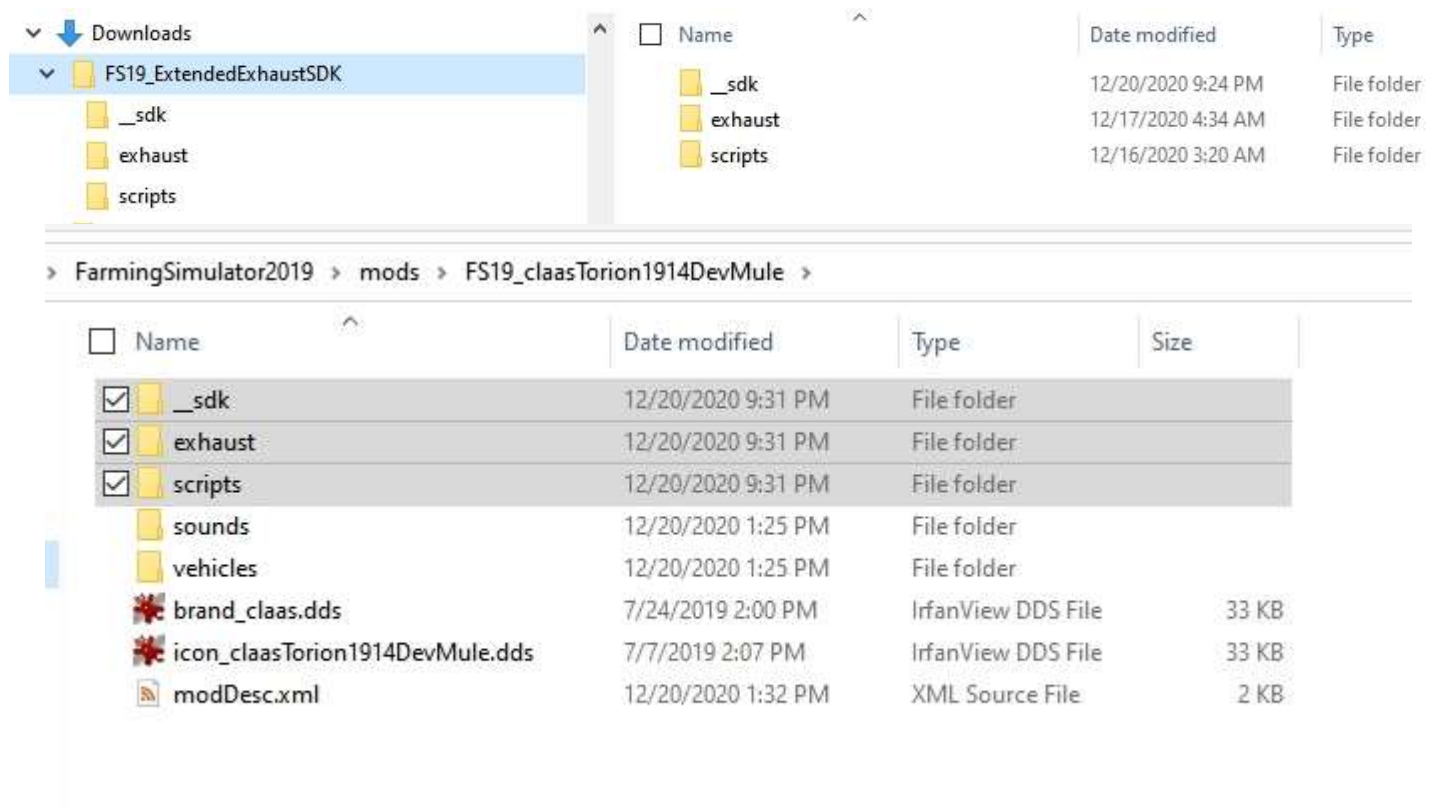


## Installing the ExtendedExhaust specialization:

The first thing you need to do is copy the contents of this mod into the root folder of your existing mod.



Next, you need to open your modDesc.xml file. Here you will be adding the specialization to the game and either creating a new vehicle type or adding it to an existing vehicle type. Some vehicles already have these entries in their modDesc files, more on this below.

If your vehicle already has a <specializations> section inside of it, simply add the highlighted line to the existing section.

```
<?xml version="1.0" encoding="utf-8" standalone="no" ?>
<modDesc descVersion="43">
  <author>GIANTS Software</author>
  <version>1.0.0.0</version>
  <multiplayer supported="true" />
  <title>
    <en>CLAAS TORION 1914 Dev Mule</en>
  </title>
  <description>
    <en>CLAAS TORION 1914 Dev Mule</en>
  </description>
  <iconFilename>icon_claasTorion1914DevMule.png</iconFilename>
  <specializations>
    <specialization name="extendedExhaust" className="ExtendedExhaust" filename="scripts/ExtendedExhaust.lua" />
  </specializations>
  <storeItems>
    <storeItem xmlFilename="vehicles/claas/torion1914DevMule/torion1914DevMule.xml"/>
  </storeItems>
  <brands>
    <brand name="CLAAS" title="CLAAS" image="brand_claas.dds"/>
  </brands>
  <brandColors>
    <color name="CLAAS_GREEN1" value="0.2384 0.3186 0.0116 1" />
    <color name="CLAAS_RED1" value="0.5310 0.0357 0.0112 1" />
    <color name="CLAAS_WHITE1" value="0.784 0.784 0.784 1" />
    <color name="CLAAS_DARKGREY1" value="0.0721 0.0765 0.0906 1" />
    <color name="CLAAS_DARKGREY2" value="0.068 0.068 0.068 1" />
  </brandColors>
</modDesc>
```

After that, you want to create/add a new vehicle type. This is also done one of two ways, depending on whether or not your vehicle already has a <vehicleTypes> section or not.

If your vehicle does **NOT** have a <vehicleTypes> section in the modDesc.xml, you will first want to open your vehicle xml file and take note of its vehicle type. This can be found at the top of that file.

```
1 <?xml version="1.0" encoding="utf-8" standalone="no" ?>
2 <vehicle type="tractor">
3   <annotation>Copyright (C) GIANTS Software GmbH, All Rights Reserved.</annotation>
4
5   <storeData>
6     <name>TORION 1914 Dev Mule</name>
7     <specs>
```

Now, copy the <vehicleTypes> section from modDescEntries.xml found in the \_sdk folder to your modDesc.xml file. Change OLD\_VEHICLE\_TYPE to the vehicle type you noted above. Change NEW\_VEHICLE\_TYPE to whatever name you want. Just remember the name you chose. I used "tractorXT" for this example.

```
1  <?xml version="1.0" encoding="utf-8" standalone="no" ?>
2  <modDesc descVersion="43">
3    <author>GIANTS Software</author>
4    <version>1.0.0.0</version>
5    <multiplayer supported="true" />
6    <title>
7      <en>CLAAS TORION 1914 Dev Mule</en>
8    </title>
9
10   <description>
11     <en>CLAAS TORION 1914 Dev Mule</en>
12   </description>
13
14   <iconFilename>icon_claasTorion1914DevMule.png</iconFilename>
15
16   <specializations>
17     <specialization name="extendedExhaust" className="ExtendedExhaust" filename="scripts/ExtendedExhaust.lua" />
18   </specializations>
19
20   <vehicleTypes>
21     <type name="tractorXT" parent="tractor" filename="$dataS/scripts/vehicles/Vehicle.lua">
22       <specialization name="extendedExhaust"/>
23     </type>
24   </vehicleTypes>
25
26   <storeItems>
27     <storeItem xmlFilename="vehicles/claas/torion1914DevMule/torion1914DevMule.xml"/>
28   </storeItems>
29
30   <brands>
31     <brand name="CLAAS" title="CLAAS" image="brand_claas.dds"/>
32   </brands>
33
34   <brandColors>
35     <color name="CLAAS_GREEN1" value="0.2384 0.3186 0.0116 1" />
36     <color name="CLAAS_RED1" value="0.5310 0.0357 0.0112 1" />
37     <color name="CLAAS_WHITE1" value="0.784 0.784 0.784 1" />
38     <color name="CLAAS_DARKGREY1" value="0.0721 0.0765 0.0906 1" />
39     <color name="CLAAS_DARKGREY2" value="0.068 0.068 0.068 1" />
40   </brandColors>
41 </modDesc>
42
```

If your vehicle already has a <vehicleTypes> section inside of modDesc.xml, you simply add the highlighted line to the existing vehicle type. You can also **SKIP** the next section.

The next step is to change the vehicle type of your vehicle to the name you created above. Remember this step is **NOT** necessary if your vehicle already has a custom type specified in your modDesc.xml.

Back inside of your vehicle xml file, again at the top, change the vehicle type. Since I used "tractorXT" in the above example, this is what I change this value to.

```
1 <?xml version="1.0" encoding="utf-8" standalone="no" ?>
2 <vehicle type="tractorXT">
3   <annotation>Copyright (C) GIANTS Software GmbH, All Rights Reserved.</annotation>
4
5   <storeData>
6     <name>TORION 1914 Dev Mule</name>
7   <specs>
8     <power>224</power>
9     <maxSpeed>40</maxSpeed>
```

**Some** vehicles have a <vehicleTypeConfigurations> section inside of their vehicle xml file. If it does, you need to change the vehicleType entries there to the same name you just set above. This is **ONLY** for vehicles that have this section.

```
76 <vehicleTypeConfigurations title="Exhausts">
77   <vehicleTypeConfiguration name="Muffler W/ AirCleaner" price="0" vehicleType="tractorXT">
78     <objectChange node="0>22|0" visibilityActive="true"/>
79   </vehicleTypeConfiguration>
80   <vehicleTypeConfiguration name="Muffler W/ Short Cleaner" price="0" vehicleType="tractorXT">
81     <objectChange node="0>22|1" visibilityActive="true" />
82     <objectChange node="0>22|0" visibilityActive="false" />
83   </vehicleTypeConfiguration>
84   <vehicleTypeConfiguration name="Straight W/ Turbo II" price="0" vehicleType="tractorXT">
85     <objectChange node="0>22|2" visibilityActive="true" />
86     <objectChange node="0>22|0" visibilityActive="false" />
87   </vehicleTypeConfiguration>
88   <vehicleTypeConfiguration name="Muffler" price="0" vehicleType="tractorXT">
89     <objectChange node="0>22|3" visibilityActive="true" />
90     <objectChange node="0>22|0" visibilityActive="false" />
91     <objectChange node="0>14|16" visibilityActive="true" />
92   </vehicleTypeConfiguration>
93 </vehicleTypeConfigurations>
94
```

Now you need to, again in your vehicle xml file, find the <motorized> section. At the bottom of that section, you will usually find your <exhaustEffect> entries.

```
371         <transmission minForwardGearRatio="19.2" maxForwardGearRatio="300" minBackwardGearRatio
372         </motorConfiguration>
373     </motorConfigurations>
374
375     <exhaustEffects>
376         <exhaustEffect node="exhaustParticle1" filename="$data/particleSystems/shared/exhaust.i3d"
377     </exhaustEffects>
378
379     <motorStartDuration>2750</motorStartDuration>
380
```

Copy the <extendedExhaust> section from vehicleEntries.xml found in the \_sdk folder under the <exhaustEffects> section shown above.

```
374
375     <exhaustEffects>
376         <exhaustEffect node="exhaustParticle1" filename="$data/particleSystems/shared/exhaust.i3d" minRpmCol
377     </exhaustEffects>
378
379     <extendedExhaust motorStartDuration="1500">
380         <particleSystems>
381             <particleSystem node="1>0|8" position="0 0 0" rotation="0 0 0" file="exhaust/exhaust.i3d">
382                 <startInfo emitScale="7.5" speedScale="1.5"/>
383                 <loadInfo emitScale="7.5" threshold="1.0"/>
384                 <rpmInfo emitScale="1.0" speedScale="2"/>
385             </particleSystem>
386         </particleSystems>
387     </extendedExhaust>
388
```

Note in the above example, the original exhaustEffect node="exhaustParticle1". At present you **CAN NOT** use the string name of a node for extended particles. For whatever reason, the vanilla particle loading code does not recognize them. To find the actual node, scroll down to the <i3dMappings> section of your vehicle xml and find "exhaustParticle1". You could also search for this with Notepad++ or something similar.

```
741     <i3dMapping id="fuelNeedle" node="1>0|5|7|5|0" />
742     <i3dMapping id="tempNeedle" node="1>0|5|7|6|0" />
743     <i3dMapping id="interiorScreenLight" node="1>0|5|8" />
744     <i3dMapping id="articulatedAxisAiReverserNode" node="1>0|6" />
745     <i3dMapping id="exitPoint" node="1>0|7" />
746     <i3dMapping id="exhaustParticle1" node="1>0|8" />
747     <i3dMapping id="axisJoint" node="1>0|9" />
748     <i3dMapping id="exterior_decals" node="1>0|10|9" />
749     <i3dMapping id="exterior_decals3" node="1>0|10|14" />
750     <i3dMapping id="exterior_decals4" node="1>0|10|15" />
```

In the above image, the actual node for "exhaustParticle1" is "1>0|8". This is the value you want to use for the node entry of your new particleSystem (shown above).

**Some** vehicles have multiple exhaust effects by default. To add more particle systems, copy the <particleSystem> lines from the first <particleSystem> section as many times as you like. Change each node to the entry of the corresponding <exhaustEffect>.

The following is an example of a vehicle with multiple exhaust nodes:

```
280 <exhaustEffects>
281   <exhaustEffect node="0>22|0|3" filename="$data/particleSystems/shared/exhaust.i3d" minRpmColor="0.9 0.9 0
282   <exhaustEffect node="0>22|1|3" filename="$data/particleSystems/shared/exhaust.i3d" minRpmColor="0.9 0.9 0
283   <exhaustEffect node="0>22|2|2" filename="$data/particleSystems/shared/exhaust.i3d" minRpmColor="0.9 0.9 0
284   <exhaustEffect node="0>22|3|1" filename="$data/particleSystems/shared/exhaust.i3d" minRpmColor="0.9 0.9 0
285 </exhaustEffects>
286
287 <extendedExhaust motorStartDuration="2000">
288   <particleSystems>
289     <particleSystem node="0>22|0|3" position="0 0 0" rotation="0 0 0" file="exhaust/exhaust.i3d">
290       <startInfo emitScale="7.5"/>
291       <loadInfo emitScale="5" threshold="1.0"/>
292       <rpmInfo emitScale="1.2" speedScale="2"/>
293     </particleSystem>
294     <particleSystem node="0>22|1|3" position="0 0 0" rotation="0 0 0" file="exhaust/exhaust.i3d">
295       <startInfo emitScale="7.5"/>
296       <loadInfo emitScale="5" threshold="1.0"/>
297       <rpmInfo emitScale="1.2" speedScale="2"/>
298     </particleSystem>
299     <particleSystem node="0>22|2|2" position="0 0 0" rotation="0 0 0" file="exhaust/exhaust.i3d">
300       <startInfo emitScale="7.5"/>
301       <loadInfo emitScale="5" threshold="1.0"/>
302       <rpmInfo emitScale="1.2" speedScale="2"/>
303     </particleSystem>
304     <particleSystem node="0>22|3|1" position="0 0 0" rotation="0 0 0" file="exhaust/exhaust.i3d">
305       <startInfo emitScale="7.5"/>
306       <loadInfo emitScale="5" threshold="1.0"/>
307       <rpmInfo emitScale="1.2" speedScale="2"/>
308     </particleSystem>
309   </particleSystems>
310 </extendedExhaust>
311
```

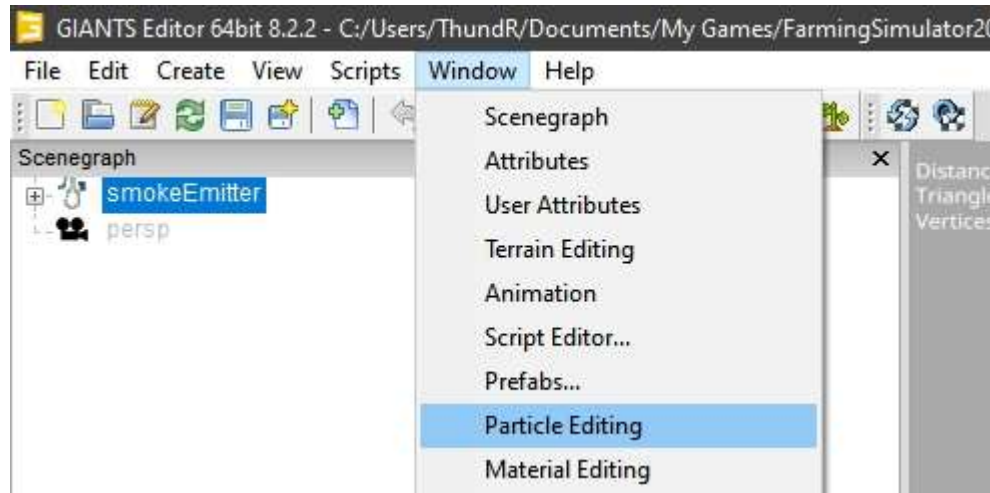
If you want to remove the default exhaust effects from the vehicle, you can simply comment out the original <exhaustEffects> section as follows:

```
374
375 <!--
376 <exhaustEffects>
377   <exhaustEffect node="exhaustParticle1" filename="$data/particleSystems/shared/exhaust.i3d" minRpmColor="0.
378 </exhaustEffects>
379 -->
380
381 <extendedExhaust motorStartDuration="1500">
382   <particleSystems>
383     <particleSystem node="1>0|8" position="0 0 0" rotation="0 0 0" file="exhaust/exhaust.i3d">
384       <startInfo emitScale="7.5" speedScale="1.5"/>
385       <loadInfo emitScale="7.5" threshold="1.0"/>
386       <rpmInfo emitScale="1.0" speedScale="2"/>
387     </particleSystem>
388   </particleSystems>
389 </extendedExhaust>
390
```

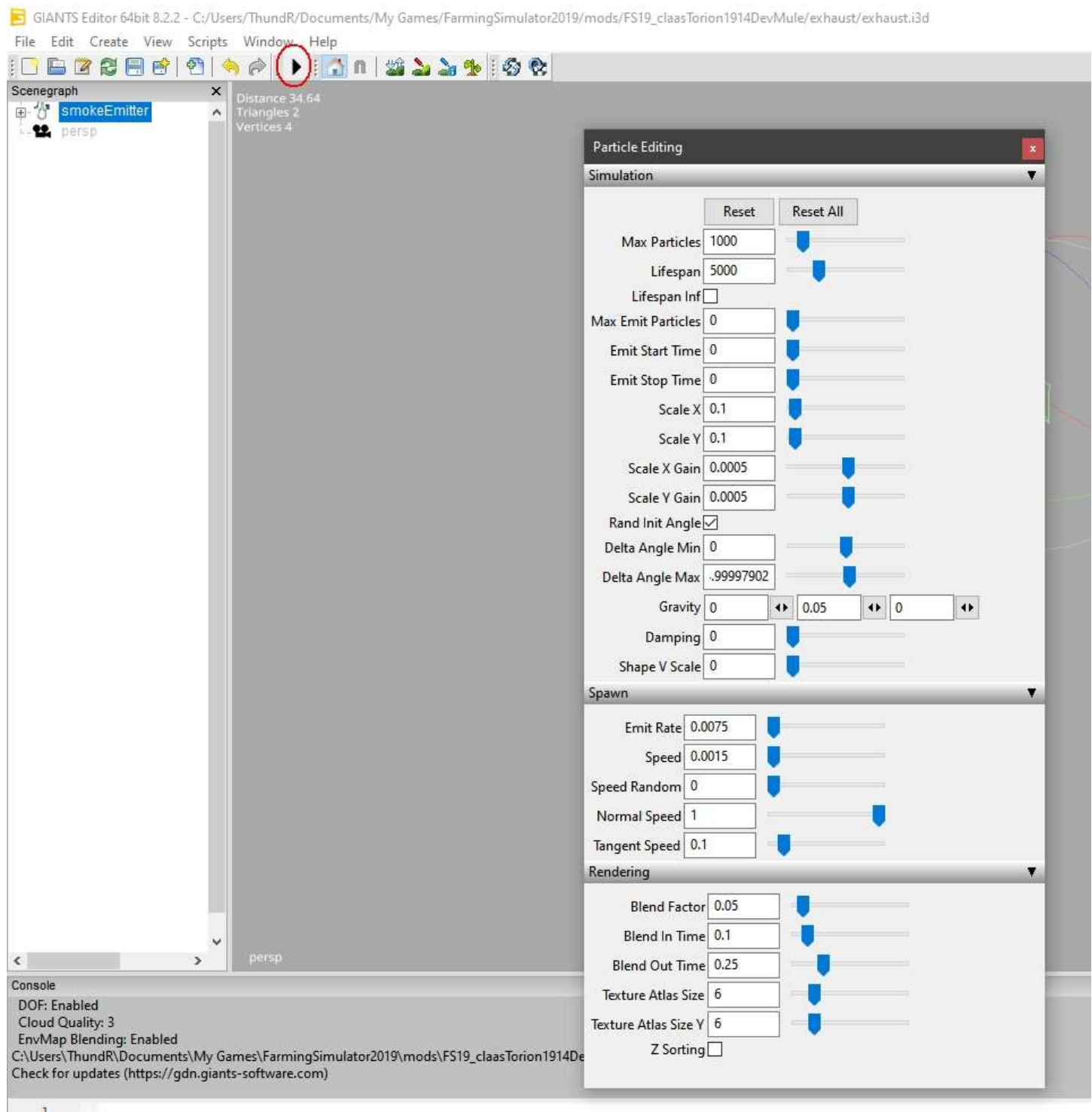
The extended exhaust xml settings can be found inside of the vehicleEntries.xml file.

## Adjusting the particle i3d for your vehicle:

To adjust the smoke effect, open the exhaust.i3d file located in the exhaust folder of your mod. Inside of GE, select “smokeEmitter” and open the particle editor.



This will open the particle editing window. You can also hit the play button to view your smoke effect real time.



The main values in this window are Scale X, Scale Y, Scale X Gain, Scale Y Gain, Gravity, Emit Rate, Speed, Tangent Speed, and Blend Factor.

- \* Scale X and Scale Y are the size of the particle at the base or start.
- \* Scale X Gain and Scale Y Gain are the amount the particle spreads out as it travels or how wide it becomes.
- \* Gravity is how “light” the smoke is. The higher the number, the quicker the smoke will lift. Setting this to zero basically creates a straight line effect.
- \* Emit Rate is how “thick” the smoke appears. This can be adjusted inside of the vehicle xml based on motor load and vehicle rpm. This is explained in vehicleEntries.xml in the \_sdk folder. You generally want to set the idle emit rate in the i3d.
- \* Speed is how fast the smoke travels. This can also be adjusted inside of the vehicle xml based on the rpm of the motor. Again, you generally set the idle speed in the i3d.
- \* Tangent Speed is how much the smoke “dissipates” as it moves. Unlike Scale X Gain and Scale Y gain, this is more of a random effect.
- \* Blend Factor is the value most people will want to set. This determines how “opaque” or black the smoke is. I could not find a way to adjust this via lua, so you’ll have to set the base darkness of your smoke effect inside of the i3d.

Two other values of note are Max Particles and Lifespan. These are used mostly for performance tweaking and determining how long the smoke lingers.

- \* Max Particles is simply the number of particles that can be emitted in one cycle. If you notice the smoke breaking up and seeming to “reset”, you do not have enough particles for the amount of smoke you are trying to show. Increasing this could degrade performance, so keep an eye on this one.
- \* Lifespan is how long the smoke lingers in milliseconds. Higher numbers will require a higher value for Max Particles, especially at higher emit rates. Again, increasing this value could degrade performance. Make a note of that.

When you are done, save your i3d and you should be all set! You can delete the \_sdk folder if you want, or you can leave it there for future reference if you like as well. Should not hurt anything by being there. For further xml editing instructions, again, see vehicleEntries.xml in the \_sdk folder.

