

# CTI Runtime Components HDRP 3.0

## About this documentation

In case you want to use CTI trees along with the HDRP you have to assign the *CTI LOD HDRP* shaders and use the *CTI\_SRP\_CustomWind* script. Both shaders and script or slightly different from the CTI Runtime Components for the built in RP.

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## Limitations

- Shaders need Unity 2019.3.0b8 and HDRP 7.1.2. Other versions have not been tested.
- Only basic LOD trees are supported. No texture arrays, no tessellation.
- The shaders only except wind from script.
- You can not author billboard textures using HDRP nor can you use the debug shader, so authoring should take place using the built in RP.
- Color Variation currently is not supported.

## Changes

- The leaf shader uses the **built in transmission lighting**. So you have to add/edit a diffusion profile.
- **Specular color** has been dropped. The shaders use the default value.
- The **leaf shader** uses a **regular normal** or bump map. Lighting uses the built in transmission feature.

- The shaders only except **wind from script**. → *The Tree component is not needed at all and should be removed.*
- The CTI LOD HDRP shaders need a slightly different input for the **wind from script**. → *You have to use the CTI\_SRP\_CustomWind script instead of the old one.*
- **Fade out Wind** has been dropped.
- **Fade out Translucency** has been dropped.
- **Tumbling** and **Turbulence** have slightly been reworked and optimized. **Leaf Noise** has been added. → *You may have to adjust their settings.*
- **Wind multipliers** for primary and secondary bending as well as edge fluttering have been added. → *Now you can tweak the bending without editing the tree. Make sure multipliers in the bark material match those in the leaf material.*

## CTI HDRP LOD Shaders

The shaders were authored using Shader Graph. Then edited manually to add missing functionality and fix some bugs. Thus the source code will look quite weird...

### CTI HDRP/Bark HLSL shader

#### Shader Inputs

##### Surface Options

**Surface Type** Opaque

**Double-Sided** Should be unchecked

##### Exposed Properties

**Albedo (RGB) Smoothness (A)** Diffuse texture which contains **smoothness** (unlike the leaf shader which expects transparency) in the alpha channel.

**Normal Map (GA) Occlusion (B)** contains the combined normal and occlusion map. *Red color channel should be black.*

**Normal Strength** Lets you adjust the strength of the normal.

**Smoothness** Multiplier for the smoothness as sampled from the *Albedo (RGB) Smoothness (A)* map.

##### Wind Multipliers

**X** Multiplier for the Primary Strength. *Must match the value in the leaf material.*

**Y** Multiplier for the Secondary Strength. *Must match the value in the leaf material.*

**Z** Multiplier for Edge Flutter. *Does not matter here.*

## CTI HDRP/Leaves HLSL shader

### Shader inputs

#### Surface Options

**Surface Type** Opaque

**Double-Sided** Please check if your leaf geometry is only single sided (recommended)

**Normal Mode** Should be set to *Flip*.

#### Exposed Properties

**Albedo (RGB) Alpha (A)** Diffuse texture which contains transparency in the alpha channel.

**Alpha Cutoff** If the alpha channel of the Base texture contains different shades of gray instead of just black and white, you can manually determine the cutoff point by adjusting the slider.

**Normal (GA) Smoothness (B) Trans (R)** contains the combined normal, smoothness and translucency map.

**Smoothness** Multiplier for the smoothness as sampled from the *Normal (GA) Smoothness (B) Trans (R)* map. If this map is disabled *Smoothness* defines the final smoothness value.

**Translucency** Lets you remap the the “thickness” as sampled from the *Normal (GA) Smoothness (B) Trans (R)* texture.

#### Wind Multipliers

**X** Multiplier for the Primary Strength. *Must match the value in the bark material.*

**Y** Multiplier for the Secondary Strength. *Must match the value in the bark material.*

**Z** Multiplier for Edge Flutter.

**Tumble Strength** defines the strength of the tumbling animation.

**Tumble Frequency** lets you adjust the frequency of the tumbling.

**Leaf Turbulence** lets you adjust the strength of the turbulence.

**Leaf Noise** lets you adjust the strength of the edge flutter (stored in vertex color green) affecting the leaf turbulence. Using edge flutter influence values above 0.0 will most likely add some distortion to the leaf meshes – which in fact looks really nice.

**Shadow Caster Culling** Lets you determine how the faces are culled in the shadow caster pass. Usually it is set to *Off*. In order to speed up rendering a bit you may try to set it to *Back*.

## CTI HDPR/Billboard HLSL shader

### Shader inputs

#### Surface Options

**Surface Type** Opaque

**Double-Sided** Must be checked!

**Normal Mode** Must be set to *Flip*!

### Exposed Properties

**Albedo (RGB) Alpha/Occlusion (A)** This slot should contain the created albedo texture atlas.

**Alpha Cutoff** If the alpha channel of the Base texture contains different shades of gray instead of just black and white, you can manually determine the cutoff point by adjusting the slider. A value of 0.45 should just be fine.

**Normal (AG) Translucency (R) Smoothness (B)** This slot should contain the created texture atlas.

**Normal Scale** Scale of the normal.

**Smoothness** Multiplier for the smoothness as sampled from the *Normal (AG) Translucency (R) Smoothness (B)* map. If this map is disabled *Smoothness* defines the final smoothness value.

**Wind Strength** As Billboards do not have any baked wind information you may use this parameter to make the bending of the billboard better match the bending of the mesh tree.

**Wind Power** Power Value which drives the wind strength along the y axis. Should match the power value used on importing the tree. Default is 1.5.

**Thickness Remap** Lets you remap the thickness as sampled from the translucency channel. Nevertheless the bark will never get fully opaque when using the built in Foliage diffusion profile... *Consider creating a diffusion profile just for billboards.*