**Attachment No.:3 \_ Unit Reactor and Cooldown information. Rev.1**

1. UNIT INFORMATION

|  |  |  |
| --- | --- | --- |
| Unit capacity | t/day | 6360 |
| Process type |  | Hydrotreatment |
| Number of Reactors | Qty | 1 |
| Material of Construction: | | |
|  | Reactors | SA387 Gr11 Cl2 Cladding TYPE 347 |
| Recycle Line | Old pipeline segments 08X18H10T  New pipeline segments ASTM A312 TIP321 |

1. REACTOR DETAILS

|  |  |  |
| --- | --- | --- |
| Recycle Gas Line I/D (Upstream of Reactor) | mm | 400 |
| Reactor I/D | mm | 5400 |
| Reactor Height | mm | 32260 |
| Bed Depth | | |
| Bed 1 | mm | 7170 |
| Bed 2 | mm | 13310 |
| Wall Thickness | mm | 120 |
| Catalyst Type |  | CoMo |
| Catalyst Manufacturer |  | Ketjen |
| Catalyst Bulk Density |  |  |
| Bed 1 | kg/m3 | 1049 |
| Bed 2 | kg/m3 | 811 |
| Reactor Mass | kg | 485000 |
| Catalyst Mass | kg | 370040 |
| Minimum Allowable Temperature | oC | -15 |

1. COOLDOWN INFORMATION

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | Top | | Bottom | |
| Anticipated Initial Bed Temperature | oC | 150 | | 150 | |
| Anticipated Initial Skin Temperature | oC | 150 | | 150 | |
| Required Final Bed Temperatures | oC | 35 | | 35 | |
| Required Final Skin Temperatures | oC | 35 | | 35 | |
| Maximum Cooling Rate | oC/hour | 38 | | | |
| Maximum Allowable Gas-Bed ΔT (Difference between cool inlet gas and bed temperatures) | oC | 100 | | | |
| Minimum Allowable Gas Temperature (mixed recycled gas with cold nitrogen) | oC | +5 | | | |
| Minimum Recycle Gas Temperature (recycle gas after compressor) | oC | 60 | | | |
| Current Cooldown Time | hrs | 96 | | | |
| Process Gas, Molecular Weight |  | 6–7 | | | |
|  |  | Min | Typical | | Max |
| Recycle Gas Flow Rate (with Nitrogen) | nm3/h |  |  | |  |
| System Pressure (with Nitrogen) | barg | 6 | 8 | | 10 |