

## VkPipelineMultisampleStateCreateInfo for VkGraphicsPipelineCreateInfo

### VkPipelineMultisampleStateCreateInfo

```
sType = VK_STRUCTURE_TYPE_PIPELINE_MULTISAMPLE_STATE_CREATE_INFO;  
pNext = nullptr;  
flags = 0;  
rasterizationSamples = VK_SAMPLE_COUNT_8_BIT;  
sampleShadingEnable = VK_FALSE;  
minSampleShading = 1.0; // don't care  
pSampleMask = nullptr;  
alphaToCoverageEnable = VK_FALSE;  
alphaToOneEnable = VK_FALSE;
```

### VkPhysicalDeviceLimits

```
...  
framebufferColorSampleCounts: 0xf  
framebufferDepthSampleCounts: 0xf  
...
```

## VkPipelineDepthStencilStateCreateInfo for VkGraphicsPipelineCreateInfo

### typedef enum VkStencilOp {

```
VK_STENCIL_OP_KEEP = 0,  
VK_STENCIL_OP_ZERO = 1,  
VK_STENCIL_OP_REPLACE = 2,  
VK_STENCIL_OP_INCREMENT_AND_CLAMP = 3,  
VK_STENCIL_OP_DECREMENT_AND_CLAMP = 4,  
VK_STENCIL_OP_INVERT = 5,  
VK_STENCIL_OP_INCREMENT_AND_WRAP = 6,  
VK_STENCIL_OP_DECREMENT_AND_WRAP = 7,  
} VkStencilOp;
```

### typedef enum VkCompareOp {

```
VK_COMPARE_OP_NEVER = 0,  
VK_COMPARE_OP_LESS = 1,  
VK_COMPARE_OP_EQUAL = 2,  
VK_COMPARE_OP_LESS_OR_EQUAL = 3,  
VK_COMPARE_OP_GREATER = 4,  
VK_COMPARE_OP_NOT_EQUAL = 5,  
VK_COMPARE_OP_GREATER_OR_EQUAL = 6,  
VK_COMPARE_OP_ALWAYS = 7,  
} VkCompareOp;
```

### typedef struct VkStencilOpState {

```
    VkStencilOp failOp;  
    VkStencilOp passOp;  
    VkStencilOp depthFailOp;  
    VkCompareOp compareOp;  
    uint32_t compareMask;  
    uint32_t writeMask;  
    uint32_t reference;  
} VkStencilOpState;
```

### VkPipelineDepthStencilStateCreateInfo

```
sType = VK_STRUCTURE_TYPE_PIPELINE_DEPTH_STENCIL_STATE_CREATE_INFO;  
pNext = nullptr;  
flags = 0;  
depthTestEnable = VK_TRUE;  
depthWriteEnable = VK_TRUE;  
depthCompareOp = VK_COMPARE_OP_LESS;  
depthBoundsTestEnable = VK_FALSE;  
stencilTestEnable = VK_FALSE;  
front;  
back;  
minDepthBounds = 0.0f;  
maxDepthBounds = 1.0f;
```