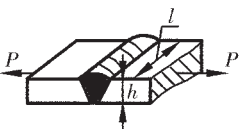
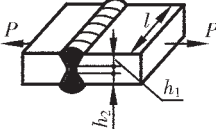
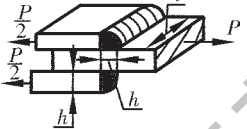
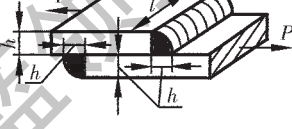
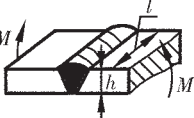
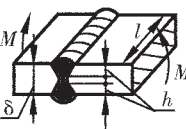
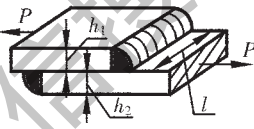
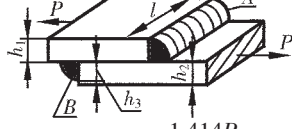
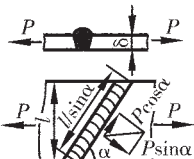
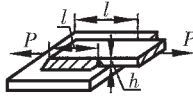
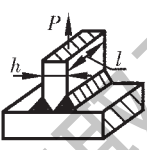
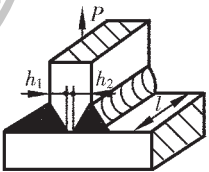
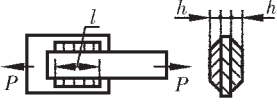
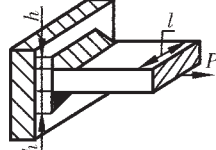

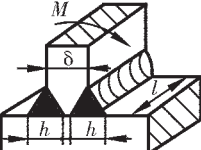
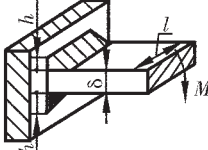
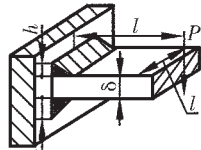


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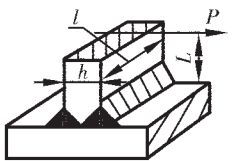
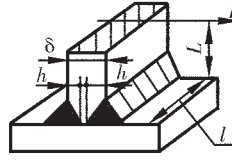
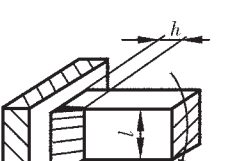
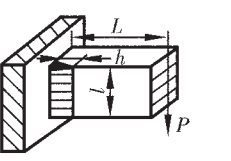
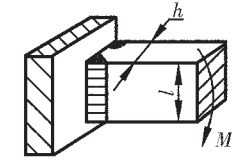
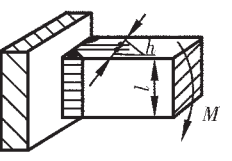
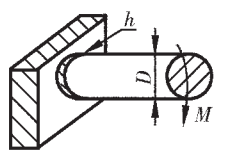
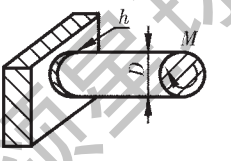
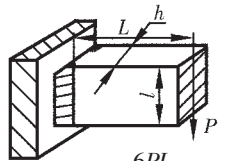
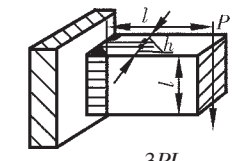
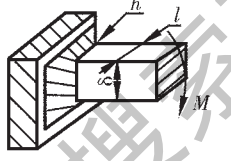
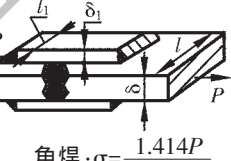
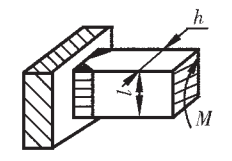
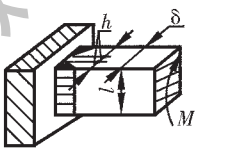
焊缝强度计算

YZB 250-89

1 不同焊缝的强度计算公式

 $\sigma = \frac{P}{hl}$	 $\sigma = \frac{P}{(h_1+h_2)l}$	 $\sigma = \frac{0.707P}{hl}$	 $\sigma = \frac{0.707P}{hl}$
 $\sigma = \frac{6M}{lh^2}$	 $\sigma = \frac{3\delta M}{lh(3\delta^2 - 6\delta h + 4h^2)}$	 $\sigma = \frac{1.414P}{(h_1+h_2)l}$	 $A: \sigma = \frac{1.414P}{(h_1+h_2)l}$ $B: \sigma = \frac{1.414Ph_2}{h_3l(h_1+h_2)}$
 $\sigma = \frac{P \sin^2 \alpha}{\delta l}$ $\tau = \frac{P \sin \alpha \cos \alpha}{\delta l}$	 $\sigma = \frac{0.707P}{hl}$		
 $\sigma = \frac{P}{hl}$	 $\sigma = \frac{P}{(h_1+h_2)l}$	 $\sigma = \frac{0.354P}{hl}$	 $\sigma = \frac{0.707P}{hl}$
 $\sigma = \frac{6M}{lh^2}$	 $\sigma = \frac{3\delta M}{lh(3\delta^2 - 6\delta h + 4h^2)}$	 $\sigma = \frac{1.414M}{hl(\delta+h)}$	 $\tau = \frac{0.707P}{lh}$ $\sigma_{\max} = \frac{P}{lh(\delta+h)} \times \sqrt{2L^2 + \frac{(\delta+h)^2}{2}}$

续表

 $\sigma = \frac{6PL}{hl^2}$ $\tau = \frac{P}{hl}$	 $\sigma = \frac{3\delta PL}{lh(3\delta^2 - 6\delta h + 4h^2)}$ $\tau = \frac{P}{2lh}$	 $\sigma = \frac{4.24M}{hl^2}$	 $\tau = \frac{0.707P}{hl}$ $\sigma_{\max} = \frac{4.24PL}{hl^2}$
 $\sigma = \frac{6M}{hl^2}$	 $\sigma = \frac{3M}{hl^2}$	 $\sigma = \frac{5.66M}{hD^2\pi}$	 $\tau = \frac{2.83M}{hD^2\pi}$
 $\sigma = \frac{6PL}{hl^2}$ $\tau = \frac{P}{hl}$	 $\sigma = \frac{3PL}{hl^2}$ $\tau = \frac{P}{2hl}$	 $\sigma = \frac{4.24M}{h(\delta^2 + 3l(\delta + h))}$	 <p>角焊: $\sigma = \frac{1.414P}{2\delta l_1 + \delta l}$</p> <p>对焊: $\sigma = \frac{P}{2\delta l_1 + \delta l}$</p>
	$\tau = \frac{M(3l + 1.8h)}{h^2 l^2}$		$\tau = \frac{M}{2(\delta - h)(l - h)h}$

2 焊缝的许用应力

2.1 机械制造中:

2.1.1 受静载荷时的许用应力 $[\sigma]$

$$[\sigma] = n[\sigma']$$

式中: $[\sigma]$ —焊缝的许用应力 (受静载荷时)

$[\sigma']$ —母体金属许用应力

n —工作条件系数

工作条件系数 n

焊 接 方 法	系 数 n		
	对 接		剪 切 [τ]
	受拉 [σ_b]	受压 [σ_y]	
手工电弧焊 T42 号焊条	0.8	0.9	0.6
在熔剂层下自动焊接, 闪光接触对接焊, 用 T427 手工焊接	0.9	1.0	0.65

常用钢材的许用应力 $[\sigma]'$

材料名称	受拉(或压)时	材料名称	受拉(或压)时
A2	140 N/mm ²	A3(用于梁桥时)	140 N/mm ²
A3	160 N/mm ²	A5	175~210 N/mm ²

2.1.2 受变载荷和变向载荷时许用应力 $[R]$

$$[R]=r[\sigma]$$

式中: r —降低系数

$[\sigma]$ —焊缝的许用应力(受静载荷时)

降低系数 r

焊缝类别	载荷类型	r
对接接头	受变载荷	$r=1$
	受变向载荷	$r = \frac{1}{1 - \frac{1}{3} \cdot \frac{P_{\min}}{P_{\max}}}$
角焊缝及其他焊缝	受变载荷	$r = \frac{1}{\frac{4}{3} - \frac{1}{3} \cdot \frac{P_{\min}}{P_{\max}}}$

注: ① P_{\min} 及 P_{\max} 为绝对数值的最小和最大作用力, 代入时必须带有本身的正负号。

② $r \leq 1$ (当 $r > 1$ 时则取 $r=1$)。

2.2 金属结构中:

2.2.1 静载荷时的许用应力 $[\sigma]'$

$$[\sigma]'=m[\sigma]''$$

式中: m —工作条件系数

$[\sigma]''$ —焊缝的基本许用应力

工作条件系数 m

工作条件	m
受拉元件	1.0
受压元件	0.9
单面焊接的角钢元件	0.75

焊缝的基本许用应力 $[\sigma]''$

焊缝分类	应力种类	T42 和 T426、T427 号焊条或熔剂层下的自动焊接用在 Q215-A、Q235-A、Q255-A 钢号的元件上
对接	压力	210 N/mm ²
对接	拉力	180 N/mm ²
对接	剪力	130 N/mm ²
填角	压力、拉力、剪力	140 N/mm ²

2.2.2 受变向载荷时的许用应力 $[R]'$

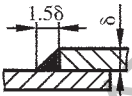
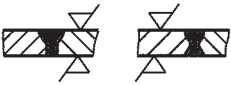

$$[R]' = \gamma[\sigma]'$$

$$\gamma = \frac{1}{a - b \cdot \frac{P_{\min}}{P_{\max}}} \leq 1$$

式中： P_{\min} 、 P_{\max} —为绝对数值的最小和最大的作用力，代入时必须带有本身的正负号。

当计算的 γ 大于1时，则应取 $\gamma=1$ 。

钢号 A3 的 a、b 系数

焊 缝 分 类	A3		焊 缝 分 类	A3	
	a	b		a	b
应力集中未涉及的母体金属	1.00	0.50	直角边之比为 1/1.5 的端焊缝 	1.50	1.00
表面加工 的对接焊缝 	1.10	0.60			
有背焊的 对接焊缝 	1.30	0.80	侧焊缝 	2.00	1.50