : **public** CBase

*Lib3MF\_uint32* **GetMetaDataCount** ()  
returns the number of metadata in this metadatagroup

**Returns** returns the number metadata

*PMetaData* **GetMetaData** (**const** *Lib3MF\_uint32* *nIndex*)  
returns a metadata value within this metadatagroup

**Parameters** **nIndex** – Index of the Metadata.

**Returns** an instance of the metadata

*PMetaData* **GetMetaDataByKey** (**const** std::string &*sNamespace*, **const** std::string &*sName*)  
returns a metadata value within this metadatagroup

**Parameters**

- **sNamespace** – the namespace of the metadata
- **sName** – the name of the Metadata

**Returns** an instance of the metadata

void **RemoveMetaDataByIndex** (**const** *Lib3MF\_uint32* *nIndex*)  
removes metadata by index from the model.

**Parameters** **nIndex** – Index of the metadata to remove

void **RemoveMetaData** (*CMetaData* \**pTheMetaData*)  
removes metadata from the model.

**Parameters** **pTheMetaData** – The metadata to remove

*PMetaData* **AddMetaData** (**const** std::string &*sNamespace*, **const** std::string &*sName*, **const** std::string &*sValue*, **const** std::string &*sType*, **const** bool *bMustPreserve*)

adds a new metadata to this metadatatagroup

**Parameters**

- **sNamespace** – the namespace of the metadata
- **sName** – the name of the metadata
- **sValue** – the value of the metadata
- **sType** – the type of the metadata
- **bMustPreserve** – should the metadata be preserved

**Returns** a new instance of the metadata

**typedef** std::shared\_ptr<*CMetaDataGroup*> **Lib3MF::PMetaDataGroup**  
Shared pointer to CMetaDataGroup to easily allow reference counting.

## CModel

**class** Lib3MF::CModel : **public** CBase

**void** **SetUnit** (**const** *eModelUnit* *eUnit*)  
sets the units of a model.

**Parameters** **eUnit** – Unit enum value for the model unit

*eModelUnit* **GetUnit** ()  
returns the units of a model.

**Returns** Unit enum value for the model unit

std::string **GetLanguage** ()  
retrieves the language of a model

**Returns** language identifier

**void** **SetLanguage** (**const** std::string &*sLanguage*)  
sets the language of a model

**Parameters** **sLanguage** – language identifier

*PWriter* **QueryWriter** (**const** std::string &*sWriterClass*)  
creates a model writer instance for a specific file type

**Parameters** **sWriterClass** – string identifier for the file type

**Returns** string identifier for the file type

*PReader* **QueryReader** (**const** std::string &*sReaderClass*)  
creates a model reader instance for a specific file type

**Parameters** **sReaderClass** – string identifier for the file type

**Returns** string identifier for the file type

*PTexture2D* **GetTexture2DByID** (**const** *Lib3MF\_uint32* *nResourceID*)  
finds a model texture by its id



**Parameters** `nResourceID` – Resource ID

**Returns** returns the texture2d instance

*ePropertyType* **GetPropertyTypeByID** (`const Lib3MF_uint32 nResourceID`)  
returns a Property's type

**Parameters** `nResourceID` – Resource ID of the Property to Query

**Returns** returns a Property's type

*PBaseMaterialGroup* **GetBaseMaterialGroupByID** (`const Lib3MF_uint32 nResourceID`)  
finds a model base material group by its id

**Parameters** `nResourceID` – Resource ID

**Returns** returns the BaseMaterialGroup instance

*PTexture2DGroup* **GetTexture2DGroupByID** (`const Lib3MF_uint32 nResourceID`)  
finds a model texture2d group by its id

**Parameters** `nResourceID` – Resource ID

**Returns** returns the Texture2DGroup instance

*PCompositeMaterials* **GetCompositeMaterialsByID** (`const Lib3MF_uint32 nResourceID`)  
finds a model CompositeMaterials by its id

**Parameters** `nResourceID` – Resource ID

**Returns** returns the CompositeMaterials instance

*PMultiPropertyGroup* **GetMultiPropertyGroupByID** (`const Lib3MF_uint32 nResourceID`)  
finds a model MultiPropertyGroup by its id

**Parameters** `nResourceID` – Resource ID

**Returns** returns the MultiPropertyGroup instance

*PMeshObject* **GetMeshObjectByID** (`const Lib3MF_uint32 nResourceID`)  
finds a mesh object by its id

**Parameters** `nResourceID` – Resource ID

**Returns** returns the mesh object instance

*PComponentsObject* **GetComponentsObjectByID** (`const Lib3MF_uint32 nResourceID`)  
finds a components object by its id

**Parameters** `nResourceID` – Resource ID

**Returns** returns the components object instance

*PColorGroup* **GetColorGroupByID** (`const Lib3MF_uint32 nResourceID`)  
finds a model color group by its id

**Parameters** `nResourceID` – Resource ID

**Returns** returns the ColorGroup instance

*PSliceStack* **GetSliceStackByID** (`const Lib3MF_uint32 nResourceID`)  
finds a model slicestack by its id

**Parameters** `nResourceID` – Resource ID

**Returns** returns the slicestack instance

std::string **GetBuildUUID** (bool &*bHasUUID*)

returns, whether a build has a UUID and, if true, the build's UUID

**Parameters** *bHasUUID* – flag whether the build has a UUID

**Returns** the UUID as string of the form 'xxxxxxxx-xxxx-xxxx-xxxxxxxxxxxxxxxx'

void **SetBuildUUID** (const std::string &*sUUID*)

sets the build's UUID

**Parameters** *sUUID* – the UUID as string of the form 'xxxxxxxx-xxxx-xxxx-xxxxxxxxxxxxxxxx'

*PBuildItemIterator* **GetBuildItems** ()

creates a build item iterator instance with all build items.

**Returns** returns the iterator instance.

*sBox* **GetOutbox** ()

Returns the outbox of a Model

**Returns** Outbox of this Model

*PResourceIterator* **GetResources** ()

creates a resource iterator instance with all resources.

**Returns** returns the iterator instance.

*PObjectIterator* **GetObjects** ()

creates a resource iterator instance with all object resources.

**Returns** returns the iterator instance.

*PMeshObjectIterator* **GetMeshObjects** ()

creates a resource iterator instance with all mesh object resources.

**Returns** returns the iterator instance.

*PComponentsObjectIterator* **GetComponentsObjects** ()

creates a resource iterator instance with all components object resources.

**Returns** returns the iterator instance.

*PTexture2DIterator* **GetTexture2Ds** ()

creates a Texture2DIterator instance with all texture2d resources.

**Returns** returns the iterator instance.

*PBaseMaterialGroupIterator* **GetBaseMaterialGroups** ()

creates a BaseMaterialGroupIterator instance with all base material resources.

**Returns** returns the iterator instance.

*PColorGroupIterator* **GetColorGroups** ()

creates a ColorGroupIterator instance with all ColorGroup resources.

**Returns** returns the iterator instance.

*PTexture2DGroupIterator* **GetTexture2DGroups** ()

creates a Texture2DGroupIterator instance with all base material resources.

**Returns** returns the iterator instance.

*PCompositeMaterialsIterator* **GetCompositeMaterials** ()

creates a CompositeMaterialsIterator instance with all CompositeMaterials resources.

**Returns** returns the iterator instance.

***PMultiPropertyGroupIterator* GetMultiPropertyGroups ()**

creates a MultiPropertyGroupsIterator instance with all MultiPropertyGroup resources.

**Returns** returns the iterator instance.

***PSliceStackIterator* GetSliceStacks ()**

creates a resource iterator instance with all slice stack resources.

**Returns** returns the iterator instance.

***PModel* MergeToModel ()**

Merges all components and objects which are referenced by a build item into a mesh. The memory is duplicated and a new model is created.

**Returns** returns the merged model instance

***PMeshObject* AddMeshObject ()**

adds an empty mesh object to the model.

**Returns** returns the mesh object instance

***PComponentsObject* AddComponentsObject ()**

adds an empty component object to the model.

**Returns** returns the components object instance

***PSliceStack* AddSliceStack (const *Lib3MF\_double* dZBottom)**

creates a new model slicestack by its id

**Parameters** **dZBottom** – Bottom Z value of the slicestack

**Returns** returns the new slicestack instance

***PTexture2D* AddTexture2DFromAttachment (*CAttachment* \*pTextureAttachment)**

adds a texture2d resource to the model. Its path is given by that of an existing attachment.

**Parameters** **pTextureAttachment** – attachment containing the image data.

**Returns** returns the new texture instance.

***PBaseMaterialGroup* AddBaseMaterialGroup ()**

adds an empty BaseMaterialGroup resource to the model.

**Returns** returns the new base material instance.

***PColorGroup* AddColorGroup ()**

adds an empty ColorGroup resource to the model.

**Returns** returns the new ColorGroup instance.

***PTexture2DGroup* AddTexture2DGroup (*CTexture2D* \*pTexture2DInstance)**

adds an empty Texture2DGroup resource to the model.

**Parameters** **pTexture2DInstance** – The texture2D instance of the created Texture2DGroup.

**Returns** returns the new Texture2DGroup instance.

***PCompositeMaterials* AddCompositeMaterials (*CBaseMaterialGroup* \*pBaseMaterialGroupInstance)**

adds an empty CompositeMaterials resource to the model.

**Parameters** **pBaseMaterialGroupInstance** – The BaseMaterialGroup instance of the created CompositeMaterials.

**Returns** returns the new CompositeMaterials instance.

*PMultiPropertyGroup* **AddMultiPropertyGroup** ()

adds an empty MultiPropertyGroup resource to the model.

**Returns** returns the new MultiPropertyGroup instance.

*PBuildItem* **AddBuildItem** (*CObject* \*pObject, **const** *sTransform* &Transform)

adds a build item to the model.

**Parameters**

- **pObject** – Object instance.
- **Transform** – Transformation matrix.

**Returns** returns the build item instance.

void **RemoveBuildItem** (*CBuildItem* \*pBuildItemInstance)

removes a build item from the model

**Parameters** **pBuildItemInstance** – Build item to remove.

*PMetaDataGroup* **GetMetaDataGroup** ()

Returns the metadata of the model as MetaDataGroup

**Returns** returns an Instance of the metadatagroup of the model

*PAttachment* **AddAttachment** (**const** std::string &sURI, **const** std::string &sRelationshipType)

adds an attachment stream to the model. The OPC part will be related to the model stream with a certain relationship type..

**Parameters**

- **sURI** – Path of the attachment
- **sRelationshipType** – Relationship type of the attachment

**Returns** Instance of the attachment object

void **RemoveAttachment** (*CAttachment* \*pAttachmentInstance)

Removes attachment from the model.

**Parameters** **pAttachmentInstance** – Attachment instance to remove

*PAttachment* **GetAttachment** (**const** *Lib3MF\_uint32* nIndex)

retrieves an attachment stream object from the model..

**Parameters** **nIndex** – Index of the attachment stream

**Returns** Instance of the attachment object

*PAttachment* **FindAttachment** (**const** std::string &sURI)

retrieves an attachment stream object from the model.

**Parameters** **sURI** – Path URI in the package

**Returns** Instance of the attachment object

*Lib3MF\_uint32* **GetAttachmentCount** ()

retrieves the number of attachments of the model.

**Returns** Returns the number of attachments.

bool **HasPackageThumbnailAttachment** ()

Retrieve whether the OPC package contains a package thumbnail.

**Returns** returns whether the OPC package contains a package thumbnail

*PAttachment* **CreatePackageThumbnailAttachment** ()

Create a new or the existing package thumbnail for the OPC package.

**Returns** Instance of a new or the existing thumbnailattachment object.

*PAttachment* **GetPackageThumbnailAttachment** ()

Get the attachment to the OPC package containing the package thumbnail.

**Returns** Instance of the thumbnailattachment object or NULL.

void **RemovePackageThumbnailAttachment** ()

Remove the attachment to the OPC package containing the package thumbnail.

void **AddCustomContentType** (const std::string &*sExtension*, const std::string &*sContentType*)

adds a new Content Type to the model.

**Parameters**

- **sExtension** – File Extension
- **sContentType** – Content Type Identifier

void **RemoveCustomContentType** (const std::string &*sExtension*)

removes a custom Content Type from the model (UTF8 version).

**Parameters** **sExtension** – File Extension

**typedef** std::shared\_ptr<*CModel*> Lib3MF::PModel

Shared pointer to CModel to easily allow reference counting.

## CMultiPropertyGroup

**class** Lib3MF::CMultiPropertyGroup : public *CResource*

*Lib3MF\_uint32* **GetCount** ()

Retrieves the count of MultiProperty-s in the MultiPropertyGroup.

**Returns** returns the count of MultiProperty-s

void **GetAllPropertyIDs** (std::vector<*Lib3MF\_uint32*> &*PropertyIDsBuffer*)

returns all the PropertyIDs of all MultiProperty-s in this MultiPropertyGroup

**Parameters** **PropertyIDsBuffer** – PropertyID of the MultiProperty-s in the MultiPropertyGroup.

*Lib3MF\_uint32* **AddMultiProperty** (const *CInputVector*<*Lib3MF\_uint32*> &*PropertyIDsBuffer*)

Adds a new MultiProperty to the MultiPropertyGroup.

**Parameters** **PropertyIDsBuffer** – The PropertyIDs of the new MultiProperty.

**Returns** returns the PropertyID of the new MultiProperty in the MultiPropertyGroup.

void **SetMultiProperty** (const *Lib3MF\_uint32* *nPropertyID*, const *CInputVector*<*Lib3MF\_uint32*> &*PropertyIDsBuffer*)

Sets the PropertyIDs of a MultiProperty.

**Parameters**

- **nPropertyID** – the PropertyID of the MultiProperty to be changed.
- **PropertyIDsBuffer** – The new PropertyIDs of the MultiProperty

void **GetMultiProperty** (const *Lib3MF\_uint32* nPropertyID, std::vector<*Lib3MF\_uint32*> &PropertyIDsBuffer)  
Obtains the PropertyIDs of a MultiProperty.

**Parameters**

- **nPropertyID** – the PropertyID of the MultiProperty to be queried.
- **PropertyIDsBuffer** – The PropertyIDs of the MultiProperty

void **RemoveMultiProperty** (const *Lib3MF\_uint32* nPropertyID)  
Removes a MultiProperty from this MultiPropertyGroup.

**Parameters** **nPropertyID** – the PropertyID of the MultiProperty to be removed.

*Lib3MF\_uint32* **GetLayerCount** ()  
Retrieves the number of layers of this MultiPropertyGroup.

**Returns** returns the number of layers

*Lib3MF\_uint32* **AddLayer** (const *sMultiPropertyLayer* &TheLayer)  
Adds a MultiPropertyLayer to this MultiPropertyGroup.

**Parameters** **TheLayer** – The MultiPropertyLayer to add to this MultiPropertyGroup

**Returns** returns the index of this MultiPropertyLayer

*sMultiPropertyLayer* **GetLayer** (const *Lib3MF\_uint32* nLayerIndex)  
Obtains a MultiPropertyLayer of this MultiPropertyGroup.

**Parameters** **nLayerIndex** – The Index of the MultiPropertyLayer queried

**Returns** The MultiPropertyLayer with index LayerIndex within MultiPropertyGroup

void **RemoveLayer** (const *Lib3MF\_uint32* nLayerIndex)  
Removes a MultiPropertyLayer from this MultiPropertyGroup.

**Parameters** **nLayerIndex** – The Index of the MultiPropertyLayer to be removed

**typedef** std::shared\_ptr<*CMultiPropertyGroup*> **Lib3MF::PMultiPropertyGroup**  
Shared pointer to CMultiPropertyGroup to easily allow reference counting.

## **CMultiPropertyGroupIterator**

**class** **Lib3MF::CMultiPropertyGroupIterator** : public *CResourceIterator*

*PMultiPropertyGroup* **GetCurrentMultiPropertyGroup** ()  
Returns the MultiPropertyGroup the iterator points at.

**Returns** returns the MultiPropertyGroup instance.

**typedef** std::shared\_ptr<*CMultiPropertyGroupIterator*> **Lib3MF::PMultiPropertyGroupIterator**  
Shared pointer to CMultiPropertyGroupIterator to easily allow reference counting.

## CObject

**class** Lib3MF::CObject : public CResource

*eObjectType* GetType ()

Retrieves an object's type

**Returns** returns object type enum.

void SetType (const *eObjectType* eObjectType)

Sets an object's type

**Parameters** eObjectType – object type enum.

std::string GetName ()

Retrieves an object's name

**Returns** returns object name.

void SetName (const std::string &sName)

Sets an object's name string

**Parameters** sName – new object name.

std::string GetPartNumber ()

Retrieves an object's part number

**Returns** returns object part number.

void SetPartNumber (const std::string &sPartNumber)

Sets an objects partnumber string

**Parameters** sPartNumber – new object part number.

bool IsMeshObject ()

Retrieves, if an object is a mesh object

**Returns** returns, whether the object is a mesh object

bool IsComponentsObject ()

Retrieves, if an object is a components object

**Returns** returns, whether the object is a components object

bool IsValid ()

Retrieves, if the object is valid according to the core spec. For mesh objects, we distinguish between the type attribute of the object: In case of object type other, this always means false. In case of object type model or solidsupport, this means, if the mesh suffices all requirements of the core spec chapter 4.1. In case of object type support or surface, this always means true. A component objects is valid if and only if it contains at least one component and all child components are valid objects.

**Returns** returns whether the object is a valid object description

void SetAttachmentAsThumbnail (CAttachment \*pAttachment)

Use an existing attachment as thumbnail for this object

**Parameters** pAttachment – Instance of a new or the existing thumbnailattachment object.

*CAttachment* GetThumbnailAttachment ()

Get the attachment containing the object thumbnail.

**Returns** Instance of the thumbnailattachment object or NULL.

void **ClearThumbnailAttachment** ()

Clears the attachment. The attachment instance is not removed from the package.

*sBox* **GetOutbox** ()

Returns the outbox of a build item

**Returns** Outbox of this build item

std::string **GetUUID** (bool &*bHasUUID*)

Retrieves an object's uuid string (see production extension specification)

**Parameters** *bHasUUID* – flag whether the build item has a UUID

**Returns** returns object uuid.

void **SetUUID** (const std::string &*sUUID*)

Sets a build object's uuid string (see production extension specification)

**Parameters** *sUUID* – new object uuid string.

*PMetaDataGroup* **GetMetaDataGroup** ()

Returns the metadatagroup of this object

**Returns** returns an Instance of the metadatagroup of this object

void **SetSlicesMeshResolution** (const *eSlicesMeshResolution* *eMeshResolution*)

set the meshresolution of the mesh object

**Parameters** *eMeshResolution* – meshresolution of this object

*eSlicesMeshResolution* **GetSlicesMeshResolution** ()

get the meshresolution of the mesh object

**Returns** meshresolution of this object

bool **HasSlices** (const bool *bRecursive*)

returns whether the Object has a slice stack. If Recursive is true, also checks whether any references object has a slice stack

**Parameters** *bRecursive* – check also all referenced objects?

**Returns** does the object have a slice stack?

void **ClearSliceStack** ()

unlinks the attached slicestack from this object. If no slice stack is attached, do noting.

*PSliceStack* **GetSliceStack** ()

get the Slicestack attached to the object

**Returns** returns the slicestack instance

void **AssignSliceStack** (*CSliceStack* \**pSliceStackInstance*)

assigns a slicestack to the object

**Parameters** *pSliceStackInstance* – the new slice stack of this Object

**typedef** std::shared\_ptr<*CObject*> Lib3MF::PObject

Shared pointer to CObject to easily allow reference counting.



## CObjectIterator

```
class Lib3MF::CObjectIterator : public CResourceIterator
```

*PObject* **GetCurrentObject** ()

Returns the Object the iterator points at.

**Returns** returns the Object instance.

```
typedef std::shared_ptr<CObjectIterator> Lib3MF::PObjectIterator
```

Shared pointer to CObjectIterator to easily allow reference counting.

## CReader

```
class Lib3MF::CReader : public CBase
```

void **ReadFromFile** (const std::string &sFilename)

Reads a model from a file. The file type is specified by the Model Reader class

**Parameters** sFilename – Filename to read from

void **ReadFromBuffer** (const CInputVector<Lib3MF\_uint8> &BufferBuffer)

Reads a model from a memory buffer.

**Parameters** BufferBuffer – Buffer to read from

void **ReadFromCallback** (const ReadCallback pTheReadCallback, const Lib3MF\_uint64 nStreamSize, const SeekCallback pTheSeekCallback, const Lib3MF\_pvoid pUserData)

Reads a model and from the data provided by a callback function

**Parameters**

- pTheReadCallback – Callback to call for reading a data chunk
- nStreamSize – number of bytes the callback returns
- pTheSeekCallback – Callback to call for seeking in the stream.
- pUserData – Userdata that is passed to the callback function

void **SetProgressCallback** (const ProgressCallback pProgressCallback, const Lib3MF\_pvoid pUserData)

Set the progress callback for calls to this writer

**Parameters**

- pProgressCallback – pointer to the callback function.
- pUserData – pointer to arbitrary user data that is passed without modification to the callback.

void **AddRelationToRead** (const std::string &sRelationshipType)

Adds a relationship type which shall be read as attachment in memory while loading

**Parameters** sRelationshipType – String of the relationship type

void **RemoveRelationToRead** (const std::string &sRelationshipType)

Removes a relationship type which shall be read as attachment in memory while loading

**Parameters** sRelationshipType – String of the relationship type

void **SetStrictModeActive** (const bool *bStrictModeActive*)

Activates (deactivates) the strict mode of the reader.

**Parameters** *bStrictModeActive* – flag whether strict mode is active or not.

bool **GetStrictModeActive** ()

Queries whether the strict mode of the reader is active or not

**Returns** returns flag whether strict mode is active or not.

std::string **GetWarning** (const *Lib3MF\_uint32* *nIndex*, *Lib3MF\_uint32* &*nErrorCode*)

Returns Warning and Error Information of the read process

**Parameters**

- **nIndex** – Index of the Warning. Valid values are 0 to WarningCount - 1
- **nErrorCode** – filled with the error code of the warning

**Returns** the message of the warning

*Lib3MF\_uint32* **GetWarningCount** ()

Returns Warning and Error Count of the read process

**Returns** filled with the count of the occurred warnings.

typedef std::shared\_ptr<*CReader*> Lib3MF::PReader

Shared pointer to CReader to easily allow reference counting.

## CResource

class Lib3MF::CResource : public *CBase*

*Lib3MF\_uint32* **GetResourceID** ()

Retrieves the resource id of the resource instance.

**Returns** Retrieves the ID of a Model Resource Instance.

typedef std::shared\_ptr<*CResource*> Lib3MF::PResource

Shared pointer to CResource to easily allow reference counting.

## CResourceIterator

class Lib3MF::CResourceIterator : public *CBase*

bool **MoveNext** ()

Iterates to the next resource in the list.

**Returns** Iterates to the next resource in the list.

bool **MovePrevious** ()

Iterates to the previous resource in the list.

**Returns** Iterates to the previous resource in the list.

*PResource* **GetCurrent** ()

Returns the resource the iterator points at.

**Returns** returns the resource instance.

***PResourceIterator* Clone ()**

Creates a new resource iterator with the same resource list.

**Returns** returns the cloned Iterator instance

***Lib3MF\_uint64* Count ()**

Returns the number of resouces the iterator captures.

**Returns** returns the number of resouces the iterator captures.

**typedef** std::shared\_ptr<*CResourceIterator*> Lib3MF::PResourceIterator  
Shared pointer to CResourceIterator to easily allow reference counting.

**CSlice**

**class** Lib3MF::CSlice : public *CBase*

void **SetVertices** (const *CInputVector*<*sPosition2D*> &*VerticesBuffer*)

Set all vertices of a slice. All polygons will be cleared.

**Parameters** *VerticesBuffer* – contains the positions.

void **GetVertices** (std::vector<*sPosition2D*> &*VerticesBuffer*)

Get all vertices of a slice

**Parameters** *VerticesBuffer* – contains the positions.

*Lib3MF\_uint64* **GetVertexCount** ()

Get the number of vertices in a slice

**Returns** the number of vertices in the slice

*Lib3MF\_uint64* **AddPolygon** (const *CInputVector*<*Lib3MF\_uint32*> &*IndicesBuffer*)

Add a new polygon to this slice

**Parameters** *IndicesBuffer* – the new indices of the new polygon

**Returns** the index of the new polygon

*Lib3MF\_uint64* **GetPolygonCount** ()

Get the number of polygons in the slice

**Returns** the number of polygons in the slice

void **SetPolygonIndices** (const *Lib3MF\_uint64* *nIndex*, const *CInputVector*<*Lib3MF\_uint32*> &*IndicesBuffer*)

Set all indices of a polygon

**Parameters**

- **nIndex** – the index of the polygon to manipulate
- **IndicesBuffer** – the new indices of the index-th polygon

void **GetPolygonIndices** (const *Lib3MF\_uint64* *nIndex*, std::vector<*Lib3MF\_uint32*> &*IndicesBuffer*)

Get all vertices of a slice

**Parameters**

- **nIndex** – the index of the polygon to manipulate
- **IndicesBuffer** – the indices of the index-th polygon

*Lib3MF\_uint64* **GetPolygonIndexCount** (**const** *Lib3MF\_uint64* *nIndex*)

Get the number of vertices in a slice

**Parameters** *nIndex* – the index of the polygon to manipulate

**Returns** the number of indices of the index-th polygon

*Lib3MF\_double* **GetZTop** ()

Get the upper Z-Coordinate of this slice.

**Returns** the upper Z-Coordinate of this slice

**typedef** std::shared\_ptr<*CSlice*> *Lib3MF::PSlice*

Shared pointer to *CSlice* to easily allow reference counting.

## **CSliceStack**

**class** *Lib3MF::CSliceStack* : **public** *CResource*

*Lib3MF\_double* **GetBottomZ** ()

Get the lower Z-Coordinate of the slice stack.

**Returns** the lower Z-Coordinate the slice stack

*Lib3MF\_uint64* **GetSliceCount** ()

Returns the number of slices

**Returns** the number of slices

*PSlice* **GetSlice** (**const** *Lib3MF\_uint64* *nSliceIndex*)

Query a slice from the slice stack

**Parameters** *nSliceIndex* – the index of the slice

**Returns** the Slice instance

*PSlice* **AddSlice** (**const** *Lib3MF\_double* *dZTop*)

Returns the number of slices

**Parameters** *dZTop* – upper Z coordinate of the slice

**Returns** a new Slice instance

*Lib3MF\_uint64* **GetSliceRefCount** ()

Returns the number of slice refs

**Returns** the number of slicereferences

**void** **AddSliceStackReference** (*CSliceStack* \**pTheSliceStack*)

Adds another existing slicestack as sliceref in this slicestack

**Parameters** *pTheSliceStack* – the slicestack to use as sliceref

*PSliceStack* **GetSliceStackReference** (**const** *Lib3MF\_uint64* *nSliceRefIndex*)

Adds another existing slicestack as sliceref in this slicestack

**Parameters** *nSliceRefIndex* – the index of the slice ref

**Returns** the slicestack that is used as sliceref

**void** **CollapseSliceReferences** ()

Removes the indirection of slices via slice-refs, i.e. creates the slices of all slice refs of this SliceStack as actual slices of this SliceStack. All previously existing slices or slicerefs will be removed.

void **SetOwnPath** (const std::string &*sPath*)

Sets the package path where this Slice should be stored. Input an empty string to reset the path

**Parameters** *sPath* – the package path where this Slice should be stored

std::string **GetOwnPath** ()

Obtains the package path where this Slice should be stored. Returns an empty string if the slicestack is stored within the root model.

**Returns** the package path where this Slice will be stored

**typedef** std::shared\_ptr<*CSliceStack*> Lib3MF::PSliceStack

Shared pointer to CSliceStack to easily allow reference counting.

## CSliceStackIterator

**class** Lib3MF::CSliceStackIterator : public *CResourceIterator*

*PSliceStack* **GetCurrentSliceStack** ()

Returns the SliceStack the iterator points at.

**Returns** returns the SliceStack instance.

**typedef** std::shared\_ptr<*CSliceStackIterator*> Lib3MF::PSliceStackIterator

Shared pointer to CSliceStackIterator to easily allow reference counting.

## CTexture2D

**class** Lib3MF::CTexture2D : public *CResource*

*PAttachment* **GetAttachment** ()

Retrieves the attachment located at the path of the texture.

**Returns** attachment that holds the texture's image information.

void **SetAttachment** (*PAttachment* \**pAttachment*)

Sets the texture's package path to the path of the attachment.

**Parameters** *pAttachment* – attachment that holds the texture's image information.

*eTextureType* **GetContentType** ()

Retrieves a texture's content type.

**Returns** returns content type enum.

void **SetContentType** (const *eTextureType* *eContentType*)

Retrieves a texture's content type.

**Parameters** *eContentType* – new Content Type

void **GetTileStyleUV** (*eTextureTileStyle* &*eTileStyleU*, *eTextureTileStyle* &*eTileStyleV*)

Retrieves a texture's tilestyle type.

**Parameters**

- *eTileStyleU* – returns tilestyle type enum.
- *eTileStyleV* – returns tilestyle type enum.

void **SetTileStyleUV** (const *eTextureTileStyle* *eTileStyleU*, const *eTextureTileStyle* *eTileStyleV*)

Sets a texture's tilestyle type.

**Parameters**

- **eTileStyleU** – new tilestyle type enum.
- **eTileStyleV** – new tilestyle type enum.

*eTextureFilter* **GetFilter** ()

Retrieves a texture's filter type.

**Returns** returns filter type enum.

void **SetFilter** (const *eTextureFilter* eFilter)

Sets a texture's filter type.

**Parameters** **eFilter** – sets new filter type enum.

**typedef** std::shared\_ptr<*CTexture2D*> Lib3MF::PTexture2D  
Shared pointer to CTexture2D to easily allow reference counting.

**CTexture2DGroup**

**class** Lib3MF::CTexture2DGroup : public *CResource*

*Lib3MF\_uint32* **GetCount** ()

Retrieves the count of tex2coords in the Texture2DGroup.

**Returns** returns the count of tex2coords.

void **GetAllPropertyIDs** (std::vector<*Lib3MF\_uint32*> &*PropertyIDsBuffer*)  
returns all the PropertyIDs of all tex2coords in this Texture2DGroup

**Parameters** **PropertyIDsBuffer** – PropertyID of the tex2coords in the Texture2DGroup.

*Lib3MF\_uint32* **AddTex2Coord** (const *sTex2Coord* &*UVCoordinate*)

Adds a new tex2coord to the Texture2DGroup

**Parameters** **UVCoordinate** – The u/v-coordinate within the texture, horizontally right/vertically up from the origin in the lower left of the texture.

**Returns** returns new PropertyID of the new tex2coord in the Texture2DGroup.

*sTex2Coord* **GetTex2Coord** (const *Lib3MF\_uint32* nPropertyID)

Obtains a tex2coord to the Texture2DGroup

**Parameters** **nPropertyID** – the PropertyID of the tex2coord in the Texture2DGroup.

**Returns** The u/v-coordinate within the texture, horizontally right/vertically up from the origin in the lower left of the texture.

void **RemoveTex2Coord** (const *Lib3MF\_uint32* nPropertyID)

Removes a tex2coords from the Texture2DGroup.

**Parameters** **nPropertyID** – PropertyID of the tex2coords in the Texture2DGroup.

*PTexture2D* **GetTexture2D** ()

Obtains the texture2D instance of this group.

**Returns** the texture2D instance of this group.

**typedef** std::shared\_ptr<*CTexture2DGroup*> Lib3MF::PTexture2DGroup  
Shared pointer to CTexture2DGroup to easily allow reference counting.

## CTexture2DGroupIterator

```
class Lib3MF::CTexture2DGroupIterator : public CResourceIterator
```

*PTexture2DGroup* **GetCurrentTexture2DGroup** ()

Returns the Texture2DGroup the iterator points at.

**Returns** returns the Texture2DGroup instance.

```
typedef std::shared_ptr<CTexture2DGroupIterator> Lib3MF::PTexture2DGroupIterator
```

Shared pointer to CTexture2DGroupIterator to easily allow reference counting.

## CTexture2DIterator

```
class Lib3MF::CTexture2DIterator : public CResourceIterator
```

*PTexture2D* **GetCurrentTexture2D** ()

Returns the Texture2D the iterator points at.

**Returns** returns the Texture2D instance.

```
typedef std::shared_ptr<CTexture2DIterator> Lib3MF::PTexture2DIterator
```

Shared pointer to CTexture2DIterator to easily allow reference counting.

## CWriter

```
class Lib3MF::CWriter : public CBase
```

void **WriteToFile** (const std::string &sFilename)

Writes out the model as file. The file type is specified by the Model Writer class.

**Parameters** **sFilename** – Filename to write into

*Lib3MF\_uint64* **GetStreamSize** ()

Retrieves the size of the full 3MF file stream.

**Returns** the stream size

void **WriteToBuffer** (std::vector<*Lib3MF\_uint8*> &BufferBuffer)

Writes out the 3MF file into a memory buffer

**Parameters** **BufferBuffer** – buffer to write into

void **WriteToCallback** (const *WriteCallback* pTheWriteCallback, const *SeekCallback* pTheSeekCallback, const *Lib3MF\_pvoid* pUserData)

Writes out the model and passes the data to a provided callback function. The file type is specified by the Model Writer class.

**Parameters**

- **pTheWriteCallback** – Callback to call for writing a data chunk
- **pTheSeekCallback** – Callback to call for seeking in the stream
- **pUserData** – Userdata that is passed to the callback function

void **SetProgressCallback** (const *ProgressCallback* pProgressCallback, const *Lib3MF\_pvoid* pUserData)

Set the progress callback for calls to this writer

**Parameters**

- **pProgressCallback** – pointer to the callback function.
- **pUserData** – pointer to arbitrary user data that is passed without modification to the callback.

*Lib3MF\_uint32* **GetDecimalPrecision** ()

Returns the number of digits after the decimal point to be written in each vertex coordinate-value.

**Returns** The number of digits to be written in each vertex coordinate-value after the decimal point.

void **SetDecimalPrecision** (const *Lib3MF\_uint32* *nDecimalPrecision*)

Sets the number of digits after the decimal point to be written in each vertex coordinate-value.

**Parameters** *nDecimalPrecision* – The number of digits to be written in each vertex coordinate-value after the decimal point.

**typedef** std::shared\_ptr<*CWriter*> *Lib3MF::PWriter*

Shared pointer to CWriter to easily allow reference counting.

## 1.2 C-language bindings

This space describes the usage of lib3mf in a C host application.

TODO

## 1.3 Python-language bindings

TODO

## 1.4 Pascal-language bindings

TODO

## 1.5 C#-language bindings

This space describes the usage of lib3mf in a C# host application.

TODO



## 1.6 Golang-language bindings

TODO

## 1.7 NodeJS-language bindings

TODO



## OBTAINING LIB3MF

Simply download the precompiled binary SDK <https://github.com/3MFConsortium/lib3mf/releases>.



## USING LIB3MF

Although the different language bindings are kept as similar as possible, the usage of lib3mf still depends your programming language. You are best-off starting with one of the examples distributed in the SDK (<https://github.com/3MFConsortium/lib3mf/releases>).

In addition, the home pages for each language binding give detailed instructions on how to use them.



## META INFORMATION

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[The 3MF Consortium](#)

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