|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **椭圆封头插入式接管开孔补强** | | | | | | | 计算单位 | |  | | | | | | | | |
| 管口符号： | | **$$001** | 接管规格： | | | **$$002** | | | | 计算方法：NB/T 47003.1-2009 等面积补强法, 单孔 | | | | | | | |
| **计 算 条 件** | | | | | | | | | **简 图** | | | | | | | | |
| 设计压力, Pd | | | | | MPa | | **$$003** | | $11  $16  $17  $19  $18  $27  $28  $22  $21  $20  $09  $10 | | | | | | | | |
| 设计温度, t | | | | | °C | | **$$004** | |
| 静压力, Ps | | | | | MPa | | **$$005** | |
| 压力试验类型 | | | | | **$$006** | | | |
| 封 头 | 材料标准号 | | | | **$$007** | | | |
| 材料牌号/名称 | | | | **$$008** | | | |
| 内直径, Dsi | | | | mm | | **$$009** | |
| 内壁曲面深度, hsi | | | | mm | | **$$010** | |
| 开孔处名义厚度, δsn | | | | mm | | **$$011** | |
| 腐蚀裕量, Cs2 | | | | mm | | **$$012** | |
| 焊接接头系数, φs | | | | / | | **$$013** | |
| 接 管 | 材料标准号 | | | | **$$014** | | | |
| 材料牌号/名称 | | | | **$$015** | | | |
| 外直径, dpo | | | | mm | | **$$016** | |
| 名义厚度, δpn | | | | mm | | **$$017** | |
| 实际外伸高度, hpo | | | | mm | | **$$018** | |
| 实际内伸高度, hpi | | | | mm | | **$$019** | |
| 与封头轴线夹角, α | | | | ° | | **$$020** | |
| 与过封头轴线和  开孔中心的平面夹角, β | | | | ° | | **$$021** | |
| 开孔中心到封头  轴线距离, L | | | | mm | | **$$022** | |
| 腐蚀裕量, Cp2 | | | | mm | | **$$023** | |
| 焊接接头系数, φp | | | | / | | **$$024** | |
| 补 强 圈 | 材料标准号 | | | | **$$025** | | | |
| 材料牌号/名称 | | | | **$$026** | | | |
| 外直径, dro | | | | mm | | **$$027** | |
| 名义厚度, δrn | | | | mm | | **$$028** | |
| 腐蚀裕量, Cr2 | | | | mm | | **$$029** | |
| 焊缝金属截面积, A3 | | | | | mm2 | | **$$030** | |
| 实际补强范围, Bs | | | | | mm | | **$$031** | |
| **材 料 特 性** | | | | | | | | | | | | | | | | | |
| 封 头 | 密度, ρs | | | | kg/m³ | | **$$032** | | 接 管 | | 密度, ρp | | | | | kg/m³ | **$$040** |
| 材料负偏差, Cs1 | | | | mm | | **$$033** | | 材料负偏差, Cp1 | | | | | mm | **$$041** |
| 试验屈服点, RseL | | | | MPa | | **$$034** | | 试验屈服点, RpeL | | | | | MPa | **$$042** |
| 设计温度许用应力, [σ]st | | | | MPa | | **$$035** | | 设计温度许用应力, [σ]pt | | | | | MPa | **$$043** |
| 试验温度许用应力, [σ]s | | | | MPa | | **$$036** | | 试验温度许用应力, [σ]p | | | | | MPa | **$$044** |
| 补强圈 | 密度, ρr | | | | kg/m³ | | **$$037** | | 设计温度许用应力, [σ]rt | | | | | | | MPa | **$$045** |
| 材料负偏差, Cr1 | | | | mm | | **$$038** | | 试验温度许用应力, [σ]r | | | | | | | MPa | **$$046** |
| 试验屈服点, RreL | | | | MPa | | **$$039** | | / | | | | | | | | |
| **过 程 参 数** | | | | | | | | | | | | | | | | | |
| 计算压力, Pc | | | | | MPa | | Pc = Pd + Ps | | | | | | | | | | **$$047** |
| 封 头 | 厚度附加量, Cs | | | | mm | | Cs = Cs1 + Cs2 | | | | | | | | | | **$$048** |
| 有效厚度, δse | | | | mm | |  | | | | | | | | | | **$$049** |
| 外直径, Dso | | | | mm | |  | | | | | | | | | | **$$050** |
| 外壁曲面高度, hso | | | | mm | |  | | | | | | | | | | **$$051** |
| 内壁长短轴比, Dsi/2hsi | | | | mm | |  | | | | | | | | | | **$$052** |
| 内压形状系数, K | | | | / | |  | | | | | | | | | | **$$053** |
| 外壁长短轴比, Dso/2hso | | | | mm | |  | | | | | | | | | | **$$054** |
| 外压形状系数, K1 | | | | / | | 根据 Dso/2hso 查表 5-2 | | | | | | | | | | **$$055** |
| 中面长半轴, asm | | | | mm | |  | | | | | | | | | | **$$056** |
| 中面短半轴, bsm | | | | mm | |  | | | | | | | | | | **$$057** |
| 开孔中心到  封头切线距离, H | | | | mm | |  | | | | | | | | | | **$$058** |
| 开孔中心处  法线与封头轴线夹角, θ | | | | ° | |  | | | | | | | | | | **$$059** |
| 接 管 | 厚度附加量, Cp | | | | mm | | Cp = Cp1 + Cp2 | | | | | | | | | | **$$060** |
| 有效厚度, δpe | | | | mm | |  | | | | | | | | | | **$$061** |
| 接管计算内直径, dpc | | | | mm | |  | | | | | | | | | | **$$062** |
| 开孔环向直径, a | | | | mm | |  | | | | | | | | | | **$$063** |
| 开孔径向直径, b | | | | mm | |  | | | | | | | | | | **$$064** |
| 开孔长短轴之比, ks | | | | / | |  | | | | | | | | | | **$$065** |
| 开孔直径, dop | | | | mm | |  | | | | | | | | | | **$$066** |
| 材料强度削弱系数, fp | | | | / | |  | | | | | | | | | | **$$067** |
| 补强圈 | 厚度附加量, Cr | | | | mm | | Cr = Cr1 + Cr2 | | | | | | | | | | **$$068** |
| 有效厚度, δre | | | | mm | |  | | | | | | | | | | **$$069** |
| 材料强度削弱系数, fr | | | | / | |  | | | | | | | | | | **$$070** |
| **内 压 强 度 计 算 及 校 核** | | | | | | | | | | | | | | | | | |
| 封 头 | 计算厚度, δsc | | | | mm | |  | | | | | | | | | | **$$071** |
| 最小厚度, δsmin | | | | mm | |  | | | | | | | | | | **$$072** |
| 设计厚度, δsd | | | | mm | | δsd = max{δsc, δsmin} + Cs2 | | | | | | | | | | **$$073** |
| 厚度校核 | | | | / | | δsn ≥ δsd + Cs1 | | | | | | | | | | **$$074** |
| 接 管 | 计算厚度, δpc | | | | mm | |  | | | | | | | | | | **$$075** |
| 设计厚度, δpd | | | | mm | | δpd = δpc + Cp2 | | | | | | | | | | **$$076** |
| 厚度校核 | | | | / | | δpn ≥ δpd + Cp1 | | | | | | | | | | **$$077** |
| **开 孔 补 强 计 算 及 校 核** | | | | | | | | | | | | | | | | | |
| 所需补强面积, A | | | | mm2 | | |  | | | | | | | | | | **$$078** |
| 封头 | 有效补强宽度, B | | | | mm | |  | | | | | | | | | | **$$079** |
| 多余面积, A1 | | | | mm2 | |  | | | | | | | | | | **$$080** |
| 接 管 | 有效外伸补强高度, hp1 | | | | mm | |  | | | | | | | | | | **$$081** |
| 有效内伸补强高度, hp2 | | | | mm | |  | | | | | | | | | | **$$082** |
| 多余面积, A2 | | | | mm2 | |  | | | | | | | | | | **$$083** |
| 补强圈有效补强宽度, dre | | | | | mm | |  | | | | | | | | | | **$$084** |
| 补强圈有效截面积, A4 | | | | | mm2 | |  | | | | | | | | | | **$$085** |
| 实际补强面积, Ae | | | | | mm2 | |  | | | | | | | | | | **$$086** |
| 补强面积校核 | | | | | / | |  | | | | | | | | | | **$$087** |
| **压 力 试 验** | | | | | | | | | | | | | | | | | |
| 系数, η | | | | | / | |  | | | | | | | | | | **$$088** |
| 封头试验压力, PsT | | | | | MPa | | PsT = max{η×Pd×[σ]s/[σ]st, 0.05} | | | | | | | | | | **$$089** |
| 接管试验压力, PpT | | | | | MPa | | PpT = max{η×Pd×[σ]p/[σ]pt, 0.05} | | | | | | | | | | **$$090** |
| 取用试验压力, PT | | | | | MPa | |  | | | | | | | | | | **$$091** |
| **MAWP** | | | | | | | | | | | | | | | | | |
| 封头MAWPs | | | | | MPa | |  | | | | | | | | | | **$$092** |
| 接管MAWPp | | | | | MPa | |  | | | | | | | | | | **$$093** |
| 开孔补强MAWPr | | | | | MPa | | A1 | A2 | | | | A3 | A4 | A | Ae | | **$$100** |
| **$$094** | **$$095** | | | | **$$096** | **$$097** | **$$098** | **$$099** | |
| 取用MAWP | | | | | MPa | |  | | | | | | | | | | **$$101** |