

IJB E H @ ? G B ?

(j_d h f _ g ^ m) _ f h _

I J B F ? J J : K Q , L : A M ; Q : L H C ? J ? > : Q B

(b g ^ b \ b ^ m Z e a q Z q Z

< u i h e g k b m ^ _ g l
= j m i i Z 0 0 0

< Z j b Z g 0 0

B k o h ^ g u a g g u _

I _ j _ a h q g k b k e h
i _ j _ ^ Z (a - b z 1 / z 2)

u 5

Q b k e h h j h l h \
r _ k l _ j , g h [f b g

n₁ 10.796

F a d k l a e v g u f c h f _ g l
g a \ a e m h e a , k f f

T₂ 1502100

J _ k m j a k h l u q

L_h 8000

L b i h \ h j c ` b f g Z j j m a d b

L y ` z e u c

K o _ f j Z k i h e h ` _ \ g l e h \
\ i _ j _ ^ Z j b k m g h d Z

6

Q b k e h e z g Z o h ^ y s b o k y
a Z p _ i e _ k g b l _ j g _ c

c 1

K l _ i _ g h v q g h k i l b j _ ^ Z q b 8

I j b f _ q Z g b j Z k q _ l b Z g ^ " d " k k h h l \ _ l k l \ m _ l
i Z j Z f _ l j Z f k l _ j , g b g ^ " d " k i Z j Z f _ l j Z h e _ k Z

J Z k q _ l

1 < u [h j f Z l _ j b Z e Z k l _ j g b d h e _ k Z
h i j _ ^ _ e _ g b _ j ^ h k l \ b [j a g g u d a l _ j b e h \

1.1 F Z l _ j b Z r e _ k l _ j g b d h e _ k u Z j b Z x l k y a Z \ b k b f h k j b ` b f Z j j m a d j b _ ^ Z q b
> e y y ` _ e h j l h ` b f Z j j m ` _ i g h v b j Z j f d h f _ g ^ h \ Z i g m Z l _ j b Z e h \

R _ k l _ j g l y Z 4 0 Q m e m q r , f g b b f Z e v l g f Z d k b f Z e q g k e h _ j ^ h k l b

HB_{1min} 269 HB_{1max} 302

D h e _ k h Z 4 5 , m e m q r , f g b b f Z e v l g f Z d k b f Z e q g k e h _ j ^ h k l b

HB_{2min} 235 HB_{2max} 262

1.2 K j _ ^ g a g Z q _ l g b j ^ h k l b y Z l _ j b Z r e Z k l _ j g b d h e _ k Z

HB_{1 k j} 0.5 HB_{1min} HB_{1max} 285.5

HB_{2 k j} 0.5 HB_{2min} HB_{2max} 248.5

$$2 > \text{himkdZ_d b glZ d l g g Z i j y`_g b y e r_k l_j g} \mu_{H1} \wedge h_i$$

$$b \wedge e y d h e_ \mu_{H2} \wedge h_i$$

2.1 J Z k q z l g b k e p b d e g Z] j m`_ (g l Z j Z [h] a l Z j_ f y w d k i e m Z \mu_{H2} e y b k l_ j g b d h e : k Z

$$N_1 \quad 60 \tilde{m}_1 \tilde{c} L_h \quad 5.182 \cdot 10^6$$

$$N_2 \quad 60 \tilde{m}_1 \tilde{c} \frac{L_h}{u} \quad 1.036 \cdot 10^6$$

2.2 W d \ b \ Z e_ g l g k e p b d e g Z i j y`_ g k h c h l _ l k l \ m a x Z \wedge Z g j h f m f m g Z] j m`_ i g b j Z k q_ g Z h g l Z d l g m k l Z e h a k r l [v r _ k l_ j g b d h e_ k Z

$$D h w n n b p b g l g k b \ g i h d l h g l Z d l g u f$$

$$g Z i j y`_ g b l Z f [e b \mu_{H2} G = f(j_` b f g Z] j m`_) g b y$$

$$l j b g b f Z_f \quad \mu_H \quad 0.5$$

$$N_{HE1} \quad \mu_H N_1 \quad 2.591 \cdot 10^6$$

$$N_{HE2} \quad \mu_H N_2 \quad 5.182 \cdot 10^5$$

2.3 Q b k e p b d e g h g l Z d l g g Z i j y`_ g N_{H0} k h h l _ l k l \ m k j s _ \wedge _ e u n g h k e b \ h k l b

$$N_{H01} \quad 30 \text{HB}_1 k_j^{2.4} \quad 2.347 \cdot 10^7$$

$$N_{H02} \quad 30 \text{HB}_2 k_j^{2.4} \quad 1.682 \cdot 10^7$$

2.4 D h w n n b p b \wedge h g e l h _ q g i h d l h g l Z d l g g Z i j y`_ g b e f a m [v r _ k l_ j g b b d h e_ k h Z g h j h \wedge g h j c n d l m f j Z l c_ j b Z e Z f h h [j Z [h d e Z m q r)_ g b _

$$:) ? k e N_{HE} > N_{H0}: \quad K_{HL1} \quad \sqrt[6]{\frac{N_{H01}}{N_{HE1}}} \quad 1.444 \quad K_{HL2} \quad \sqrt[6]{\frac{N_{H02}}{N_{HE2}}} \quad 1.786$$

$$> h e` g h i h e g y l v n k y e h _ l b` K_{HL1(2)} > 2,6$$

$$1) ? k e K_{HL1(2)} < 1, \text{ l h } K_{HL1(2)} = 1.$$

$$2) ? k e K_{HL1(2)} > 2,6, \text{ l h } K_{HL1(2)} = 2,6$$

$$;) ? k e N_{HE} > N_{H0}: \quad K_{HL1} \quad \sqrt[20]{\frac{N_{H01}}{N_{HE1}}} \quad 1.116 \quad K_{HL2} \quad \sqrt[20]{\frac{N_{H02}}{N_{HE2}}} \quad 1.19$$

$$> h e` g h i h e g y l v n k y e h _ 0,75` K_{HL1(2)} > 1$$

- 1) $k_{HL1(2)} < 0,75$, $k_{HL1(2)} = 0,75$
 2) $k_{HL1(2)} > 1$, $k_{HL1(2)} = 1$.

$$I_{jbgbfZ} : f \quad K_{HL1} \quad 1.444 \quad K_{HL2} \quad 1.786$$

2.5 $I_{j_}^{\wedge} _e h g l Z d l g b g h k e b \setminus H_{lim} \wedge e y Z I_j b Z r e _ Z I_j _p h e _ k Z$
 $I \setminus z j^{\wedge} h k d h l h j u b i Z j Z f _ I G_{k,j(2)} " 350 (I Z [e b _ 3$

$$\sigma_{Hlim1} \quad 2 \text{ HB}_{1kj} \quad 70 \quad 641 \quad F I Z$$

$$\sigma_{Hlim2} \quad 2 \text{ HB}_{2kj} \quad 70 \quad 567 \quad F I Z$$

2.6 $> h i m k d Z _ d f u g _ Z d l g u Z i j y _ _ g _ e y Z I_j b Z r e _ Z I_j _p h e _ k Z$
 $D h w n n b p p _ a g h i Z k g (H_{lim} k d Z _ a f z i a _ k h q g h) k l b$
 $_ e y _ k l _ j _ p h e _ (k Z [e b _ 3$

$$I_{jbgbfZ} : f \quad S_{H1} \quad 1.1 \quad S_{H2} \quad 1.1$$

$$\sigma_{H1}^{\wedge} h i \quad \frac{0.9 \sigma_{Hlim1}}{S_{H1}} \quad K_{HL1} \quad 757.312 \quad F I Z$$

$$\sigma_{H2}^{\wedge} h i \quad \frac{0.9 \sigma_{Hlim2}}{S_{H2}} \quad K_{HL2} \quad 828.542 \quad F I Z$$

2.7 $H d h g q Z I _ _ a g g Z r _ _ g b i m k d Z _ d f h g h Z d l g h Z i j y _ _ g _ e y$

$> e y d h k h a m p l h h _ k j Z g b f Z _ g Z y b f _ g v b _ a _ m a g Z q : g b c$

$$\sigma_{H}^{\wedge} h i \quad 0.45 \tilde{\sigma}_{H1}^{\wedge} h i \quad \sigma_{H2}^{\wedge} h i \quad 713.634 \quad F I Z$$

$$\sigma_{H}^{\wedge} h i \quad 1.23 \tilde{\sigma}_{H2}^{\wedge} h i \quad 1.019 \cdot 10^3 \quad F I Z$$

$F b g b f Z e v g h i m k d Z _ d f h g l Z d l g h Z i j y _ _ g b _$

$$I_{jbgbfZ} _ f \quad \sigma_{H}^{\wedge} h i \quad 713.634 \quad F I Z$$

3 $J Z k q a m [v g Z k h i j h l b _ e _ g m k l Z e h i k l d h g l Z d l g h Z i j y _ _ g b y f$
(проектный расчёт)

3.1 $I_{j_}^{\wedge} _ Z j b l _ e v g h h _ _ e _ g h w n n b p b g Z g l j z h k q b j Z k q z l g Z d h g l Z d l g m x$
 $m k l Z e h k l v$

$A Z^{\wedge} Z z i f j k y _ _ Z j b l _ e v g g Z l g _ g b y f v n n b p b j Z g k h j _ _ e g g b j m a d b$
 $f _ _ _ m [v y k p d d h g p _ g l j z z b j m k q e _ _ b g Z f b q g g Z l p m k q b$

$$I_{jbgbfZ} : f \quad K'_{H\alpha} \quad 1.1 \quad K'_{H\beta} \quad 1.12 \quad K'_{Hv} \quad 1.15$$

$$K'_H \quad K'_{H\alpha} \quad K'_{H\beta} \quad K'_{H\nu} \quad 1.417$$

3.2 $I_j \sim \sqrt{Z} j b l \sim e v j Z k q \sqrt{l} \sim h k \sim \sqrt{j Z k k l h y a} \sim p a m k e h \sim d h y l Z d l g m k l Z e h k l b$
 $Z d l b \sim g i h d \sim j o g h k a m \sim v \sim$

$$I_j \sim \sqrt{Z} j b l \sim e a g h Z q \sim j g Z k q \sim l g f h j h \sim g l g Z Z e m h e \sim k Z$$

$$T'_p \quad T_2 \quad K'_H \quad 2.128 u 10^6 \quad G f f$$

D h w n n b p b b j g l g u \sim g p d z h e \sim k l z h k b l \sim e v g h k \sim \sqrt{j Z k k l h y} (g/a = b_2/a_w).

$$I_j b g b f Z \sim f \psi_{ba} \quad 0.4$$

$$a'_w \quad (u \sim 1) \sim \sqrt[3]{\frac{T'_p \sim \sqrt{270}}{\psi_{ba} \sim \sqrt{H \sim h \sim \mu \sim 1}}} \quad 187.39 \quad f f$$

I h e m q \sim g \sim g r e b q a \sim g m d j m] e b h [e b \sim Z c r \sim] h g Z q \sim f g b \sim h k \sim \sqrt{h} h
j Z k k l h y \sim \sqrt{b b y a \sim y \sim (Z f)}: 40; 45; 50; 56; 63; 71; 80; 90; 100; 112; 125; 140;
160; 180; 200; 224; 250; 280; 315; 355; 400; 450; 500; 560; 630; 710; 800; 900.

< g Z q Z k e e \sim \wedge \mu [l j Z l [e b \sim Z c r \sim f \sim g v r \sim a g Z q \sim a g \sim b a k l Z g \sim \wedge Z j l g y h] Z
> Z e i h j \sim a m e v l \sim \sqrt{Z} Z k q \sim d \sim \sqrt{h} [v g \sim Z h g l Z d l g m k l a] b [g m k l Z e h k l v
g \sim h [o h \sim \wedge b f m k l \sim b e b q b a \sim Z \sim h [e b \sim Z c r \sim] h e v r \sim \sqrt{h} g Z q \sim \sqrt{g} y \sim \sqrt{Z} \sim
i h \sim \sqrt{h} j y \sim Z k q \sim l

$$I_j b g b f Z \sim f a_w \quad 200 \quad f f$$

3.3 $H i j \sim \wedge \sim e \sim r g b j b g d h e \sim k Z \sim k l \sim j : g b$

$$b_2 \quad \psi_{ba} \sim a_w \quad 80 \quad f f$$

< g Z q Z k e e \sim \wedge m j b l g y l r b j b g d h e \sim \sqrt{Z} \sim g h j Z k q \sim l g h e b q b_2 g \sim
> Z e i h j \sim a m e v l \sim \sqrt{Z} Z k q \sim d \sim \sqrt{h} [v g \sim Z h g l Z d l g m k l a] b [g m k l Z e h k l v
i j b g \sim h [o h \sim \wedge b f m k l \sim b e b q b a \sim Z \sim h [e b \sim Z c r \sim] h e v r \sim \sqrt{h} g Z q \sim \sqrt{g} y \sim \sqrt{Z} \sim
\sim h [b \sim \sqrt{Z} y \sim k v h e g \sim g j b \sim y \sim m \sim f m k e h . \sim b c

$$I_j b g b f Z \sim f b_2 \quad 65 \quad f f$$

$$b_1 \quad 1.12 b_2 \quad 72.8 \quad f f \quad I_j b g b f Z \sim f b_1 \quad 72 \quad f f$$

J Z k q \sim l g g Z q \sim g h w n n b p b r b g b Z d h e \sim k Z

$$\psi_{ba} \quad \frac{b_2}{a_w} \quad 0.325$$

3.4 $H i j \sim \wedge \sim e \sim r g Z d l b q \sim k h d h j m \sim g h d h j h . k l b$

$$v = \frac{a_w \pi n_1}{30(u-1)} = 37.685 \text{ f f/k}$$

3.5 Mlhqg $\frac{1}{u}$ g h k l j $\frac{1}{u}$ ^ Zich $\frac{1}{u}$ e b q $\frac{1}{u}$ j m $\frac{1}{u}$ g h k l j h k l b
 I h k d h e v d h j m $\frac{1}{u}$ g h k l j h k l j $\frac{1}{u}$ j Z \ g Z V 0.001 ~ v 0.038 f/k
 C l _ i _ g h q g h k l j $\frac{1}{u}$ e b q $\frac{1}{u}$ l j b g b f Z _ f 9

3.6 Mlhqg $\frac{1}{u}$ d h w n n b p b j Z g h j \ ^ _ e g h j m k d b d h g p _ g l j Z g h j m k d b
 ^ b g Z f b q g h k l j b l \ z j ^ h k l j b l _ j b Z r e Z l _ j d h e _ G Z k j (2)

$$D h w n n b p b j Z g h j \ ^ _ e g h j m k d b d h g p _ g l j Z g h j m k d b$$

$$\psi_{bd} = 0.5 \psi_{ba} (1 - u) = 0.975$$

D h w n n b p b j Z g h j \ ^ _ e g h j m k d b d h g p _ g l j Z g h j m k d b
 V, l b i Z _ j _ ^ Z d b k h a m b j y b g y l h k l _ i _ g h q g h k l j b k m g h d Z
 l j b g b f Z _ f K_{H\alpha} = 1.10

D h w n n b p b j Z g h j \ ^ _ e g h j m k d b d h g p _ g l j Z g h j m k d b
 H B_{k j (2)} " 350 % d b \ b ^ Z _ j _ ^ Z i c h - h c k o _ f j Z k i h e h \ _ g h j m k d b
 l j b g b f Z _ f K_{H\beta} = 1.02

D h w n n b p b j Z g h j \ ^ _ e g h j m k d b d h g p _ g l j Z g h j m k d b
 i _ j _ ^ Z d b k h a m b j y b g y l h k l _ i _ g h q g h k l j b k m g h d Z
 l j b g b f Z _ f K_{Hv} = 1.02

M l h q g z g a g h Z _ q _ d h w n n b p b j Z g h j \ ^ _ e g h j m k d b d h g p _ g l j Z g h j m k d b
 K_H K_{H\alpha} K_{H\beta} K_{Hv} = 1.144

3.7 N Z d l b q _ a g Z g _ j Z k q z l g h j m l y s f h f _ g l Z b d h g l Z d l g u z i j y ` _ g v c
 (i j h \ _ j h q g Z k q z l

$$T_p = T_2 K_H = 1.719 \times 10^6 \text{ G f f}$$

$$\sigma_H = 270 \frac{\mu}{a_w \tilde{u}} \sqrt{\frac{S}{C} \frac{1}{b_2} \cdot T_p} = 645.327 \text{ F I Z}$$

l j h \ _ j d r z k e h d h g l Z d l g h t c q g h k l j b h p 1.
 $\sigma_H^{hi} = 713.634 \text{ F I Z}$ $\sigma_H = 645.327 \text{ F I Z}$

? ke m ke h i p h q g h k d b u i h e g y _ l k i j h \ _ j y _ l k y _] j m a d j Z ^ Z q b [h e 5% .
 ? ke m ke h i p h q g h k l b i h e g y _ l k i j h \ _ j y _ l k y ^ h] j m a d j Z ^ Z q b [h e 10% .

$$I_{j_j} m \Delta \sigma_H \frac{a \sigma_H \sigma_H \wedge h i^0}{\sigma_H \wedge h i} 100 \quad 9.572\%$$

I j b i _ j _] j m a d j Z ^ Z q b [h e 5% \ _ j g m l \ v k r m g 6.2 b e 3.3 b m \ _ e b a p b v e b _ 2 .
 I j b g _ ^ h] j m a d j Z ^ Z q b [h e 10% \ _ j g m l \ v k r m g 6.2 b e 3.3 b m f _ g v r a w b e b _ 2 .

4 Hij _ ^ _ e _ g b h f _ l j b q _ k Z p z f _ l j h a m [q Z l d u h e z k

4.1 Hij _ ^ _ e _ f g h m a z p _ i e i g b l y h l g h r _ m p x (0,01 ... 0,02) a_w

$$I h e m q b f m_n \quad 0.01 \tilde{a}_w \quad 2 \quad f f \quad m_n \quad 0.02 \tilde{a}_w \quad 4 \quad f f$$

A g Z q _ f g h ^ m b d j m] e y h k l Z g ^ Z j l g h e c b q b g a u y ^ (Z f f) :
 1,0; 1,125; 1,25; 1,375; 1,5; 1,75; 2,0; 2,25; 2,5; 2,75; 3,0; 3,5; 4,0;
 4,5; 5,0; 5,5; 6,0; 7,0; 8,0; 9,0; 10; 11; 12; 14; 16; 18; 20; 22; 25.

< g Z q Z a [b j Z _ l k i y ^ g a g Z q _ f g h ^ m a z p _ i e .] g b y
 < ^ Z e v g _ c i h j f _ a m e v l z z Z q _ d a z [v g Z a] b [b
 g _ h [o h ^ b f h k ^ m b e m \ _ e b q b b z e h f _ g v r Z x l
 i h \ l h j y z k q _ l

$$I j b g b f Z _ f m_n \quad 4.0 \quad f f$$

4.2 I j _ ^ \ Z j b l _ e v a g h Z q _ m p e g Z d e h a g n Z [r Z _ k l _ j g b l h e _ k Z

$$\beta'_{min} \quad a \sin \frac{3.5 \tilde{m}_n}{b_2} \quad 0.217 \quad j Z ^ \beta'] j_{min} \quad \beta'_{min} \frac{180}{\pi} \quad 12.438 \quad] j Z ^$$

G Z a g Z q Z _ ^ \ Z j b l _ e v a g h Z d e h a g n Z [Z j _ ^ _ e l Z b ^ h 15] j Z ^ m , k h \] Z q l h [u] j . \cdot '] j_{min}

$$I j b g b f Z _ f \beta'] j \quad 12.5 \quad] j Z ^ \beta' \quad \beta'] j \frac{\pi}{180} \quad 0.218 \quad j Z ^$$

4.3 K m f f Z j g q b k e a m [v r \ k l _ j g b l h e _ k e z y h k h a m i [h j c ^ Z q b

$$Z_{\Sigma} \quad \frac{2 \tilde{a}_w}{m_n} \tilde{\cos}(\beta') \quad 97.63$$

H d j m] e _ l g n b f Z j g q b k e a z n [v \ l _ g v r m k l h j h g m p _ e h q b k e Z

$$I j b g b f Z _ f \quad Z_{\Sigma} \quad 97$$

4.4 M l h q g _ m p e g Z d e h a g n Z [r Z _ k l _ j g b l h e _ k e z y h [_ k i _ q \ g b j z g g a_w] h

$$\beta = \arccos \frac{\sum \tilde{m}_n}{2 \tilde{a}_w} = 0.246 \text{ rad} \quad \beta \approx \frac{80}{\pi} = 14.07 \text{ rad}$$

$$l_{jh} \approx j d_{Z1} \sin \beta \approx 0.246 j d_{Z1}$$

$$\beta \approx 14.07 \text{ rad} \quad \beta' \approx 12.438 \text{ rad}$$

4.5 Q b k a l m [v r _ _ k l _ j] (z_{1min} = 17, _ k e p_j < 12^\circ; z_{1min} = 16 _ k e p_j \cdot 12^\circ) b d h e _ k Z h d j m] e _ g b [e b _ _ z c r _] h _ e h a j g z q _ g b y

$$Z_1 = \frac{Z_\Sigma}{u - 1} = 16.167 \text{ l j b g b f } Z _ f \quad Z_1 = 16$$

$$Q b k a l m [v d _ h e _ k z z_2 = Z_\Sigma - Z_1 = 81$$

$$N Z d l b q _ k d j h _ _ z l h q q p h k e h u_n = \frac{Z_2}{Z_1} = 5.063$$

H l d e h g _ m z d l b q _ k i d j] h z l h q g b k h e u_n h l a z _ z g u h j h [h e 4%

$$\Delta u = \frac{\sum |u - u_n|}{u} \cdot 100 = 1.25 \%$$

4.6 H k g h _ g] u _ h f _ l j b q _ j k z d a f _ j r u _ k l _ j p h e _ k z

$$> _ e b l _ e v g u z _ f _ l j u$$

$$d_1 = m_n \frac{Z_1}{\cos(\beta)} = 65.979 \text{ ff} \quad d_2 = m_n \frac{Z_2}{\cos(\beta)} = 334.021 \text{ ff}$$

$$> b z f _ l] u j r b : g$$

$$d_{a1} = d_1 + 2 \tilde{m}_n = 73.979 \text{ ff} \quad d_{a2} = d_2 + 2 \tilde{m}_n = 342.021 \text{ ff}$$

$$> b z f _ l] u z _ _ b g$$

$$d_{f1} = d_1 + 2.5 \tilde{m}_n = 55.979 \text{ ff} \quad d_{f2} = d_2 + 2.5 \tilde{m}_n = 324.021 \text{ ff}$$

4.7 H i j _ _ e _ g b z f _ l j z _ _ j k l b k l m i b p _ k l _ j p h e _ k z z f _ l j u _ _ j k l b c _ h e _ g [u l v j z _ g u b z f _ l j z z e h] z k q z b z f _ l j z z e z h j b _ g l b j h _ h) q g u c i j h _ h _ b l i k y i h g b _ _ g g u h f i m k d z _ d f z i k z l _ e g z u f y _ _ g . b y f

$$l j b g b f z _ f \quad \tau _ h 1 = 15 \text{ FIZ} \quad \tau _ h 2 = 15 \text{ FIZ}$$

$$D_{jml} y_s b h f h g g Z Z e m_{kl} j g b T_1 \frac{T_2}{u_n} 2.967 \cdot 10^5 \text{ Gf}$$

$$d_{\backslash 1} \sqrt[3]{\frac{T_1}{0.2 \tilde{\tau} \wedge h_1}} 46.246 \text{ ff} \quad d_{\backslash 2} \sqrt[3]{\frac{T_2}{0.2 \tilde{\tau} \wedge h_2}} 79.407 \text{ ff}$$

l j b g b f Z _ : f \quad d_{\backslash 1} \quad 48 \text{ ff} \quad d_{\backslash 2} \quad 80 \text{ ff}

5 H i j _ ^ _ e _ g b h i m k d Z _ g f i j y ` _ g b a y Z k q z b z m [v g z b a] b [

5.1 G h j f Z l b \ g a z c i Z k h q g h S _ b b i j _ ^ _ e e b l _ e v g u h g h k e b \ h i k b l a] b [g u f
g Z i j y ` _ g b a y f (I Z [e b 2 3] ^ e y Z l _ j b z a m Z [v k \ \ z ^ h k l G x <_{k,j(2)} " 350.

$$l j b g b f Z _ f \quad S_F \quad 1.7$$

$$\sigma_{Flim1} \quad 1.75 \cdot HB_1 \cdot k_j \quad 499.625 \text{ F I Z} \quad \sigma_{Flim2} \quad 1.75 \cdot HB_2 \cdot k_j \quad 434.875 \text{ F I Z}$$

5.2 > h i m k d Z _ g f i j y ` _ g b a y] b \ z y _ k l _ j g b h e _ : k Z

$$\sigma_{F1} \wedge h_i \quad \frac{\sigma_{Flim1}}{S_F} \quad 293.897 \text{ F I Z} \quad \sigma_{F2} \wedge h_i \quad \frac{\sigma_{Flim2}}{S_F} \quad 255.809 \text{ F I Z}$$

6 J Z k q g Z k h i j h l b \ e _ g r b k l Z e h l a r b [v i h g Z i j y ` _ g b y f a] b [Z
(проверочный расчёт)

6.1 W d \ b \ Z e _ g g l g h e m [v r _ \ k l _ j g b h e _ : k Z

$$Z_{v1} \quad \frac{Z_1}{\cos(\beta)^3} \quad 17.531 \quad Z_{v2} \quad \frac{Z_2}{\cos(\beta)^3} \quad 88.75$$

6.2 D h w n n b p b h i j l a m [Y_{F1(2)} ^ e y _ k l _ j g b h e _ k h z w d \ b \ Z e _ g g p u k f e z m [v _ \ (I Z [e b 2 4]

$$l j b g b f Z _ : f \quad Y_{F1} \quad 4.2 \quad Y_{F2} \quad 3.60$$

6.3 D h w n n b p b i j z d e h a g z i z e

$$Y_{\beta} \quad 1 \quad \frac{S_{ij}}{C_{20}^1} \quad 0.883$$

6.4 H d j m ` g z b y e Z _ c k l \ m x g z a m [v y h e _ k Z

$$F_t = \frac{T_2 \tilde{u}_n}{a_w \tilde{u}_n} = 8.994 \cdot 10^3 \text{ G}$$

6.5 $W_d \setminus b \setminus Z_e \dots$

Dh w n n b p b g b l g k b \setminus g i h k l a b [g g Z i j y \setminus _ g b a Z \setminus b k b f h k l b

$$I_{jbgbfZ_f} \quad \mu_F = 0.3$$

$$N_{FE1} \quad \mu_F N_1 = 1.555 \cdot 10^6 \quad N_{FE2} \quad \mu_F N_2 = 3.109 \cdot 10^5$$

6.6 Dh w n n b p b ^ h g l j h \setminus _ q g i h k l a b [g g Z i j y \setminus _ g b a f a m [v r \setminus k l _ j g b

; Z a h \setminus q b k e r b d e b a [g g Z i j y \setminus _ g b I_{jbgbfZ_f} N_{F0} = 4 \cdot 10^6

$$K_{FL1} = \sqrt[6]{\frac{N_{F0}}{N_{FE1}}} = 1.171 \quad K_{FL2} = \sqrt[6]{\frac{N_{F0}}{N_{FE2}}} = 1.531$$

> h e \setminus g b i h e g y l v k l y e h \setminus b " K_{FL1(2)} " 4

- 1) ? k e k_{FL1(2)} < 1, I h K_{HL1(2)} = 1.
- 2) ? k e k_{FL1(2)} > 4, I h K_{HL1(2)} = 4.

$$I_{jbgbfZ_f} \quad K_{FL1} = 1.171 \quad K_{FL2} = 1.531$$

6.7 M l h q g _ g l w n n b p b j z k h j \setminus ^ _ e g z b j m k e p d h g p _ g l j z z b j m k e p

Dh w n n b p b b j o l g u _ k l _ j g b g h k b l _ e v o f z f _ l j z

$$\psi_{bd} = 0.5 \tilde{\psi}_{ba} \tilde{u}_n = 0.985$$

Dh w n n b p b z k j _ ^ _ e g z b j m k e p \setminus a Z \setminus b k b f h k h d j m \setminus g h c

$$I_{jbgbfZ_f} \quad K_{F\alpha} = 1.26$$

Dh w n n b p b h g p _ g l j z z b j m k e p (j b k m g r b d) \setminus a Z \setminus b k b f h k l b _ j ^ h k l b

$$I_{jbgbfZ_f} \quad K_{F\beta} = 1.13$$

D h w n n b p b b g Z f b q g h k Z b k b f h k k b _ i _ g h b q g h k l b
 i _ j _ ^ Z b d j m ^ g h k h j h k l b k l _ j g l b Z [e b 2 9 .

$$l j b g b f Z _ f \quad K_{FV} \quad 1.04$$

$$D h w n n b p b Z b j l m a c K_F \quad K_{F\alpha} \quad K_{F\beta} \quad K_{FV} \quad 1.481$$

6.8 H i j _ ^ _ e _ r g Z d l b q _ k d b o f _ g g u Z i j y ` _ g b a c] b [Z_{(2)} ^ e y _ k l _ j g b h e _ k Z

$$\sigma_{F1} \quad \frac{Y_{F1} Y_{\beta}}{b_1 \tilde{m}_n} F_t K_{FL1} K_F \quad 200.766 F I Z$$

$$\sigma_{F2} \quad \frac{Y_{F2} Y_{\beta}}{b_2 \tilde{m}_n} F_t K_{FL2} K_F \quad 249.219 F I Z$$

6.9 l j h \ _ j d i z h q g h k i h b a] b [g g Z i j y ` _ g b a c] b [Z_{(2)} ^ e y _ k l _ j g b h e _ k Z

$$\sigma_{F1} \quad 200.766 F I Z \quad \sigma_{F1 \wedge h i} \quad 293.897 F I Z$$

$$\sigma_{F2} \quad 249.219 F I Z \quad \sigma_{F2 \wedge h i} \quad 255.809 F I Z$$

$$l _ j _ g Z i j y ` (g b _ \quad \Delta \sigma \quad \frac{a \sigma_{F1} \sigma_{F1 \wedge h i}^0}{\sigma_{F1 \wedge h i} \quad 1/4} \quad 100 \quad 31.688 \%$$

g _ ^ h g Z i j y ` (-) g b _
 ^ e y a m [v r \ k l _ j g b

$$l _ j _ g Z i j y ` (g b _ \quad \Delta \sigma \quad \frac{a \sigma_{F2} \sigma_{F2 \wedge h i}^0}{\sigma_{F2 \wedge h i} \quad 1/4} \quad 100 \quad 2.576 \%$$

g _ ^ h g Z i j y ` (-) g b _
 ^ e y a m [v d h e _ k Z

1) ? k e b Z d l b q _ k d b o f _ g g u Z i j y ` _ g b a c] b [Z_{(2)} ^ e y _ k l _ j g b h e _ k Z
 i j _ \ u r Z x 1 h i m k d Z g Z i j y ` _ g l b h y n k e h \ i p h y q g h k l b h e g y x l k y
 2) ? k e b e y _ k l _ j g b h e _ k Z _ g Z i j y ` _ k g h k l Z \ e j h e 15% , l h
 g _ h [o h ^ b f j h m l v k r n g d . l l b m \ _ e b o f b l v m a Z p _ i e m g . b y

6.10 N Z d l b q _ k d b o f _ g g u Z i j y ` _ g b a c] b [Z_{(2)} ^ e y _ k l _ j g b h e _ k Z " 2,5 i j b g _ ^ h g Z i j y ` _ g b b

$$S_F \quad 1.7$$

$$S_{F1} \quad \frac{\sigma_{Flim1}}{\sigma_{F1}} \quad 2.489 \quad S_{F2} \quad \frac{\sigma_{Flim2}}{\sigma_{F2}} \quad 1.745$$

? k e b Z d l b q _ k d b o f _ g g u Z i j y ` _ g b a c] b [Z_{(2)} ^ e y _ k l _ j g b h e _ k Z \ u r Z _ l
 2,5 , l h i h \ h a f h ` g h k l b _ g v r b v j b g d h e _ k i z h g d 3.3 .

6.11 N Z d l b q _ k d b o f _ g g u Z i j y ` _ g b a c] b [Z_{(2)} ^ e y _ k l _ j g b h e _ k Z \ u r Z _ l \ S_{Fmin} i j b i _ j _ g Z i j y ` _ g b b

> himklbklg_b`_ggZ% ghjfZlb\gahZkjZqghklb

$$S_{Fmin} S_F (1 - 0.05) = 1.615$$

$$S_{F1} \frac{\sigma_{Flim1}}{\sigma_{F1}} = 2.489 \quad S_{F2} \frac{\sigma_{Flim2}}{\sigma_{F2}} = 1.745$$

? kebZdlbq_kabZkhqghkl_bkl_jgbdhe_kZgvr_ S _{Fmin} lhg_h[oh^mfhebqrbljvgm_gplZmgd3.3.
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NZdlbq_kabZkhqghkl_bkl_jgbdhe_kZihegy_.lky