Material(ID)

base classes — `bpy_struct`, `ID`

class `bpy.types.`**`Material`**(*ID*)

Material datablock to define the appearance of geometric objects for rendering

`active_node_material`

Active node material

Type : `Material`

`active_texture`

Active texture slot being displayed

Type : `Texture`

`active_texture_index`

Index of active texture slot

Type : int in [0, 17], default 0

`alpha`

Alpha transparency of the material

Type : float in [0, 1], default 0.0

`ambient` ¶

Amount of global ambient color the material receives

Type : float in [0, 1], default 0.0

`animation_data`

Animation data for this datablock

Type : `AnimData`, (readonly)

`cycles`

Cycles material settings

Type : `CyclesMaterialSettings`, (readonly)

`darkness`

Minnaert darkness

Type : float in [0, 2], default 0.0

`diffuse_color`

Diffuse color of the material

Type : float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

`diffuse_fresnel`

Power of Fresnel

Type : float in [0, 5], default 0.0

`diffuse_fresnel_factor`

Blending factor of Fresnel

Type : float in [0, 5], default 0.0

`diffuse_intensity`

Amount of diffuse reflection

Type : float in [0, 1], default 0.0

`diffuse_ramp`

Color ramp used to affect diffuse shading

Type : `ColorRamp`, (readonly)

`diffuse_ramp_blend`

Blending method of the ramp and the diffuse color

Type : enum in [‘MIX’, ‘ADD’, ‘MULTIPLY’, ‘SUBTRACT’, ‘SCREEN’, ‘DIVIDE’, ‘DIFFERENCE’, ‘DARKEN’, ‘LIGHTEN’, ‘OVERLAY’, ‘DODGE’, ‘BURN’, ‘HUE’, ‘SATURATION’, ‘VALUE’, ‘COLOR’, ‘SOFT_LIGHT’, ‘LINEAR_LIGHT’], default ‘MIX’

`diffuse_ramp_factor`

Blending factor (also uses alpha in Colorband)

Type : float in [0, 1], default 0.0

`diffuse_ramp_input`

How the ramp maps on the surface

Type : enum in [‘SHADER’, ‘ENERGY’, ‘NORMAL’, ‘RESULT’], default ‘SHADER’

`diffuse_shader`

- `LAMBERT` Lambert, Use a Lambertian shader.
- `OREN_NAYAR` Oren-Nayar, Use an Oren-Nayar shader.
- `TOON` Toon, Use a toon shader.
- `MINNAERT` Minnaert, Use a Minnaert shader.
- `FRESNEL` Fresnel, Use a Fresnel shader.

Type : enum in [‘LAMBERT’, ‘OREN_NAYAR’, ‘TOON’, ‘MINNAERT’, ‘FRESNEL’], default ‘LAMBERT’

`diffuse_toon_size`

Size of diffuse toon area

Type : float in [0, 3.14], default 0.0

`diffuse_toon_smooth`

Smoothness of diffuse toon area

Type : float in [0, 1], default 0.0

`emit`

Amount of light to emit

Type : float in [0, inf], default 0.0

`game_settings`

Game material settings

Type : `MaterialGameSettings`, (readonly, never None)

`halo`

Halo settings for the material

Type : `MaterialHalo`, (readonly, never None)

`invert_z`

Render material’s faces with an inverted Z buffer (scanline only)

Type : boolean, default False

`light_group`

Limit lighting to lamps in this Group

Type : `Group`

`mirror_color`

Mirror color of the material

Type : float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

`node_tree`

Node tree for node based materials

Type : `NodeTree`, (readonly)

`offset_z`

Give faces an artificial offset in the Z buffer for Z transparency

Type : float in [-inf, inf], default 0.0

`pass_index`

Index number for the IndexMA render pass

Type : int in [0, 32767], default 0

`physics`

Game physics settings

Type : `MaterialPhysics`, (readonly, never None)

`preview_render_type`

Type of preview render

- `FLAT` Flat, Flat XY plane.
- `SPHERE` Sphere, Sphere.
- `CUBE` Cube, Cube.
- `MONKEY` Monkey, Monkey.
- `HAIR` Hair, Hair strands.
- `SPHERE_A` World Sphere, Large sphere with sky.

Type : enum in [‘FLAT’, ‘SPHERE’, ‘CUBE’, ‘MONKEY’, ‘HAIR’, ‘SPHERE_A’], default ‘FLAT’

`raytrace_mirror`

Raytraced reflection settings for the material

Type : `MaterialRaytraceMirror`, (readonly, never None)

`raytrace_transparency`

Raytraced transparency settings for the material

Type : `MaterialRaytraceTransparency`, (readonly, never None)

`roughness`

Oren-Nayar Roughness

Type : float in [0, 3.14], default 0.0

`shadow_buffer_bias`

Factor to multiply shadow buffer bias with (0 is ignore)

Type : float in [0, 10], default 0.0

`shadow_cast_alpha`

Shadow casting alpha, in use for Irregular and Deep shadow buffer

Type : float in [0.001, 1], default 0.0

`shadow_only_type`

How to draw shadows

- `SHADOW_ONLY_OLD` Shadow and Distance, Old shadow only method.
- `SHADOW_ONLY` Shadow Only, Improved shadow only method.
- `SHADOW_ONLY_SHADED` Shadow and Shading, Improved shadow only method which also renders lightless areas as shadows.

Type : enum in [‘SHADOW_ONLY_OLD’, ‘SHADOW_ONLY’, ‘SHADOW_ONLY_SHADED’], default ‘SHADOW_ONLY_OLD’

`shadow_ray_bias`

Shadow raytracing bias to prevent terminator problems on shadow boundary

Type : float in [0, 0.25], default 0.0

specular_alpha

Alpha transparency for specular areas

Type : float in [0, 1], default 0.0

specular_color

Specular color of the material

Type : float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

specular_hardness

How hard (sharp) the specular reflection is

Type : int in [1, 511], default 0

specular_intensity

How intense (bright) the specular reflection is

Type : float in [0, 1], default 0.0

specular_ior

Specular index of refraction

Type : float in [1, 10], default 0.0

specular_ramp

Color ramp used to affect specular shading

Type : `ColorRamp`, (readonly)

specular_ramp_blend

Blending method of the ramp and the specular color

Type : enum in [‘MIX’, ‘ADD’, ‘MULTIPLY’, ‘SUBTRACT’, ‘SCREEN’, ‘DIVIDE’, ‘DIFFERENCE’, ‘DARKEN’, ‘LIGHTEN’, ‘OVERLAY’, ‘DODGE’, ‘BURN’, ‘HUE’, ‘SATURATION’, ‘VALUE’, ‘COLOR’, ‘SOFT_LIGHT’, ‘LINEAR_LIGHT’], default ‘MIX’

specular_ramp_factor

Blending factor (also uses alpha in Colorband)

Type : float in [0, 1], default 0.0

specular_ramp_input

How the ramp maps on the surface

Type : enum in [‘SHADER’, ‘ENERGY’, ‘NORMAL’, ‘RESULT’], default ‘SHADER’

specular_shader

- `COOKTORR` CookTorr, Use a Cook-Torrance shader.

- `PHONG` Phong, Use a Phong shader.
- `BLINN` Blinn, Use a Blinn shader.
- `TOON` Toon, Use a toon shader.
- `WARDISO` WardIso, Use a Ward anisotropic shader.

Type : enum in [‘COOKTORR’, ‘PHONG’, ‘BLINN’, ‘TOON’, ‘WARDISO’], default ‘COOKTORR’

`specular_slope`

The standard deviation of surface slope

Type : float in [0, 0.4], default 0.0

`specular_toon_size`

Size of specular toon area

Type : float in [0, 1.53], default 0.0

`specular_toon_smooth`

Smoothness of specular toon area

Type : float in [0, 1], default 0.0

`strand`

Strand settings for the material

Type : `MaterialStrand`, (readonly, never None)

`subsurface_scattering`

Subsurface scattering settings for the material

Type : `MaterialSubsurfaceScattering`, (readonly, never None)

`texture_slots`

Texture slots defining the mapping and influence of textures

Type : `MaterialTextureSlots` `bpy_prop_collection` of `MaterialTextureSlot`, (readonly)

`translucency`

Amount of diffuse shading on the back side

Type : float in [0, 1], default 0.0

`transparency_method`

Method to use for rendering transparency

- `MASK` Mask, Mask the background.
- `Z_TRANSPARENCY` Z Transparency, Use alpha buffer for transparent faces.
- `RAYTRACE` Raytrace, Use raytracing for transparent refraction rendering.

Type : enum in [‘MASK’, ‘Z_TRANSPARENCY’, ‘RAYTRACE’], default ‘MASK’

`type`

Material type defining how the object is rendered

- `SURFACE` Surface, Render object as a surface.
- `WIRE` Wire, Render the edges of faces as wires (not supported in raytracing).
- `VOLUME` Volume, Render object as a volume.
- `HALO` Halo, Render object as halo particles.

Type : enum in [‘SURFACE’, ‘WIRE’, ‘VOLUME’, ‘HALO’], default ‘SURFACE’

`use_cast_approximate`

Allow this material to cast shadows when using approximate ambient occlusion

Type : boolean, default False

`use_cast_buffer_shadows`

Allow this material to cast shadows from shadow buffer lamps

Type : boolean, default False

`use_cast_shadows_only`

Make objects with this material appear invisible (not rendered), only casting shadows

Type : boolean, default False

`use_cubic`

Use cubic interpolation for diffuse values, for smoother transitions

Type : boolean, default False

`use_diffuse_ramp`

Toggle diffuse ramp operations

Type : boolean, default False

`use_face_texture`

Replace the object’s base color with color from UV map image textures

Type : boolean, default False

`use_face_texture_alpha`

Replace the object’s base alpha value with alpha from UV map image textures

Type : boolean, default False

`use_full_oversampling`

Force this material to render full shading/textures for all anti-aliasing samples

Type : boolean, default False

`use_light_group_exclusive`

Material uses the light group exclusively - these lamps are excluded from other scene lighting

Type : boolean, default False

`use_light_group_local`

When linked in, Material uses local light group with the same name

Type : boolean, default False

`use_mist`

Use mist with this material (in world settings)

Type : boolean, default False

`use_nodes`

Use shader nodes to render the material

Type : boolean, default False

`use_object_color`

Modulate the result with a per-object color

Type : boolean, default False

`use_only_shadow`

Render shadows as the material’s alpha value, making the material transparent except for shadowed areas

Type : boolean, default False

`use_ray_shadow_bias`

Prevent raytraced shadow errors on surfaces with smooth shaded normals (terminator problem)

Type : boolean, default False

`use_raytrace`

Include this material and geometry that uses it in raytracing calculations

Type : boolean, default False

`use_shadeless`

Make this material insensitive to light or shadow

Type : boolean, default False

`use_shadows`

Allow this material to receive shadows

Type : boolean, default False

`use_sky`

Render this material with zero alpha, with sky background in place (scanline only)

Type : boolean, default False

`use_specular_ramp`

Toggle specular ramp operations

Type : boolean, default False

`use_tangent_shading`

Use the material’s tangent vector instead of the normal for shading - for anisotropic shading effects

Type : boolean, default False

`use_textures`

Enable/Disable each texture

Type : boolean array of 18 items, default (False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False)

`use_transparency`

Render material as transparent

Type : boolean, default False

`use_transparent_shadows`

Allow this object to receive transparent shadows cast through other objects

Type : boolean, default False

`use_uv_project`

Use to ensure UV interpolation is correct for camera projections (use with UV project modifier)

Type : boolean, default False

`use_vertex_color_light`

Add vertex colors as additional lighting

Type : boolean, default False

`use_vertex_color_paint`

Replace object base color with vertex colors (multiply with ‘texture face’ face assigned textures)

Type : boolean, default False

`volume`

Volume settings for the material

Type : `MaterialVolume`, (readonly, never None)

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_library_indirect`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

References

- `BlendData.materials`
- `BlendDataMaterials.new`
- `BlendDataMaterials.remove`
- `Curve.materials`
- `DynamicPaintBrushSettings.material`
- `IDMaterials.append`
- `IDMaterials.pop`
- `Material.active_node_material`
- `MaterialSlot.material`
- `Mesh.materials`
- `MetaBall.materials`
- `Object.active_material`
- `RenderLayer.material_override`
- `SceneRenderLayer.material_override`
- `ShaderNodeExtendedMaterial.material`
- `ShaderNodeMaterial.material`
- `TouchSensor.material`