|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **带整体加强环耳式支座强度校核** | | | 计算单位 |  | | | |
| 计算所依据的标准 | | | | **HG/T 20582-2011** | | | |
| **计 算 条 件** | | | | **支 座 简 图** | | | |
| 设计温度, t | | °C | **$$001** | $21  $23  $25  $23  $13  $14  $17  $22  $27  $100  $100  到设备重心  $26  $101  $101  $102  $110 | | | |
| 耳座数量, n | | / | **$$002** |
| 风载 | 10m高度处基本风压, q0 | N/m2 | **$$003** |
| 风压高度变化系数, f0 | / | **$$004** |
| 容 器 | 最大操作质量, m0 | kg | **$$005** |
| 总高, H0 | mm | **$$006** |
| 外直径(含保温层), D0 | mm | **$$007** |
| 偏心载荷, G0 | kg | **$$008** |
| 偏心距, S0 | mm | **$$009** |
| 筒 体 | 材料标准号 | **$$010** | |
| 材料名称/牌号 | **$$011** | |
| 腐蚀裕量, Cs2 | mm | **$$012** |
| 内直径, Dsi | mm | **$$013** |
| 名义厚度, δsn | mm | **$$014** |
| 垫板 | 材料标准号 | **$$015** | |
| 材料名称/牌号 | **$$016** | |
| 名义厚度, δdn | mm | **$$017** |
| 腐蚀裕量, Cd2 | mm | **$$018** |
| 刚 性 环 | 材料标准号 | **$$019** | |
| 材料名称/牌号 | **$$020** | |
| 上刚性环宽度, Wb | mm | **$$021** |
| 下刚性环宽度, Lb | mm | **$$022** |
| 名义厚度, δbn | mm | **$$023** |
| 腐蚀裕量, Cb2 | mm | **$$024** |
| 上-下刚性环间距, h | mm | **$$025** |
| 下刚性环下表面  到设备重心高差, H | mm | **$$026** |
| 螺栓外侧径向距离, Ld | mm | **$$027** |
| 筋 板 | 材料标准号 | **$$121** | |
| 材料名称/牌号 | **$$122** | |
| 筋板与底板的夹角, α | ° | **$$100** |
| 名义厚度, δcn | mm | **$$101** |
| 间距, b2 | mm | **$$102** |
| 腐蚀裕量, Cc2 | mm | **$$103** |
| 地震影响系数, u | | g | **$$104** |
| **材 料 特 性** | | | | | | | |
| 筒 体 | 密度, ρs | kg/m³ | **$$028** | 垫 板 | 密度, ρd | kg/m³ | **$$033** |
| 材料负偏差, Cs1 | mm | **$$029** | 设计温度许用应力, [σ]dt | MPa | **$$034** |
| 设计温度许用应力, [σ]st | MPa | **$$030** | 材料负偏差, Cd1 | mm | **$$035** |
| / | | | | / | | | |
| 刚性环 | 密度, ρb | kg/m³ | **$$031** | 筋 板 | 密度, ρc | kg/m³ | **$$105** |
| 材料负偏差, Cb1 | mm | **$$032** | 材料负偏差, Cc1 | mm | **$$106** |
| 设计应力, [σ]bt | MPa | **$$036** | 设计温度许用应力, [σ]ct | MPa | **$$107** |
| **过 程 参 数** | | | | | | | |
| 重力加速度, g | | m/s2 | g = 9.8 | | | | **9.8** |
| 不均匀系数, k | | / | k = 1, n <= 3; k = 0.83, n > 3 | | | | **$$108** |
| 筒体外直径, Dso | | mm | Dso = Dsi + 2δsn | | | | **$$038** |
| 筒体厚度附加量, Cs | | mm | Cs = Cs1 + Cs2 | | | | **$$039** |
| 筒体有效厚度, δse | | mm | δse =δsn - Cs | | | | **$$040** |
| 筒体有效加强宽度, Lss | | mm |  | | | | **$$041** |
| 垫板外直径, Ddo | | mm | Ddo = Dso + 2δdn | | | | **$$042** |
| 垫板厚度附加量, Cd | | mm | Cd = Cd1 + Cd2 | | | | **$$043** |
| 垫板有效厚度, δde | | mm | δde =δdn – Cd | | | | **$$044** |
| 垫板有效加强宽度, Lds | | mm |  | | | | **$$045** |
| 刚性环厚度附加量, Cb | | mm | Cb = Cb1 + Cb2 | | | | **$$046** |
| 刚性环有效厚度, δbe | | mm | δbe =δbn – Cb | | | | **$$047** |
| **安 装 尺 寸 计 算** | | | | | | | |
| 支座安装尺寸  (地脚螺栓中心圆直径), Db | | mm |  | | | | **$$048** |
| **计 算 支 座 处 作 用 于 刚 性 环 上 的 力** | | | | | | | |
| 地脚螺栓中心  到筒体外壁距离, b | | mm | b = (Db-Dso)/2 | | | | **$$049** |
| 水平风载荷, Pw | | N | Pw = 1.2×f0×q0×Do×H0×10-6 | | | | **$$050** |
| 水平地震力, Pe | | N | Pe = um0g | | | | **$$109** |
| 水平力, P | | N | P = max{Pw, Pe+0.25Pw} | | | | **$$110** |
| 作用于一个支座上的力, Fb | | N |  | | | | **$$051** |
| 支座处  作用于刚性环上的力, F | | N |  | | | | **$$052** |
| **加 强 环 组 合 截 面 特 性 计 算** | | | | | | | |
| 组合截面截面积, A | | mm2 | A = Wb×δbe +δde×Lds +δse×Lss | | | | **$$053** |
| 刚性环外缘  到惯性轴的距离, ax | | mm |  | | | | **$$054** |
| 惯性轴直径, Ds | | mm | Ds = Dso + 2(δde + Wb - ax) | | | | **$$055** |
| 刚性环形心到惯性轴距离, a1 | | mm | a1 = ax – Wb/2 | | | | **$$056** |
| 刚性环惯性矩, I1 | | mm4 |  | | | | **$$057** |
| 垫板形心到惯性轴距离, a2 | | mm | a2 = Wb + δde/2 - ax | | | | **$$058** |
| 垫板惯性矩, I2 | | mm4 |  | | | | **$$059** |
| 筒体形心到惯性轴距离, a3 | | mm | a3 = Wb + δde + δse/2 - ax | | | | **$$060** |
| 筒体惯性矩, I3 | | mm4 |  | | | | **$$061** |
| 组合截面惯性矩, I | | mm4 | I = I1 + I2 + I3 | | | | **$$062** |
| **刚 性 环 组 合 截 面 应 力 计 算 及 校 核** | | | | | | | |
| 支 座 处 | 耳座半夹角, θ | rad | θ = π/n | | | | **$$063** |
| 惯性轴半径, Rs | mm | Rs = Ds/2 | | | | **$$064** |
| 内力矩, Mr | N·mm |  | | | | **$$065** |
| 周向力, Tr | N |  | | | | **$$066** |
| 实际应力, σr | MPa |  | | | | **$$067** |
| 许用应力, [σr] | MPa | [σr] = min{[σ]st, [σ]bt, [σ]dt } | | | | **$$068** |
| 应力校核 | / | σr<=[σr] | | | | **$$069** |
| 两支座中间处 | 内力矩, Mt | N·mm |  | | | | **$$070** |
| 周向力, Tt | N |  | | | | **$$071** |
| 应力, σt | MPa |  | | | | **$$072** |
| 许用应力, [σt] | MPa | [σt] = min{[σ]st, [σ]bt, [σ]dt } | | | | **$$073** |
| 应力校核 | / | σt<=[σt] | | | | **$$074** |
| **筋 板 校 核** | | | | | | | |
| 厚度附加量, Cc | | mm | Cc = Cc1 + Cc2 | | | | **$$111** |
| 有效厚度, δce | | mm | δce = δcn – Cc | | | | **$$112** |
| 筋板惯性半径, r | | mm | r = 0.289×δce | | | | **$$113** |
| 筋板长度, L2 | | mm | L2 = h / sinα | | | | **$$114** |
| 许用压缩应力, [σ]cmax | | MPa |  | | | | **$$115** |
| 沿中性轴载荷, FR | | N |  | | | | **$$116** |
| 底板与壳体交点  到筋板斜边距离, L1 | | mm | L1 = Lb×sinα | | | | **$$117** |
| 偏心力臂, e | | mm |  | | | | **$$118** |
| 最大压缩应力, σcmax | | MPa |  | | | | **$$119** |
| 筋板压缩应力校核 | | / | σcmax <= [σ]cmax | | | | **$$120** |