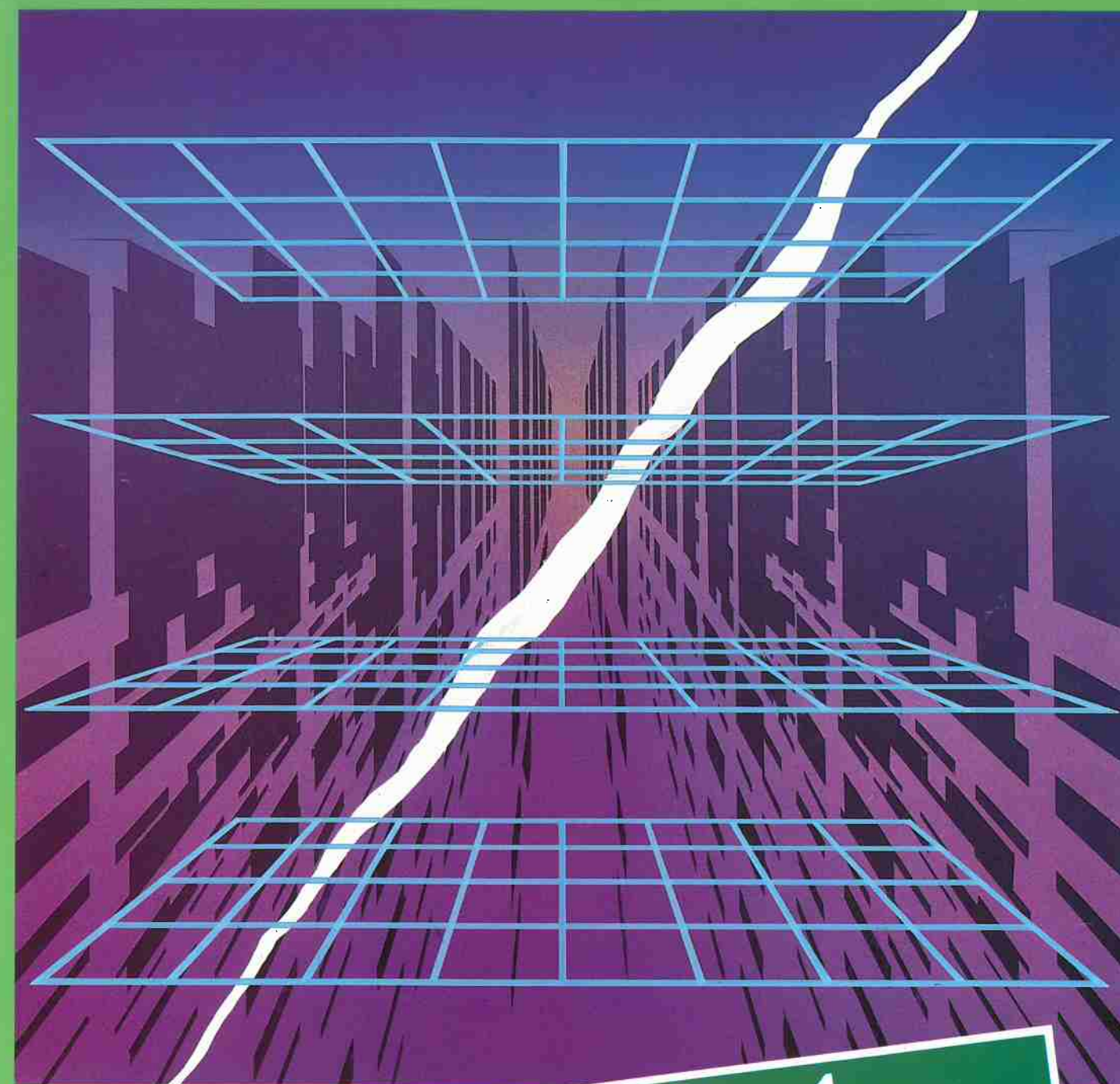


instituto brasileiro  
de telas soldadas

Rua Cardoso de Almeida, 313 conj. 132  
Perdizes - São Paulo - SP - CEP 05013-000  
Telefone: (0xx11) 826-5954 / 826-9804  
Fax: (0xx11) 3663-6558  
e-mail: [ibts@dialdata.com.br](mailto:ibts@dialdata.com.br)



**ibts**

**O uso da  
Tela Soldada  
no Combate à  
Fissuração**

# O uso da Tela Soldada no Combate à Fissuração

Sérgio Mollica Júnior  
Mestre em Engenharia de Estruturas  
EPUSP - 1979 - CREA 47.206/D  
Trabalho Desenvolvido para o  
IBTS - Instituto Brasileiro de Telas Soldadas

# Índice

Prefácio	4
I - Estados limites	5
II - Etapas do estudo da fissuração	5
III - Formação sistemática e não sistemática de fissuras	6
IV - O que prescreve a NBR-6118	7
V - A primeira expressão da NBR-6118 (do item 4.2.2)	9
VI - A segunda expressão da NBR-6118 (do item 4.2.2)	12
VII - Exemplo de aplicação	14
VIII - A verificação da fissuração com o uso de Telas Soldadas	15
IX - Tabelas para uso prático	16



# Prefácio

O trabalho "FISSURAÇÃO" desenvolvido pelo Instituto Brasileiro de Telas Soldadas é importante ajuda para os profissionais que desejam usar telas soldadas em seus projetos.

As telas soldadas oferecem grande vantagem econômica - pela redução de mão-de-obra e pela facilidade de construção - porém ressentia-se de uma fonte de consulta que permitisse ao engenheiro o seu emprego mais amplo com garantias em relação ao aparecimento de fissuras prejudiciais à segurança global.

O trabalho apresentado pelo Instituto de Telas Soldadas se inicia com uma descrição dos conceitos atuais sobre segurança, definindo o estado limite último e o estado limite de utilização.

Esta parte do trabalho dá noção perfeita das condições a serem atingidas no projeto de estruturas.

A apresentação do problema da fissuração é feita de maneira precisa e sistemática, ilustrada com a transcrição do texto da norma NBR-6118 que regula a matéria.

O trabalho prossegue apresentando as teorias e fórmulas gerais para verificar-se a fissuração acompanhadas de roteiro de cálculo para solução dos problemas que surgem na análise dos fenômenos de fissuração.

Como coroamento do trabalho são apresentados exemplos de aplicação de grande interesse prático.

Importante é destacar os conceitos finais em que o problema específico da tela soldada é exposto com simplicidade e clareza, deixando bem demonstradas as vantagens deste tipo de armadura na solução de muitos problemas de projeto de estrutura de concreto armado.

Cumpra também assinalar que a exposição não se detém no exame da teoria e na apresentação dos métodos e dos exemplos práticos.

O trabalho é complementado com a apresentação de extensas tabelas que permitem fixar o tipo de tela a usar em função dos momentos fletores atuantes.

As tabelas abrangem os casos de concreto com vários valores de  $f_{ck}$  e diversas limitações das aberturas de fissuras, permitindo ao projetista lançar o tipo de tela dentro das condições específicas de cada caso.

É importante lembrar que o subsídio das tabelas permite o dimensionamento econômico das telas soldadas reduzindo o custo da obra.

*Aderson Moreira da Rocha*

Aderson Moreira da Rocha  
C.R.E.A. 2432 D-5ª Região

# I - Estados limites

As estruturas de concreto armado devem ser dimensionadas e verificadas não somente em função da segurança que possam oferecer devido à sua capacidade resistente, como também pela aceitação de seu comportamento nas condições de serviço.

Desta forma, definem-se, basicamente, dois tipos de estados limites para uma estrutura:

## I. a) Estado limite último - correspondente à inutilização da estrutura, caracterizado por uma das três situações abaixo:

- ruptura do concreto
- deformação plástica excessiva do aço tracionado
- instabilidade

## I. b) Estado limite de utilização - correspondente à colocação da estrutura em condições de não utilização, levando-se em conta sua durabilidade, funcionamento e estética. Caracterizam tais situações:

- estado de formação de fissuras (quando há grande

probabilidade de iniciar-se a formação de fissuras) - considerado limite para as peças que não podem admitir fissuração, por menor que seja

- estado de fissuração inaceitável (quando as fissuras se apresentam com abertura prejudicial à durabilidade ou ao funcionamento da peça)
- estado de deformação excessiva (quando as deformações ultrapassam os limites aceitáveis para a utilização da estrutura).

O dimensionamento das peças de concreto armado em estado limite último se faz impondo-se que ele seja alcançado ao majorarem-se as ações (através de  $\gamma_f$ ) e minorarem-se as resistências dos materiais envolvidos (através de  $\gamma_c$  e  $\gamma_s$ ). Desta forma, estes coeficientes correspondem à segurança com relação à capacidade resistente da peça.

A verificação das peças, quanto aos estados limites de utilização, se faz nas condições de serviço sem o emprego dos coeficientes  $\gamma$ .

# II - Etapas do estudo da fissuração

A abertura de fissuras na superfície de uma estrutura de concreto armado compromete sua utilização tanto na redução de sua durabilidade quanto no prejuízo que traz ao seu funcionamento e à sua estética.

A durabilidade da estrutura fica comprometida por facilitar a penetração dos agentes agressivos à armadura e à própria massa do concreto. Assim sendo, a caracterização da abertura de fissura que é prejudicial à durabilidade é, logicamente, função do meio em que está a estrutura.

Desta forma, o estudo da fissuração tem que ser feito em 2 etapas distintas:

## II. a) Estabelecimento dos valores máximos admissíveis das aberturas das fissuras em função do meio

A partir de vários estudos compreendendo ensaios em laboratórios e levantamentos de campo em estruturas existentes pôde chegar-se aos seguintes valores máximos (admitidos pela NBR-6118):

- peças protegidas . . . . . 0,3 mm
- peças não protegidas, em meio não agressivo 0,2 mm
- peças não protegidas, em meio agressivo . . . 0,1 mm

## II. b) Estabelecimento de formulação que permita estimar a abertura provável das fissuras em função das características das peças

Têm sido propostas várias formulações mas vamos nos ater àquelas que conduzem às prescrições da NBR-6118 (item 4.2.2).

Convém salientar o seu caráter meramente orientador: as fórmulas com seus coeficientes experimentais foram deduzidas a partir de ensaios com tirantes ou com vigas submetidas à flexão simples,

geralmente com seções retangulares, com aço de alta aderência e, daí, feitas generalizações. Ainda, deve-se lembrar que a abertura das fissuras depende, dentre outros fatores, da resistência à tração do concreto e daí sua aleatoriedade.

Na NBR-6118, item 4.2.2 aparecem 2 fórmulas que pretendem estimar essa abertura provável das fissuras. A primeira origina-se da chamada Teoria Básica da Fissuração, que aprecia a formação sistemática de fissuras, válida para peças com taxas de armadura consideradas "não baixas" (ver definição a seguir, sub-item III.a e III.b). A segunda expressão resulta da Teoria da Dupla Ancoragem, correspondente à formação não sistemática de fissuras, válida para peças com baixas taxas de armadura.

Para atingirmos as expressões da NBR-6118, deduziu-se em cada teoria a expressão da abertura média das fissuras na superfície do concreto ( $w_m$ ) e, considerando-se a abertura das fissuras ( $w$ ) como uma variável aleatória com distribuição normal, chegou-se à abertura característica ( $w_k$ ) - máxima - que aparece multiplicada por 10 ( $10 w_k$ ) nas referidas expressões.

Para a formação sistemática de fissuras, considerando-se, segundo os ensaios, um coeficiente de variação ( $\delta$ ) igual a 0,4 e o quantil de 5% ( $\xi = 1,645$  na distribuição normal), adotou-se

$$w_k = w_m \cdot (1 + \xi \cdot \delta)$$
$$w_k = w_m \cdot (1 + 1,645 \cdot 0,4) \quad \boxed{w_k = 1,658 \cdot w_m}$$

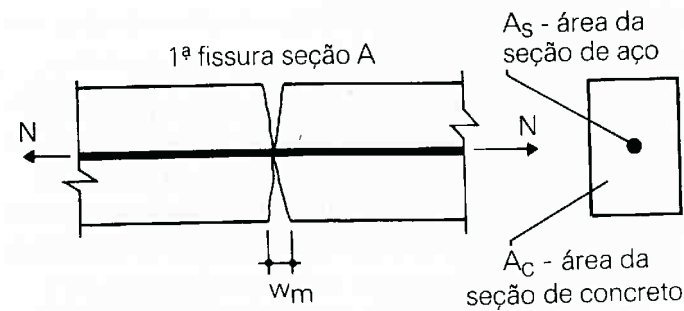
Para a formação não sistemática, constatando-se desvios padrões menores, adotou-se

$$\boxed{w_k = 1,3 \cdot w_m}$$



### III - Formação sistemática e não sistemática de fissuras

Imaginemos um tirante, conforme esboço abaixo, submetido a uma força N, no qual há o aparecimento de uma primeira fissura



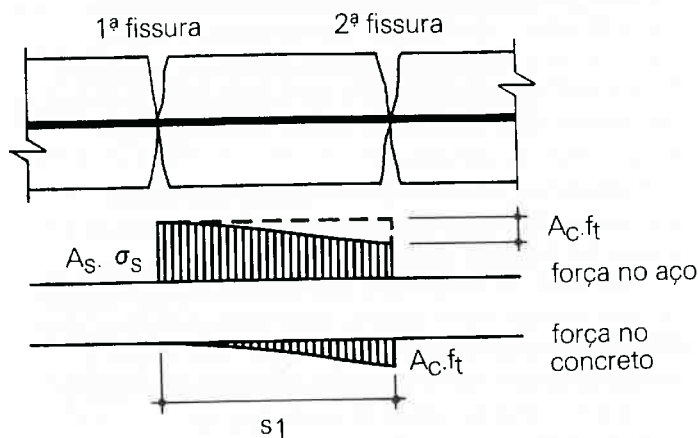
Com o aparecimento desta fissura, na seção A, o esforço N é absorvido exclusivamente pela armadura

$$N = A_s \cdot \sigma_s \quad \sigma_s - \text{tensão na armadura na seção fissurada}$$

Por existir aderência entre o aço e concreto envolvente, o esforço N passa, à medida que nos distanciamos da fissura, a ser absorvido por ambos os materiais, permitindo-se a caracterização de uma das duas situações dos gráficos abaixo:

#### III.a) Formação sistemática de fissuras

$$P_r \geq \frac{f_t}{\sigma_s} \quad f_t - \text{resistência à tração do concreto}$$



A uma distância  $s_1$  da seção da 1ª fissura, a parcela de força que está sendo absorvida pelo concreto, acarretando nele uma tensão igual à sua resistência à tração ( $f_t$ ), dá lugar ao aparecimento de uma 2ª fissura.

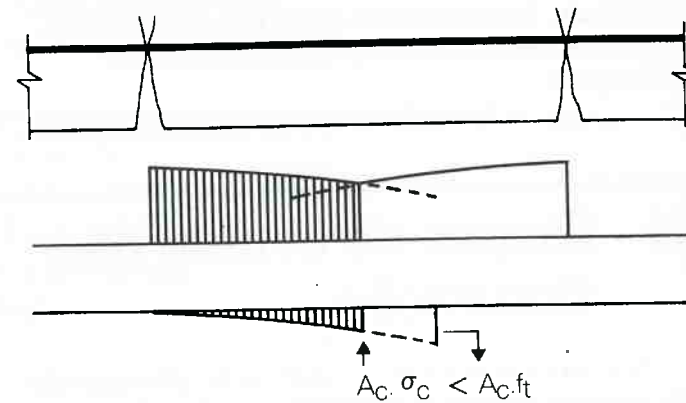
Desta forma, com  $A_s \cdot \sigma_s \geq A_c \cdot f_t$

$$P_r = \frac{A_s}{A_c}$$

$$P_r \geq \frac{f_t}{\sigma_s} \quad P_r - \text{taxa geométrica de armadura}$$

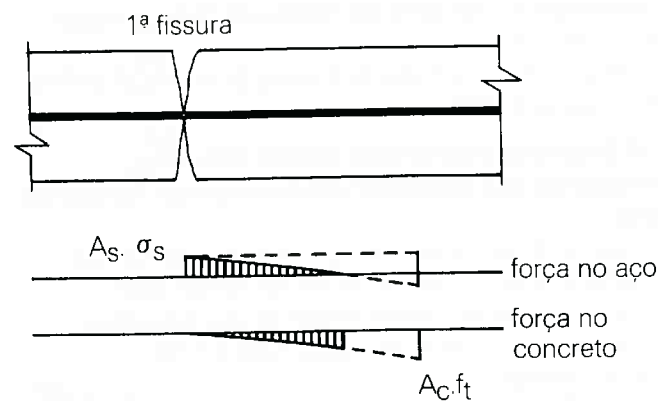
há a formação sistemática de fissuras: sempre que a tensão no concreto atingir  $f_t$  aparecerá uma fissura.

Convém lembrar que o espaçamento entre fissuras terá, então, como valor mínimo  $s_1$  e como valor máximo  $2 \cdot s_1$ . Este último valor pode ser entendido na situação em que houvesse, por algum motivo, outra fissura separada da primeira a uma distância menor do que  $2 \cdot s_1$ ; partindo de ambas as fissuras a transferência de força do aço para o concreto nunca atingiria  $f_t$  no concreto.



#### III.b) Formação não sistemática de fissuras

$$P_r < \frac{f_t}{\sigma_s} \quad (\text{baixas taxas de armadura})$$



Quando é baixa a taxa de armadura, sendo então a força na armadura na seção da 1ª fissura relativamente pequena, a aderência entre aço e concreto consegue transferir-lhe totalmente ao concreto, sem no entanto, acarretar no concreto uma tensão no nível da sua resistência à tração. Desta forma, não aparecerá sistematicamente a 2ª fissura.

Neste caso, para efeito de raciocínio, pode-se admitir que tudo se passa como se a barra que atravessa a 1ª fissura estivesse duplamente ancorada no concreto e daí a origem da Teoria da Dupla Ancoragem (vista a seguir, item VI).

### IV - O que prescreve a NBR-6118



#### Procedimento

##### 2.1.2 Estados limites de utilização (de serviço)

##### 2.1.2.1 Estado de formação de fissuras

Estado em que há uma grande probabilidade de iniciar-se a formação de fissuras de flexão.

##### 4.2.1 Estado de formação de fissuras

A solicitação resistente com a qual haverá uma grande probabilidade de iniciar-se a formação de fissuras normais à armadura longitudinal poderá ser calculada com as seguintes hipóteses:

a) a deformação de ruptura à tração do concreto é igual a  $2,7 f_{tk}/E_c$ , com  $E_c$  dado no item 8.2.5;

##### 8.2.5 Módulo de deformação longitudinal à compressão

Na falta de determinação experimental, o módulo de deformação longitudinal à compressão, no início da curva tensão deformação efetiva, correspondente ao primeiro carregamento, será suposto igual a

$$6.600 \sqrt{f_{cj}} \text{ (MPa)}$$

No projeto tomar-se-á, para o cálculo do módulo de deformação,

$$f_{cj} = f_{ck} + 3,5 \text{ MPa}$$

b) na flexão, o diagrama de tensões de compressão no concreto é triangular (régime elástico); a tensão na zona tracionada é uniforme e igual a  $f_{tk}$ , multiplicando-se a deformação de ruptura da alínea a por 1,5;

c) as seções transversais planas permanecem planas.

Deverá ser sempre levado em conta o efeito da retração. Como simplificação, nas condições correntes, este efeito pode ser considerado supondo-se a tensão de tração igual a  $0,75 f_{tk}$  e desprezando-se a armadura.

##### 5.2.1.2 Concreto à tração

A resistência do concreto à tração será determinada através de ensaios de corpos de prova cilíndricos normais, de acordo com o MB-212, fazendo-se a devida transformação para a resistência à tração axial. O seu valor característico será estimado de acordo com o item 15.

Na falta de determinação experimental, poderão ser adotadas as seguintes relações:

$$f_{tk} = \frac{f_{ck}}{10} \quad \text{para } f_{ck} \leq 18 \text{ MPa}$$

$$f_{tk} = 0,06 f_{ck} + 0,7 \text{ MPa} \quad \text{para } f_{ck} > 18 \text{ MPa}$$

##### 2.1.2.2 Estado de fissuração inaceitável

Estado em que as fissuras se apresentam com abertura prejudicial ao uso ou à durabilidade da peça.



Procedimento

4.2.2 Estado de fissuração inaceitável

Considera-se que a fissuração é nociva quando a abertura das fissuras na superfície do concreto ultrapassa os seguintes valores:

- a) 0,1 mm para peças não protegidas, em meio agressivo;
- b) 0,2 mm para peças não protegidas, em meio não agressivo;
- c) 0,3 mm para peças protegidas.

Supõe-se que, com razoável probabilidade, a condição acima ocorre quando se verificam simultaneamente as seguintes desigualdades:

$$\frac{\phi}{2 \eta_b - 0,75} \cdot \frac{\sigma_s}{E_s} \cdot \left( \frac{4}{\rho_r} + 45 \right) > \begin{cases} 1 \text{ para a alínea a} \\ 2 \text{ para a alínea b} \\ 3 \text{ para a alínea c} \end{cases}$$

$$\frac{\phi}{2 \eta_b - 0,75} \cdot \frac{\sigma_s}{E_s} \cdot \frac{3 \sigma_s}{f_{tk}} > \begin{cases} 1 \text{ para a alínea a} \\ 2 \text{ para a alínea b} \\ 3 \text{ para a alínea c} \end{cases}$$

onde  
 $\sigma_s$  = tensão na armadura sob a solitação dada em 5.4.2.2 (tensão em serviço);

5.4.2.2 Estados limites de utilização

Em geral deverá ser considerada a solitação de cálculo

$$S_d = S_{gk} + \chi S_{qk} + S_{\epsilon k}$$

Existindo ações acidentais de diferentes origens com pouca probabilidade de ocorrência simultânea, poderá a solitação de cálculo ser considerada com a seguinte expressão:

$$S_d = S_{gk} + \chi S_{qk1} + 0,8 (\chi S_{qk2} + \chi S_{qk3} + \dots) + S_{\epsilon k}$$

O valor do coeficiente  $\chi$  será 0,7 para as estruturas de edifícios e 0,5 para as demais. Em geral, não é necessário considerar a ação do vento nos estados limites de utilização ( $\chi = 0$ ).

$\phi$  = diâmetro das barras (em mm);

$\rho_r$  = taxa geométrica da armadura na seção transversal de concreto  $A_{cr}$  interessada pela fissuração =  $A_s/A_{cr}$

- para os tirantes:  $A_{cr}$  = área da seção transversal do tirante
- para as peças de seção retangular ou T, submetidas à flexão simples:  $A_{cr} = 0,25b_w h$ ;
- para as peças de seção retangular ou T, submetidas à flexão composta:  $A_{cr} = 0,4b_w (h - x)$

Quando o cobrimento  $c$  da armadura longitudinal de tração for superior ao mínimo exigido em 6.3.3.1 é permitido aumentar o valor limite da abertura das fissuras (alíneas a, b ou c), — e, portanto, os valores correspondentes 1, 2 e 3, nas desigualdades acima — de até 25%, proporcionalmente ao valor do quociente  $c/c_{min}$ .

Para o emprego das expressões acima não se tomará  $\eta_b > 1,8$ .



Procedimento

6.3.3.1 Cobrimento

Qualquer barra da armadura, inclusive de distribuição, de montagem e estribos, deve ter cobrimento de concreto pelo menos igual ao seu diâmetro, mas não menor que:

- a) para concreto revestido com argamassa de espessura mínima de 1 cm :
  - em lajes no interior de edifícios ..... 0,5 cm
  - em paredes no interior de edifícios ..... 1,0 cm
  - em lajes e paredes ao ar livre ..... 1,5 cm
  - em vigas, pilares e arcos no interior de edifícios ..... 1,5 cm
  - em vigas, pilares e arcos ao ar livre ..... 2,0 cm
- b) para concreto aparente:
  - no interior de edifícios ..... 2,0 cm
  - ao ar livre ..... 2,5 cm
- c) para concreto em contato com o solo ..... 3,0 cm
  - se o solo não for rochoso, sob a estrutura deverá ser interposta uma camada de concreto simples, não considerada no cálculo, com o consumo mínimo de 250 kg de cimento por metro cúbico e espessura de pelo menos 5 cm
- d) para concreto em meio fortemente agressivo ..... 4,0 cm

Para cobrimento maior que 6 cm deve-se colocar uma armadura de pele complementar, em rede, cujo cobrimento não deve ser inferior aos limites especificados neste item.

No caso de estruturas que devam ser resistentes ao fogo, o cobrimento deverá atender às exigências da NB-503, além das especificadas neste item.

V - A primeira expressão  
da NBR-6118 (do item  
4.2.2)

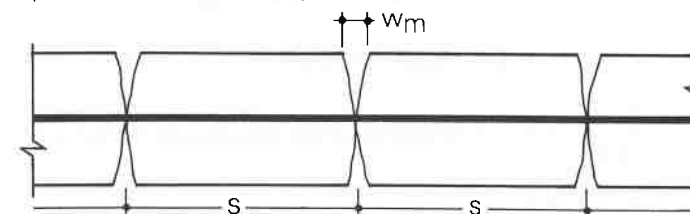
(Fissuração sistemática, Teoria Básica da Fissuração)

$$\frac{\phi}{2 \eta_b - 0,75} \cdot \frac{\sigma_s}{E_s} \cdot \left( \frac{4}{\rho_r} + 45 \right) > \begin{cases} 1 \\ 2 \\ 3 \end{cases}$$

Conforme vimos no item II anterior, esta fórmula corresponde à estimativa de  $10 \cdot w_k = 10 \cdot (1,658 \cdot w_m)$ .

$w_m$  - abertura média das fissuras  
 $w_k$  - abertura máxima das fissuras

Na condição de fissuração sistemática, a abertura  $w_m$  pode ser determinada por:



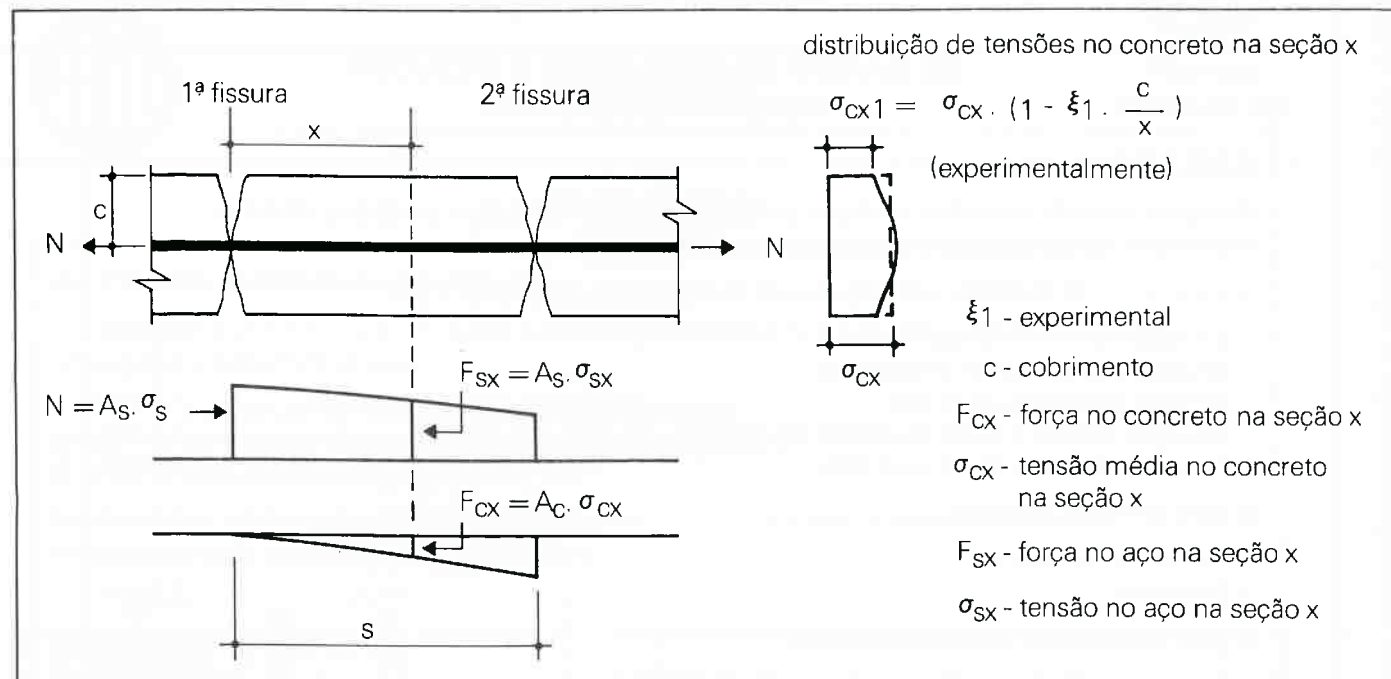
$$w_m = s \cdot (\epsilon_{sm} - \epsilon_{cm})$$

s - espaçamento médio entre fissuras  
 $\epsilon_{sm}$  - deformação específica média do aço entre fissuras  
sendo  $\epsilon_{cm} \ll \epsilon_{sm}$   
 $w_m = s \cdot \epsilon_{sm}$   
 $w_m = s \cdot \frac{\sigma_{sm}}{E_s}$   
 $\epsilon_{cm}$  - deformação específica média do concreto entre fissuras  
 $\sigma_{sm}$  - tensão média no aço entre fissuras  
 $E_s$  - módulo de elasticidade do aço

Assim, o problema fica resolvido com a determinação de  $s$  e de  $\sigma_{sm}$ .



**V.a) Determinação de s (espaçamento médio entre fissuras):**



Conforme figura acima, as tensões no concreto variam aumentando a medida que se distanciam da seção fissurada e, variam também, em cada seção entre fissuras, diminuindo à medida que se afastam da armadura.

Desta forma, seria grosseiro afirmar que a 2ª fissura aparece quando  $\sigma_{cx}$  atinge o valor  $f_t$ , o que tomamos a liberdade de fazer no item III para a caracterização de fissuração sistemática e não sistemática. Aqui, certamente, temos que, considerando a influência do cobrimento c, admitir que a abertura da 2ª fissura na superfície do concreto só se dá quando  $\sigma_{cx1}$  atinge o limite  $f_t$ .

$$\sigma_{cx1} = \sigma_{cx} \cdot \left(1 - \xi_1 \cdot \frac{c}{x}\right)$$

$$\textcircled{1} \sigma_{cx1} = \frac{F_{cx}}{A_c} \cdot \left(1 - \xi_1 \cdot \frac{c}{x}\right)$$

Considerando-se  $\tau_{bx}$  - tensão média de aderência entre aço e concreto desde a fissura até a seção x e, sendo esta aderência a responsável pela transmissão de tensões ao concreto, pode-se escrever:

$$\textcircled{2} F_{cx} = \tau_{bx} \cdot (x \cdot n \cdot \pi \cdot \Phi)$$

Quando  $\sigma_{cx1} = f_t$   
 $x = s$   
 $\tau_{bx} = \tau_b$

10 aparece a 2ª fissura

De  $\textcircled{1}$  e  $\textcircled{2}$

$$f_t = \frac{\tau_b \cdot (s \cdot n \cdot \pi \cdot \Phi)}{A_c} \cdot \left(1 - \xi_1 \cdot \frac{c}{s}\right)$$

$$f_t = \frac{\tau_b \cdot n \cdot \pi \cdot \Phi}{A_c} \cdot (s - \xi_1 \cdot c)$$

$$s = \frac{A_c \cdot f_t}{\tau_b \cdot n \cdot \pi \cdot \Phi} + \xi_1 \cdot c$$

sendo  $A_s = n \cdot \frac{\pi \cdot \Phi^2}{4}$

$$s = \xi_1 \cdot c + \frac{A_c \cdot f_t}{\tau_b \cdot n \cdot \pi \cdot \Phi} \cdot \frac{n \cdot \pi \cdot \Phi^2 / 4}{A_s}$$

sendo  $\rho_r = \frac{A_s}{A_c}$

$$s = \xi_1 \cdot c + \frac{f_t \cdot \Phi}{4 \tau_b \cdot \rho_r}$$

admitindo-se, segundo permite a experimentação, a proporcionalidade entre  $\tau_b$  e  $f_t$ , pode-se escrever

$$s = \xi_1 \cdot c + \xi_2 \cdot \frac{\Phi}{\rho_r}$$

com  $\xi_1$  e  $\xi_2$  experimentais.

Os adotados para chegar-se à fórmula da NBR-6118 foram

$$\xi_1 = 1,5$$

$$\xi_2 = 0,16 \text{ (para barras de aço com alta aderência)}$$

$$s = 1,5 \cdot c + 0,16 \cdot \frac{\Phi}{\rho_r}$$

**V.b) Determinação de  $\sigma_{sm}$  (tensão média no aço entre fissuras):**

Conforme se pode ver na figura do sub-item V.a anterior, na seção genérica que dista x a partir da 1ª fissura, vale a igualdade:

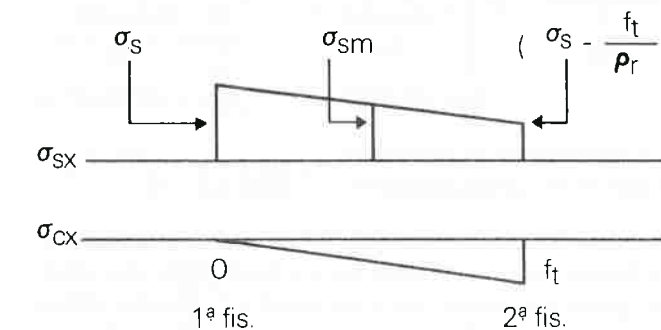
$$N = F_{sx} + F_{cx}$$

$$N = A_s \cdot \sigma_{sx} + A_c \cdot \sigma_{cx}$$

$$\sigma_{sx} = \frac{N - A_c \cdot \sigma_{cx}}{A_s}$$

$$\sigma_{sx} = \sigma_s - \frac{\sigma_{cx}}{\rho_r}$$

Se aproximarmos a curva de variação de  $\sigma_{cx}$  de 0 (na 1ª fissura) a  $f_t$  (na iminência de aparecimento da 2ª fissura) a uma reta,



podemos escrever

$$\sigma_{sm} = \frac{\sigma_s + \left(\sigma_s - \frac{f_t}{\rho_r}\right)}{2}$$

$$\sigma_{sm} = \sigma_s - \frac{1}{2} \cdot \frac{f_t}{\rho_r}$$

Esta seria uma expressão razoável para a estimativa de  $\sigma_{sm}$ , levando em consideração a resistência à tração do concreto na redução de tensão no aço a partir da seção fissurada. No entanto, na NBR-6118 optou-se por estimar esta redução sem levar em conta  $f_t$ , da seguinte forma aproximada:

$$\sigma_{sm} = \frac{2}{3} \cdot \sigma_s$$

e daí o fato de naquela expressão não aparecer a resistência limite do concreto ( $f_t$ ), apesar de ser um dos fatores condicionantes da fissuração.

**V.c) A 1ª expressão do item 4.2.2 :**

Conforme visto:

$$w_m = s \cdot \frac{\sigma_{sm}}{E_s}$$

$$s = 1,5 \cdot c + 0,16 \cdot \frac{\Phi}{\rho_r}$$

$$\sigma_{sm} = \frac{2}{3} \cdot \sigma_s$$

$$w_m = \left(1,5 \cdot c + 0,16 \cdot \frac{\Phi}{\rho_r}\right) \cdot \frac{2}{3} \cdot \frac{\sigma_s}{E_s}$$

adotando-se como valor corrente

$$c = 1,2 \cdot \Phi$$

$$w_m = \left(1,8 + \frac{0,16}{\rho_r}\right) \cdot \Phi \cdot \frac{2}{3} \cdot \frac{\sigma_s}{E_s}$$

$$w_k = 1,658 \cdot w_m$$

$$10 \cdot w_k = 16,58 \cdot w_m$$

$$10 \cdot w_k = 16,58 \cdot \left(1,8 + \frac{0,16}{\rho_r}\right) \cdot \Phi \cdot \frac{2}{3} \cdot \frac{\sigma_s}{E_s} \cdot \frac{25}{25}$$

$$10 \cdot w_k = 16,58 \cdot \frac{2}{3} \cdot \frac{1}{25} \cdot \Phi \cdot \frac{\sigma_s}{E_s} \cdot \left(\frac{0,16 \cdot 25}{\rho_r} + 1,8 \cdot 25\right)$$

$$10 \cdot w_k = 0,442 \cdot \Phi \cdot \frac{\sigma_s}{E_s} \cdot \left(\frac{4}{\rho_r} + 45\right)$$

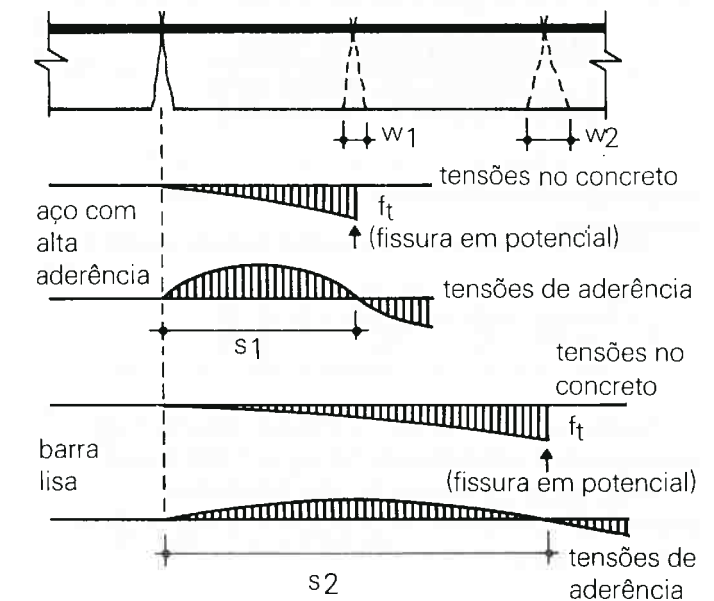
expressão esta que estima a abertura máxima de fissuras com a utilização de barras de aço com alta aderência.

De modo a generalizar a expressão para todos os tipos de barras, passou-se à introdução do coeficiente  $\eta_b$

$\eta_b$  - coeficiente de conformação superficial das barras

suposto igual a 1 para barras lisas e igual a 1,5 para barras com alta aderência.

A influência da aderência aço X concreto no fenômeno da fissuração pode ser entendida da seguinte forma:





Havendo alta aderência, esta transmite tensões ao concreto de forma mais acelerada e, desta forma, atinge-se a resistência à tração do concreto (que acarreta a abertura da fissura) num comprimento  $s_1$  bem menor que aquele  $s_2$  na situação em que as tensões ao concreto são transmitidas mais lentamente (menores tensões de aderência)

Conforme visto no início do item V:

$$w_m = s \cdot \epsilon_{sm}$$

e, assim sendo, maior espaçamento entre fissuras acarreta maior abertura de fissura e, conseqüentemente, uma situação mais danosa e indesejada.

Tendo-se em conta que experimentos permitem estimar que a diminuição da aderência deva contribuir para majorar o espaçamento e o valor da abertura das fissuras no máximo próximo ao valor 1,8, considerou-se o seguinte:

coeficiente na fórmula até aqui deduzida

alta aderência ( $\eta_b=1,5$ )  $\rightarrow$  0,442  
 barras lisas ( $\eta_b=1,0$ )  $\rightarrow$   $1,8 \cdot 0,442 = 0,8$

assim, a expressão ajustada para apreciar os tipos de aderência intermediários foi:

$$\frac{1}{2 \cdot \eta_b - 0,75} \begin{cases} 0,442 & (p/\eta_b=1,5) \\ 0,8 & (p/\eta_b=1,0) \end{cases}$$

Resultou, então

$$10 \cdot w_k = \frac{\Phi}{2 \eta_b - 0,75} \cdot \frac{\sigma_s}{E_s} \cdot \left( \frac{4}{\rho_r} + 45 \right)$$

que é a 1ª expressão do item 4.2.2 da NBR-6118

## VI - A segunda expressão da NBR-6118 (do item 4.2.2)

(Fissuração não sistemática, Teoria da Dupla Ancoragem)

$$\frac{\Phi}{2 \eta_b - 0,75} \cdot \frac{\sigma_s}{E_s} \cdot \frac{3 \cdot \sigma_s}{f_{tk}} > \begin{cases} 1 \\ 2 \\ 3 \end{cases}$$

Conforme vimos no item II anterior, esta fórmula corresponde à estimativa de  $10 \cdot w_k = 10 \cdot (1,3 w_m)$

Na condição de fissuração não sistemática (explicitada no sub-item III.b), a abertura  $w_m$  pode ser determinada por

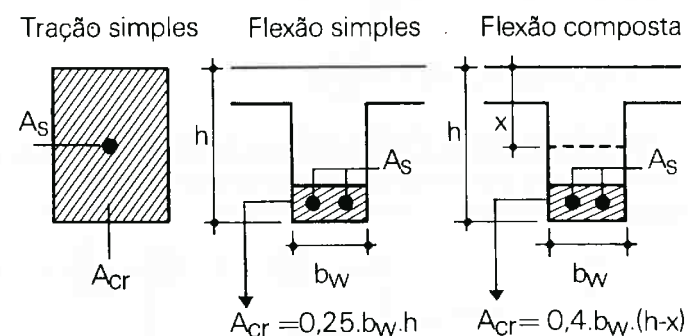
### V.d) Observações sobre a 1ª expressão do item 4.2.2 :

Devemos lembrar as condições de validade desta 1ª expressão:

- taxas de armadura compatíveis com:  $\rho_r \geq \frac{f_t}{\sigma_s}$  ,  $\rho_r = \frac{A_s}{A_{cr}}$

Tendo sido as deduções feitas a partir de considerações e ensaios em tirantes, para a adaptação da formulação a vigas (e lajes) submetidas à flexão, deve-se tomar como  $A_{cr}$  a área de concreto que realmente influencia a fissuração, ou seja, a área que envolve mais de perto as armaduras (área do tirante equivalente).

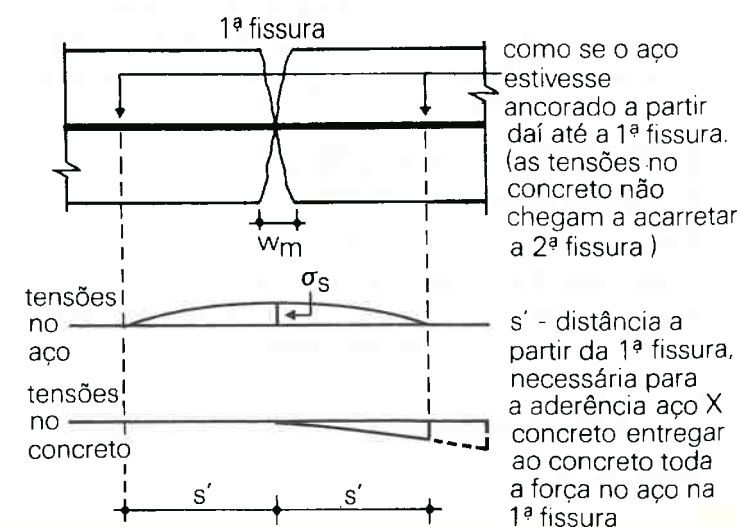
Segundo a NBR-6118:



- o cobrimento da armadura foi assumido como sendo  $c = 1,2 \cdot \Phi$

- apesar de ser a resistência à tração do concreto um dos fatores que mais condiciona a fissuração, seu valor não aparece explícito nesta expressão. Conforme vimos, a redução de tensão no aço devido a resistência do concreto foi estimada em

$$\sigma_{sm} = \frac{2}{3} \cdot \sigma_s$$



Assim

$$w_m = 2 \cdot s' \cdot (\epsilon_{sm} - \epsilon_{cm})$$

e, com as mesmas considerações do início do item V:

$$w_m = 2 \cdot s' \cdot \frac{\sigma'_{sm}}{E_s} \quad \sigma'_{sm} - \text{tensão média no aço ao longo do comprimento } s'$$

### VI.a) Determinação de $s'$ :

Pela própria definição de  $s'$ , podemos escrever

$$A_s \cdot \sigma_s = \tau_b \cdot (s' \cdot n \cdot \pi \cdot \Phi) \quad \tau_b - \text{tensão média de aderência entre aço e concreto no comprimento } s'$$

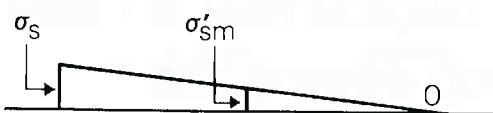
$$\text{sendo } A_s = n \cdot \frac{\pi \cdot \Phi^2}{4}$$

$$n \cdot \frac{\pi \cdot \Phi^2}{4} \cdot \sigma_s = \tau_b \cdot s' \cdot n \cdot \pi \cdot \Phi$$

$$s' = \frac{\Phi}{4} \cdot \frac{\sigma_s}{\tau_b}$$

### VI.b) Determinação de $\sigma'_{sm}$ :

Aproximando a distribuição de tensões no aço a uma distribuição linear



$$\sigma'_{sm} = \frac{\sigma_s}{2}$$

### VI.c) A 2ª expressão do item 4.2.2 :

Conforme visto:

$$w_m = 2 \cdot s' \cdot \frac{\sigma'_{sm}}{E_s}$$

$$s' = \frac{\Phi}{4} \cdot \frac{\sigma_s}{\tau_b}$$

$$\sigma'_{sm} = \frac{\sigma_s}{2}$$

$$w_m = \frac{\Phi}{4} \cdot \frac{\sigma_s}{\tau_b} \cdot \frac{\sigma_s}{2} \cdot \frac{1}{E_s}$$

$$w_m = \frac{\Phi}{4} \cdot \frac{\sigma_s^2}{\tau_b \cdot E_s}$$

Adotando-se a proporcionalidade entre  $\tau_b$  e  $f_t$  através do coeficiente experimental

$$\xi_2 = \frac{f_t}{4 \tau_b} = 0,16$$

(conforme sub-item V.a anterior), podemos escrever:

$$4 \cdot \tau_b = \frac{f_t}{0,16}$$

$$w_m = \frac{\Phi}{4} \cdot 0,16 \cdot \frac{\sigma_s^2}{E_s}$$

Na expressão de  $w_m$ , logicamente, a resistência à tração do concreto está representada pelo seu valor médio ( $f_{tm}$ ) que, através de tratamento estatístico, pode relacionar-se com seu valor característico:

$$f_{tk} = 0,6 \cdot f_{tm}$$

$$\text{Assim } w_m = \frac{\Phi \cdot 0,16 \cdot 0,6}{f_{tk}} \cdot \frac{\sigma_s^2}{E_s}$$

$$w_m = \Phi \cdot \frac{0,096 \cdot \sigma_s}{f_{tk}} \cdot \frac{\sigma_s}{E_s}$$

$$w_k = 1,3 w_m$$

$$10 \cdot w_k = 13 w_m$$

$$10 \cdot w_k = 13 \cdot \Phi \cdot \frac{0,096 \cdot \sigma_s}{f_{tk}} \cdot \frac{\sigma_s}{E_s}$$

$$10 \cdot w_k = \Phi \cdot \frac{1,248 \cdot \sigma_s}{f_{tk}} \cdot \frac{\sigma_s}{E_s}$$

expressão esta que estima a abertura máxima de fissuras (em condição de fissuração não sistemática) com o emprego de barras de aço com alta aderência.

Usando a mesma generalização da 1ª expressão da NBR-6118 (sub-item V.c), podemos escrever:

$$\frac{1}{2 \cdot \eta_b - 0,75} = 0,442 \text{ para } \eta_b = 1,5 \text{ (condição em que vale a expressão deduzida)}$$

$$10 \cdot w_k = \frac{0,442}{0,442} \cdot \Phi \cdot \frac{1,248 \sigma_s}{f_{tk}} \cdot \frac{\sigma_s}{E_s}$$

$$10 \cdot w_k = \frac{\Phi}{2 \cdot \eta_b - 0,75} \cdot \frac{\sigma_s}{E_s} \cdot \frac{1,248}{0,442} \cdot \frac{\sigma_s}{f_{tk}}$$

$$10 \cdot w_k = \frac{\Phi}{2 \cdot \eta_b - 0,75} \cdot \frac{\sigma_s}{E_s} \cdot \frac{3 \cdot \sigma_s}{f_{tk}} \quad 3 \approx 2,82$$

que é a 2ª expressão do item 4.2.2 da NBR-6118

### VI.d) Observações sobre a 2ª expressão do item 4.2.2 :

Condições de validade desta 2ª expressão:

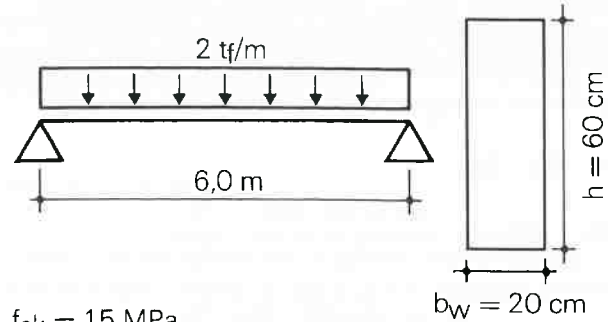
- taxas de armadura baixas, compatíveis com:

$$\rho_r < \frac{f_t}{\sigma_s}$$

- não levou-se em consideração a influência do cobrimento da armadura.

# VII - Exemplo de aplicação

Viga bi-apoiada



$f_{ck} = 15 \text{ MPa}$

CA 50B ( $\eta_b = 1,5$ )

a) dimensionamento em E.L.U. (estado limite último)

$$M_{\text{máx}} = M = \frac{q l^2}{8} = \frac{2 \cdot 6^2}{8} = 9 \text{ tf} \cdot \text{m} = 900 \text{ tf} \cdot \text{cm}$$

$d = h - 4 = 56 \text{ cm}$

$$K_6 = \frac{b d^2}{M} = \frac{20 \cdot 56^2}{900} = 69,7 \quad K_3 = 0,371$$

(tabela F1, pág. 179  
Lauro Modesto dos Santos)

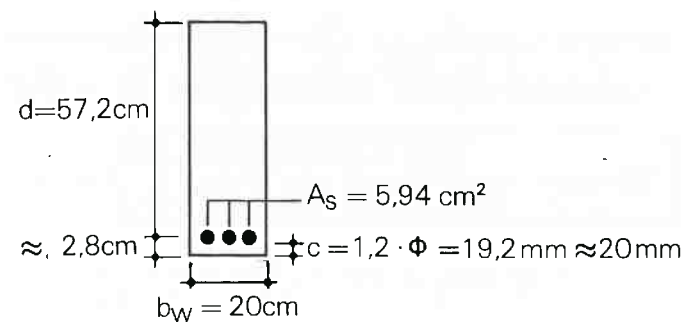
$$A_s = K_3 \cdot \frac{M}{d} = 0,371 \cdot \frac{900}{56} = 5,96 \text{ cm}^2$$

1ª opção:  $5,94 \text{ cm}^2$   $3 \Phi 16 \text{ mm}$

2ª opção:  $6,33 \text{ cm}^2$   $5 \Phi 12,5 \text{ mm}$

b) verificação da fissuração

b.1-) 1ª opção 3  $\Phi$  16 mm



$\eta_b = 1,5$

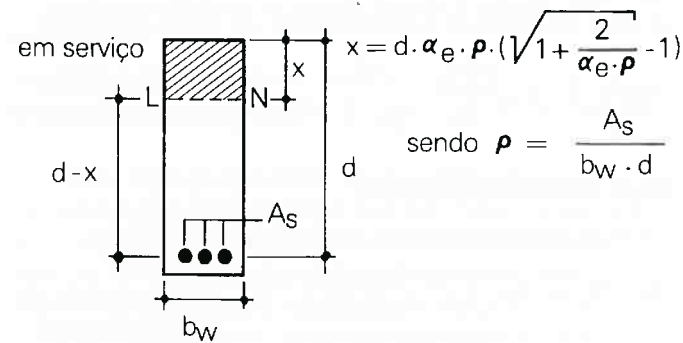
$A_{cr} = 0,25 \cdot b_w \cdot h = 0,25 \cdot 20 \cdot 60 = 300 \text{ cm}^2$

$$\rho_r = \frac{A_s}{A_{cr}} = \frac{5,94}{300} = 0,0198$$

$E_s = 210\,000 \text{ MPa}$

$$E_c = 6600 \cdot \sqrt{15 + 3,5} = 28\,387 \text{ MPa}$$

$$\alpha_e = \frac{E_s}{E_c} = 7,4$$



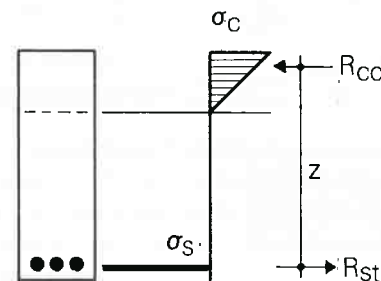
$$\rho = \frac{A_s}{b_w \cdot d} = \frac{5,94}{20 \cdot 57,2} = 0,005192$$

$x = 13,81 \text{ cm}$  ,  $d - x = 43,39 \text{ cm}$

$$I_{II} = \frac{20 \cdot 13,81^3}{3} + 7,4 \cdot 5,94 \cdot 43,39^2 = 100314 \text{ cm}^4$$

$$\sigma_s = \alpha_e \cdot \frac{M}{I_{II}} \cdot y = 7,4 \cdot \frac{900000}{100314} \cdot 43,39 = 2880 \text{ kgf/cm}^2 = 288 \text{ MPa}$$

verificando:



$$\sigma_c = \frac{900000}{100314} \cdot 13,81 = 123,9 \text{ kgf/cm}^2 = 12,39 \text{ MPa}$$

$$z = 57,2 - \frac{13,81}{3} = 52,6 \text{ cm}$$

$$R_{cc} = \frac{123,9 \cdot 13,81 \cdot 20}{2} = 17110 \text{ Kgf}$$

$$R_{st} = 2880 \cdot 5,94 = 17110 \text{ kgf}$$

$$M = 17110 \cdot 52,6 = 900000 \text{ kgf} \cdot \text{cm} \quad \text{OK!}$$

tipo de formação de fissuras?

$$\rho_r \times \frac{f_t}{\sigma_s} \quad f_{tk} = \frac{f_{ck}}{10} = \frac{15}{10} = 1,5 \text{ MPa}$$

$$0,0198 \times \frac{1,5}{288} \quad 0,0198 > 0,00521$$

Sistemática  $\rightarrow$  1ª expressão da NBR-6118

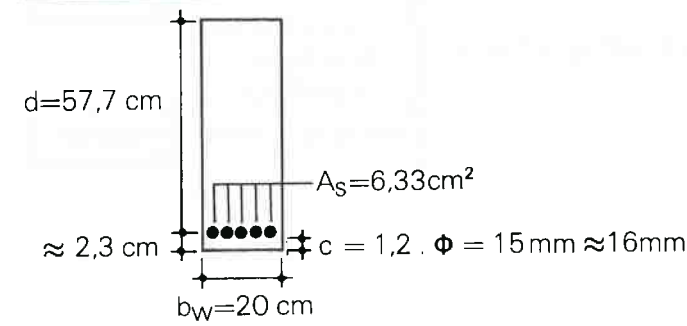
$$\frac{\phi}{2 \eta_b - 0,75} \cdot \frac{\sigma_s}{E_s} \cdot \left( \frac{4}{\rho_r} + 45 \right)$$

$$\frac{16}{2 \cdot 1,5 - 0,75} \cdot \frac{288}{210000} \cdot \left( \frac{4}{0,0198} + 45 \right) = 2,41 \text{ mm} < 3$$

OK para peças protegidas.

usando a 2ª expressão da NBR-6118, teríamos  $5,57 > 3 \rightarrow$  absurdo por usar-se formulação inadequada.

b.2-) 2ª opção 5  $\Phi$  12,5 mm



$$\rho_r = \frac{A_s}{A_{cr}} = \frac{6,33}{300} = 0,0211$$

# VIII - A verificação da fissuração com o uso de Telas Soldadas

Conforme ficou bem explicitado nos itens anteriores (particularmente no sub-item V.c.), o fenômeno do aparecimento de fissuras na superfície do concreto (assim como a estimativa de sua abertura) está intimamente ligado às tensões de aderência que se desenvolvem entre as barras de aço e a massa de concreto envolvente: com o desenvolvimento de grande aderência, o efeito danoso da fissuração é menor — menor espaçamento (s), com conseqüente menor abertura das fissuras (w).

A partir de  $w_m = s \cdot \epsilon_{sm}$

admitiu-se  $s_1 = \left( 1,8 + \frac{0,16}{\rho_r} \right) \cdot \phi$  p/barras c/ alta aderência

e  $s_2 = 1,8 \cdot s_1$  p/barras lisas

o que é traduzido na formulação final através do coeficiente  $\eta_b$

$\frac{1}{2 \eta_b - 0,75}$  c/  $\eta_b = 1,5$  (alta aderência)  $\rightarrow 0,442$

c/  $\eta_b = 1,0$  (barras lisas)  $\rightarrow 1,8 \cdot 0,442 = 0,8$

Isto posto, podemos analisar o fenômeno da fissuração quando as armaduras são **Telas Soldadas**. Uma das grandes vantagens técnicas das **Telas Soldadas** é exatamente a extremíssima aderência ao

$$\rho = \frac{A_s}{b_w \cdot d} = \frac{6,33}{20 \cdot 57,7} = 0,00548$$

$x = 14,26 \text{ cm}$  ,  $d - x = 43,44 \text{ cm}$

$$I_{II} = \frac{20 \cdot 14,26^3}{3} + 7,4 \cdot 6,33 \cdot 43,44^2 = 107723 \text{ cm}^4$$

$$\sigma_s = 7,4 \cdot \frac{900000}{107723} \cdot 43,44 = 2686 \text{ kgf/cm}^2 = 268,6 \text{ MPa}$$

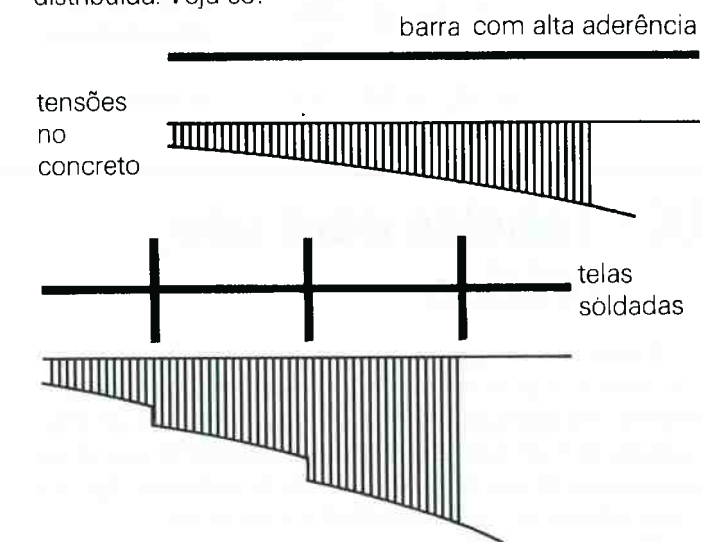
$$\rho_r = 0,0211 > \frac{1,5}{268,6} = 0,00558$$

Sistemática  $\rightarrow$  1ª expressão da NBR-6118

$$\frac{12,7}{2 \cdot 1,5 - 0,75} \cdot \frac{268,6}{210000} \cdot \left( \frac{4}{0,0211} + 45 \right) = 1,69 < 2$$

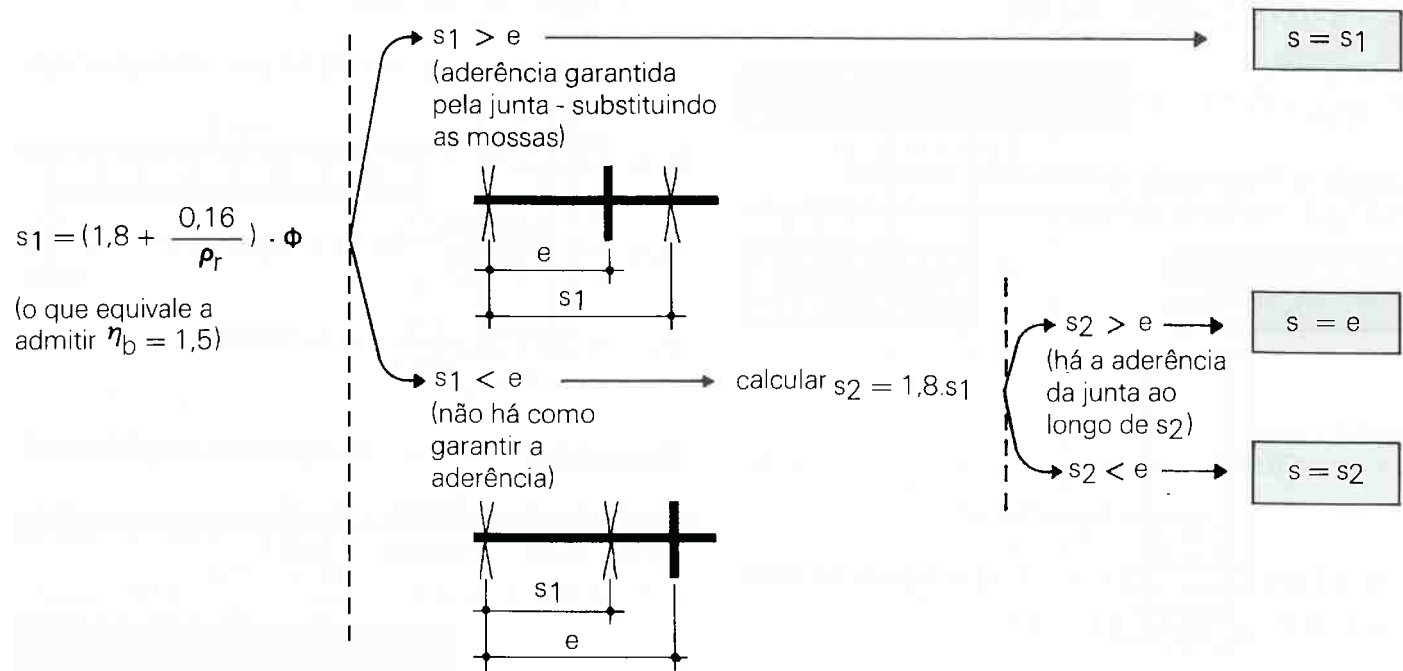
OK para peças não protegidas, em meio não agressivo.

concreto proporcionada por suas juntas soldadas, que é o que se procura ao tentar minimizar-se os efeitos da fissuração. Enquanto as barras com conformação superficial não lisas apresentam grande aderência distribuída ao longo de seu comprimento, os pontos de cruzamento dos fios das Telas constituem altas aderências concentradas, ao lado da aderência distribuída. Veja-se:



De forma a aproveitarmos as formulações propostas, nas quais somente se apreciou a aderência distribuída (através de  $1/(2 \eta_b - 0,75)$ ), propomos que se calcule o espaçamento s das fissuras da seguinte maneira:

consideremos  $e$  - espaçamento entre juntas soldadas



Assim, a estimativa do valor da abertura das fissuras, para o caso de fissuração sistemática, pode ser feita como segue:

$$10. w_k = \frac{\phi}{2,25} \cdot \frac{s}{s_1} \cdot \frac{\sigma_s}{E_s} \cdot \left( \frac{4}{\rho_r} + 45 \right)$$

Para o caso de fissuração não sistemática, vale o mesmo raciocínio para determinação de  $s'$  (ver sub-item VI):

a partir de  $w_m = 2 \cdot s' \cdot \frac{\sigma'_{sm}}{E_s}$

sendo  $s' = \frac{\phi}{4} \cdot \frac{\sigma_s}{\tau_b}$  com  $\tau_b = \frac{f_{tm}}{0,64}$  e  $f_{tm} = \frac{f_{tk}}{0,6}$

admitiu-se:  $s'_1 = 0,096 \cdot \phi \cdot \frac{\sigma_s}{f_{tk}}$  p/ barras com alta aderência  
 e  $s'_2 = 1,8 \cdot s'_1$  p/ barras lisas

Como  $s'_1$  depende de  $\sigma_s$ , buscou-se  $\sigma_s$  na estimativa do valor da abertura das fissuras, p/ barras com alta aderência, através da expressão:

$$10. w_k = \frac{\phi}{2,25} \cdot \frac{\sigma_s}{E_s} \cdot \frac{3 \cdot \sigma_s}{f_{tk}}$$

de onde pode-se escrever:

$$\sigma_s = \sqrt{\frac{0,75 \cdot 10 \cdot w_k \cdot E_s \cdot f_{tk}}{\phi}}$$

e daí  $s'_1 = \frac{0,096 \cdot \phi}{f_{tk}} \cdot \sqrt{\frac{0,75 \cdot 10 \cdot w_k \cdot E_s \cdot f_{tk}}{\phi}}$

Assim, calculando-se  $s'_1$  para uma  $w_k$  limite imposta, vem:

sendo  $s'_1 > e$  →  $s' = s'_1$   
 sendo  $s'_1 < e$  calcula-se  $s'_2$  e se  $s'_2 > e$  →  $s' = e$   
 $s'_2 < e$  →  $s' = s'_2$

## IX - Tabelas para uso prático

A idéia básica das tabelas é a apresentação dos momentos máximos que satisfazem as prescrições da NBR-6118 relativas à fissuração, para cada tipo de tela soldada (em ambas as direções), considerando-se várias espessuras de laje ( $h$ ), vários tipos de concreto ( $f_{ck}$ ) e o meio externo em que se encontra a estrutura.

Observe-se que tais momentos satisfazem apenas as restrições relativas à fissuração e podem superar os momentos que a seção considerada é capaz de resistir. Tratam-se de momentos de serviço.

- $w = 2$  ... peças não protegidas, em meio não agressivo
- $w = 3$  ... peças protegidas
- M1 ... armadura longitudinal
- M2 ... armadura transversal

Após os valores dos momentos constantes das tabelas aparece ou não um símbolo que segue a convenção seguinte:

- sem símbolo — fissuração sistemática
- \* — fissuração não sistemática
- # — limite entre os casos anteriores

# Tabelas para Dimensionamento



T E L A Q 47 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	6.2*	6.2*	8.7*	8.7*	11.3*	11.3*
	FCK = 18 MPa	6.8*	6.8*	9.6*	9.6*	11.9*	11.9*
	FCK = 20 MPa	7.0*	7.0*	9.8*	9.8*	12.1*	12.1*
h = 7.5 cm	FCK = 15 MPa	6.7*	6.7*	9.4*	9.4*	12.2*	12.2*
	FCK = 18 MPa	7.3*	7.3*	10.3*	10.3*	12.8*	12.8*
	FCK = 20 MPa	7.5*	7.5*	10.6*	10.6*	13.0*	13.0*
h = 8.0 cm	FCK = 15 MPa	7.1*	7.1*	10.1*	10.1*	13.1*	13.1*
	FCK = 18 MPa	7.8*	7.8*	11.1*	11.1*	13.7*	13.7*
	FCK = 20 MPa	8.0*	8.0*	11.4*	11.4*	13.9*	13.9*
h = 8.5 cm	FCK = 15 MPa	7.6*	7.6*	10.8*	10.8*	14.0*	14.0*
	FCK = 18 MPa	8.4*	8.4*	11.8*	11.8*	14.6*	14.6*
	FCK = 20 MPa	8.6*	8.6*	12.2*	12.2*	14.9*	14.9*
h = 9.0 cm	FCK = 15 MPa	8.1*	8.1*	11.5*	11.5*	14.9*	14.9*
	FCK = 18 MPa	8.9*	8.9*	12.6*	12.6*	15.6*	15.6*
	FCK = 20 MPa	9.1*	9.1*	12.9*	12.9*	15.8*	15.8*
h = 9.5 cm	FCK = 15 MPa	8.6*	8.6*	12.1*	12.1*	15.7*	15.7*
	FCK = 18 MPa	9.4*	9.4*	13.3*	13.3*	16.5*	16.5*
	FCK = 20 MPa	9.7*	9.7*	13.7*	13.7*	16.8*	16.8*
h = 10.0 cm	FCK = 15 MPa	9.1*	9.1*	12.8*	12.8*	16.6*	16.6*
	FCK = 18 MPa	10.0*	10.0*	14.1*	14.1*	17.4*	17.4*
	FCK = 20 MPa	10.2*	10.2*	14.5*	14.5*	17.7*	17.7*
h = 10.5 cm	FCK = 15 MPa	9.6*	9.6*	13.5*	13.5*	17.5*	17.5*
	FCK = 18 MPa	10.5*	10.5*	14.8*	14.8*	18.4*	18.4*
	FCK = 20 MPa	10.8*	10.8*	15.2*	15.2*	18.7*	18.7*
h = 11.0 cm	FCK = 15 MPa	10.0*	10.0*	14.2*	14.2*	18.4*	18.4*
	FCK = 18 MPa	11.0*	11.0*	15.6*	15.6*	19.3*	19.3*
	FCK = 20 MPa	11.3*	11.3*	16.0*	16.0*	19.6*	19.6*
h = 11.5 cm	FCK = 15 MPa	10.5*	10.5*	14.9*	14.9*	19.3*	19.3*
	FCK = 18 MPa	11.5*	11.5*	16.3*	16.3*	20.2*	20.2*
	FCK = 20 MPa	11.9*	11.9*	16.8*	16.8*	20.6*	20.6*
h = 12.0 cm	FCK = 15 MPa	11.0*	11.0*	15.6*	15.6*	20.2*	20.2*
	FCK = 18 MPa	12.1*	12.1*	17.1*	17.1*	21.1*	21.1*
	FCK = 20 MPa	12.4*	12.4*	17.6*	17.6*	21.5*	21.5*
h = 12.5 cm	FCK = 15 MPa	11.5*	11.5*	16.3*	16.3*	21.1*	21.1*
	FCK = 18 MPa	12.6*	12.6*	17.8*	17.8*	22.1*	22.1*
	FCK = 20 MPa	13.0*	13.0*	18.3*	18.3*	22.4*	22.4*
h = 13.0 cm	FCK = 15 MPa	12.0*	12.0*	16.9*	16.9*	22.0*	22.0*
	FCK = 18 MPa	13.1*	13.1*	18.6*	18.6*	23.0*	23.0*
	FCK = 20 MPa	13.5*	13.5*	19.1*	19.1*	23.4*	23.4*
h = 13.5 cm	FCK = 15 MPa	12.5*	12.5*	17.6*	17.6*	22.9*	22.9*
	FCK = 18 MPa	13.7*	13.7*	19.3*	19.3*	23.9*	23.9*
	FCK = 20 MPa	14.1*	14.1*	19.9*	19.9*	24.3*	24.3*
h = 14.0 cm	FCK = 15 MPa	13.0*	13.0*	18.3*	18.3*	23.7*	23.7*
	FCK = 18 MPa	14.2*	14.2*	20.1*	20.1*	24.9*	24.9*
	FCK = 20 MPa	14.6*	14.6*	20.6*	20.6*	25.3*	25.3*
h = 14.5 cm	FCK = 15 MPa	13.4*	13.4*	19.0*	19.0*	24.6*	24.6*
	FCK = 18 MPa	14.7*	14.7*	20.8*	20.8*	25.8*	25.8*
	FCK = 20 MPa	15.1*	15.1*	21.4*	21.4*	26.2*	26.2*
h = 15.0 cm	FCK = 15 MPa	13.9*	13.9*	19.7*	19.7*	25.5*	25.5*
	FCK = 18 MPa	15.3*	15.3*	21.6*	21.6*	26.7*	26.7*
	FCK = 20 MPa	15.7*	15.7*	22.2*	22.2*	27.2*	27.2*



T E L A Q 61 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	7.4*	7.4*	10.5*	10.5*	14.0*	14.0*
	FCK = 18 MPa	8.1*	8.1*	11.5*	11.5*	14.7*	14.7*
	FCK = 20 MPa	8.4*	8.4*	11.8*	11.8*	14.9*	14.9*
h = 7.5 cm	FCK = 15 MPa	8.0*	8.0*	11.3*	11.3*	15.1*	15.1*
	FCK = 18 MPa	8.8*	8.8*	12.4*	12.4*	15.9*	15.9*
	FCK = 20 MPa	9.0*	9.0*	12.8*	12.8*	16.1*	16.1*
h = 8.0 cm	FCK = 15 MPa	8.6*	8.6*	12.1*	12.1*	16.2*	16.2*
	FCK = 18 MPa	9.4*	9.4*	13.3*	13.3*	17.0*	17.0*
	FCK = 20 MPa	9.7*	9.7*	13.7*	13.7*	17.3*	17.3*
h = 8.5 cm	FCK = 15 MPa	9.2*	9.2*	13.0*	13.0*	17.4*	17.4*
	FCK = 18 MPa	10.1*	10.1*	14.2*	14.2*	18.2*	18.2*
	FCK = 20 MPa	10.3*	10.3*	14.6*	14.6*	18.4*	18.4*
h = 9.0 cm	FCK = 15 MPa	9.8*	9.8*	13.8*	13.8*	18.5*	18.5*
	FCK = 18 MPa	10.7*	10.7*	15.1*	15.1*	19.3*	19.3*
	FCK = 20 MPa	11.0*	11.0*	15.6*	15.6*	19.6*	19.6*
h = 9.5 cm	FCK = 15 MPa	10.4*	10.4*	14.6*	14.6*	19.6*	19.6*
	FCK = 18 MPa	11.4*	11.4*	16.1*	16.1*	20.5*	20.5*
	FCK = 20 MPa	11.7*	11.7*	16.5*	16.5*	20.8*	20.8*
h = 10.0 cm	FCK = 15 MPa	10.9*	10.9*	15.5*	15.5*	20.7*	20.7*
	FCK = 18 MPa	12.0*	12.0*	17.0*	17.0*	21.7*	21.7*
	FCK = 20 MPa	12.3*	12.3*	17.4*	17.4*	22.0*	22.0*
h = 10.5 cm	FCK = 15 MPa	11.5*	11.5*	16.3*	16.3*	21.8*	21.8*
	FCK = 18 MPa	12.6*	12.6*	17.9*	17.9*	22.8*	22.8*
	FCK = 20 MPa	13.0*	13.0*	18.4*	18.4*	23.2*	23.2*
h = 11.0 cm	FCK = 15 MPa	12.1*	12.1*	17.1*	17.1*	22.9*	22.9*
	FCK = 18 MPa	13.3*	13.3*	18.8*	18.8*	24.0*	24.0*
	FCK = 20 MPa	13.7*	13.7*	19.3*	19.3*	24.4*	24.4*
h = 11.5 cm	FCK = 15 MPa	12.7*	12.7*	18.0*	18.0*	24.0*	24.0*
	FCK = 18 MPa	13.9*	13.9*	19.7*	19.7*	25.2*	25.2*
	FCK = 20 MPa	14.3*	14.3*	20.3*	20.3*	25.5*	25.5*
h = 12.0 cm	FCK = 15 MPa	13.3*	13.3*	18.8*	18.8*	25.2*	25.2*
	FCK = 18 MPa	14.6*	14.6*	20.6*	20.6*	26.4*	26.4*
	FCK = 20 MPa	15.0*	15.0*	21.2*	21.2*	26.7*	26.7*
h = 12.5 cm	FCK = 15 MPa	13.9*	13.9*	19.6*	19.6*	26.3*	26.3*
	FCK = 18 MPa	15.2*	15.2*	21.5*	21.5*	27.5*	27.5*
	FCK = 20 MPa	15.7*	15.7*	22.1*	22.1*	27.9*	27.9*
h = 13.0 cm	FCK = 15 MPa	14.5*	14.5*	20.5*	20.5*	27.4*	27.4*
	FCK = 18 MPa	15.9*	15.9*	22.5*	22.5*	28.7*	28.7*
	FCK = 20 MPa	16.3*	16.3*	23.1*	23.1*	29.1*	29.1*
h = 13.5 cm	FCK = 15 MPa	15.1*	15.1*	21.3*	21.3*	28.5*	28.5*
	FCK = 18 MPa	16.5*	16.5*	23.4*	23.4*	29.9*	29.9*
	FCK = 20 MPa	17.0*	17.0*	24.0*	24.0*	30.3*	30.3*
h = 14.0 cm	FCK = 15 MPa	15.7*	15.7*	22.2*	22.2*	29.6*	29.6*
	FCK = 18 MPa	17.2*	17.2*	24.3*	24.3*	31.0*	31.0*
	FCK = 20 MPa	17.7*	17.7*	25.0*	25.0*	31.5*	31.5*
h = 14.5 cm	FCK = 15 MPa	16.3*	16.3*	23.0*	23.0*	30.7*	30.7*
	FCK = 18 MPa	17.8*	17.8*	25.2*	25.2*	32.2*	32.2*
	FCK = 20 MPa	18.3*	18.3*	25.9*	25.9*	32.7*	32.7*
h = 15.0 cm	FCK = 15 MPa	16.8*	16.8*	23.8*	23.8*	31.9*	31.9*
	FCK = 18 MPa	18.5*	18.5*	26.1*	26.1*	33.4*	33.4*
	FCK = 20 MPa	19.0*	19.0*	26.9*	26.9*	33.8*	33.8*

T E L A Q 75 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	8.5*	8.5*	12.2*	12.2*	17.3	17.3
	FCK = 18 MPa	9.3*	9.3*	13.2*	13.2*	17.3*	17.3*
	FCK = 20 MPa	9.6*	9.6*	13.5*	13.5*	17.6*	17.6*
h = 7.5 cm	FCK = 15 MPa	9.2*	9.2*	13.2*	13.2*	17.8*	17.8*
	FCK = 18 MPa	10.1*	10.1*	14.2*	14.2*	18.7*	18.7*
	FCK = 20 MPa	10.3*	10.3*	14.6*	14.6*	19.0*	19.0*
h = 8.0 cm	FCK = 15 MPa	9.9*	9.9*	14.1*	14.1*	19.2*	19.2*
	FCK = 18 MPa	10.8*	10.8*	15.3*	15.3*	20.1*	20.1*
	FCK = 20 MPa	11.1*	11.1*	15.7*	15.7*	20.4*	20.4*
h = 8.5 cm	FCK = 15 MPa	10.5*	10.5*	15.1*	15.1*	20.5*	20.5*
	FCK = 18 MPa	11.6*	11.6*	16.3*	16.3*	21.5*	21.5*
	FCK = 20 MPa	11.9*	11.9*	16.8*	16.8*	21.8*	21.8*
h = 9.0 cm	FCK = 15 MPa	11.2*	11.2*	16.1*	16.1*	21.8*	21.8*
	FCK = 18 MPa	12.3*	12.3*	17.4*	17.4*	22.9*	22.9*
	FCK = 20 MPa	12.7*	12.7*	17.9*	17.9*	23.2*	23.2*
h = 9.5 cm	FCK = 15 MPa	11.9*	11.9*	17.1*	17.1*	23.2*	23.2*
	FCK = 18 MPa	13.1*	13.1*	18.5*	18.5*	24.3*	24.3*
	FCK = 20 MPa	13.4*	13.4*	19.0*	19.0*	24.6*	24.6*
h = 10.0 cm	FCK = 15 MPa	12.6*	12.6*	18.1*	18.1*	24.5*	24.5*
	FCK = 18 MPa	13.8*	13.8*	19.5*	19.5*	25.7*	25.7*
	FCK = 20 MPa	14.2*	14.2*	20.1*	20.1*	26.0*	26.0*
h = 10.5 cm	FCK = 15 MPa	13.3*	13.3*	19.0*	19.0*	25.8*	25.8*
	FCK = 18 MPa	14.6*	14.6*	20.6*	20.6*	27.0*	27.0*
	FCK = 20 MPa	15.0*	15.0*	21.2*	21.2*	27.4*	27.4*
h = 11.0 cm	FCK = 15 MPa	14.0*	14.0*	20.0*	20.0*	27.1*	27.1*
	FCK = 18 MPa	15.3*	15.3*	21.7*	21.7*	28.4*	28.4*
	FCK = 20 MPa	15.7*	15.7*	22.3*	22.3*	28.9*	28.9*
h = 11.5 cm	FCK = 15 MPa	14.6*	14.6*	21.0*	21.0*	28.5*	28.5*
	FCK = 18 MPa	16.1*	16.1*	22.7*	22.7*	29.8*	29.8*
	FCK = 20 MPa	16.5*	16.5*	23.4*	23.4*	30.3*	30.3*
h = 12.0 cm	FCK = 15 MPa	15.3*	15.3*	22.0*	22.0*	29.8*	29.8*
	FCK = 18 MPa	16.8*	16.8*	23.8*	23.8*	31.2*	31.2*
	FCK = 20 MPa	17.3*	17.3*	24.4*	24.4*	31.7*	31.7*
h = 12.5 cm	FCK = 15 MPa	16.0*	16.0*	23.0*	23.0*	31.1*	31.1*
	FCK = 18 MPa	17.6*	17.6*	24.8*	24.8*	32.6*	32.6*
	FCK = 20 MPa	18.1*	18.1*	25.5*	25.5*	33.1*	33.1*
h = 13.0 cm	FCK = 15 MPa	16.7*	16.7*	24.0*	24.0*	32.5*	32.5*
	FCK = 18 MPa	18.3*	18.3*	25.9*	25.9*	34.0*	34.0*
	FCK = 20 MPa	18.8*	18.8*	26.6*	26.6*	34.5*	34.5*
h = 13.5 cm	FCK = 15 MPa	17.4*	17.4*	24.9*	24.9*	33.8*	33.8*
	FCK = 18 MPa	19.1*	19.1*	27.0*	27.0*	35.4*	35.4*
	FCK = 20 MPa	19.6*	19.6*	27.7*	27.7*	35.9*	35.9*
h = 14.0 cm	FCK = 15 MPa	18.1*	18.1*	25.9*	25.9*	35.1*	35.1*
	FCK = 18 MPa	19.8*	19.8*	28.0*	28.0*	36.8*	36.8*
	FCK = 20 MPa	20.4*	20.4*	28.8*	28.8*	37.3*	37.3*
h = 14.5 cm	FCK = 15 MPa	18.8*	18.8*	26.9*	26.9*	36.5*	36.5*
	FCK = 18 MPa	20.6*	20.6*	29.1*	29.1*	38.2*	38.2*
	FCK = 20 MPa	21.1*	21.1*	29.9*	29.9*	38.8*	38.8*
h = 15.0 cm	FCK = 15 MPa	19.4*	19.4*	27.9*	27.9*	37.8*	37.8*
	FCK = 18 MPa	21.3*	21.3*	30.2*	30.2*	39.6*	39.6*
	FCK = 20 MPa	21.9*	21.9*	31.0*	31.0*	40.2*	40.2*



TELA Q 92 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	9.8*	9.8*	14.4*	14.4*	20.9	20.9
	FCK = 18 MPa	10.7*	10.7*	15.1*	15.1*	20.9	20.9
	FCK = 20 MPa	11.0*	11.0*	15.6*	15.6*	20.9	20.9
h = 7.5 cm	FCK = 15 MPa	10.6*	10.6*	15.5*	15.5*	22.6	22.6
	FCK = 18 MPa	11.6*	11.6*	16.4*	16.4*	22.6	22.6
	FCK = 20 MPa	11.9*	11.9*	16.8*	16.8*	22.4*	22.4*
h = 8.0 cm	FCK = 15 MPa	11.3*	11.3*	16.7*	16.7*	23.7	23.7
	FCK = 18 MPa	12.4*	12.4*	17.6*	17.6*	23.7*	23.7*
	FCK = 20 MPa	12.8*	12.8*	18.1*	18.1*	24.1*	24.1*
h = 8.5 cm	FCK = 15 MPa	12.1*	12.1*	17.9*	17.9*	23.9	23.9
	FCK = 18 MPa	13.3*	13.3*	18.8*	18.8*	25.4*	25.4*
	FCK = 20 MPa	13.7*	13.7*	19.4*	19.4*	25.7*	25.7*
h = 9.0 cm	FCK = 15 MPa	12.9*	12.9*	19.0*	19.0*	25.8*	25.8*
	FCK = 18 MPa	14.2*	14.2*	20.1*	20.1*	27.0*	27.0*
	FCK = 20 MPa	14.6*	14.6*	20.6*	20.6*	27.4*	27.4*
h = 9.5 cm	FCK = 15 MPa	13.7*	13.7*	20.2*	20.2*	27.4*	27.4*
	FCK = 18 MPa	15.1*	15.1*	21.3*	21.3*	28.7*	28.7*
	FCK = 20 MPa	15.5*	15.5*	21.9*	21.9*	29.1*	29.1*
h = 10.0 cm	FCK = 15 MPa	14.5*	14.5*	21.4*	21.4*	29.0*	29.0*
	FCK = 18 MPa	15.9*	15.9*	22.5*	22.5*	30.4*	30.4*
	FCK = 20 MPa	16.4*	16.4*	23.2*	23.2*	30.8*	30.8*
h = 10.5 cm	FCK = 15 MPa	15.3*	15.3*	22.5*	22.5*	30.6*	30.6*
	FCK = 18 MPa	16.8*	16.8*	23.8*	23.8*	32.0*	32.0*
	FCK = 20 MPa	17.3*	17.3*	24.4*	24.4*	32.5*	32.5*
h = 11.0 cm	FCK = 15 MPa	16.1*	16.1*	23.7*	23.7*	32.1*	32.1*
	FCK = 18 MPa	17.7*	17.7*	25.0*	25.0*	33.7*	33.7*
	FCK = 20 MPa	18.2*	18.2*	25.7*	25.7*	34.2*	34.2*
h = 11.5 cm	FCK = 15 MPa	16.9*	16.9*	24.9*	24.9*	33.7*	33.7*
	FCK = 18 MPa	18.6*	18.6*	26.2*	26.2*	35.4*	35.4*
	FCK = 20 MPa	19.1*	19.1*	27.0*	27.0*	35.9*	35.9*
h = 12.0 cm	FCK = 15 MPa	17.7*	17.7*	26.1*	26.1*	35.3*	35.3*
	FCK = 18 MPa	19.4*	19.4*	27.5*	27.5*	37.0*	37.0*
	FCK = 20 MPa	20.0*	20.0*	28.3*	28.3*	37.6*	37.6*
h = 12.5 cm	FCK = 15 MPa	18.5*	18.5*	27.2*	27.2*	36.9*	36.9*
	FCK = 18 MPa	20.3*	20.3*	28.7*	28.7*	38.7*	38.7*
	FCK = 20 MPa	20.9*	20.9*	29.5*	29.5*	39.2*	39.2*
h = 13.0 cm	FCK = 15 MPa	19.3*	19.3*	28.4*	28.4*	38.5*	38.5*
	FCK = 18 MPa	21.2*	21.2*	30.0*	30.0*	40.4*	40.4*
	FCK = 20 MPa	21.8*	21.8*	30.8*	30.8*	40.9*	40.9*
h = 13.5 cm	FCK = 15 MPa	20.1*	20.1*	29.6*	29.6*	40.1*	40.1*
	FCK = 18 MPa	22.1*	22.1*	31.2*	31.2*	42.0*	42.0*
	FCK = 20 MPa	22.7*	22.7*	32.1*	32.1*	42.6*	42.6*
h = 14.0 cm	FCK = 15 MPa	20.9*	20.9*	30.8*	30.8*	41.7*	41.7*
	FCK = 18 MPa	22.9*	22.9*	32.4*	32.4*	43.7*	43.7*
	FCK = 20 MPa	23.6*	23.6*	33.4*	33.4*	44.3*	44.3*
h = 14.5 cm	FCK = 15 MPa	21.7*	21.7*	31.9*	31.9*	43.3*	43.3*
	FCK = 18 MPa	23.8*	23.8*	33.7*	33.7*	45.4*	45.4*
	FCK = 20 MPa	24.5*	24.5*	34.6*	34.6*	46.0*	46.0*
h = 15.0 cm	FCK = 15 MPa	22.5*	22.5*	33.1*	33.1*	44.9*	44.9*
	FCK = 18 MPa	24.7*	24.7*	34.9*	34.9*	47.0*	47.0*
	FCK = 20 MPa	25.4*	25.4*	35.9*	35.9*	47.7*	47.7*

TELA Q 113 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	13.2*	13.2*	25.5	25.5	38.3	38.3
	FCK = 18 MPa	13.9*	13.9*	25.6	25.6	38.4	38.4
	FCK = 20 MPa	14.3*	14.3*	25.6	25.6	38.4	38.4
h = 7.5 cm	FCK = 15 MPa	14.3*	14.3*	25.9	25.9	38.8	38.8
	FCK = 18 MPa	15.0*	15.0*	25.9	25.9	38.9	38.9
	FCK = 20 MPa	15.5*	15.5*	25.9	25.9	38.9	38.9
h = 8.0 cm	FCK = 15 MPa	15.4*	15.4*	26.2	26.2	39.2	39.2
	FCK = 18 MPa	16.2*	16.2*	26.2	26.2	39.3	39.3
	FCK = 20 MPa	16.6*	16.6*	26.7#	26.7#	39.4	39.4
h = 8.5 cm	FCK = 15 MPa	16.5*	16.5*	26.4	26.4	39.6	39.6
	FCK = 18 MPa	17.3*	17.3*	26.7#	26.7#	39.7	39.7
	FCK = 20 MPa	17.8*	17.8*	29.4*	29.4*	39.8	39.8
h = 9.0 cm	FCK = 15 MPa	17.5*	17.5*	27.0#	27.0#	40.0	40.0
	FCK = 18 MPa	18.4*	18.4*	30.9*	30.9*	40.1	40.1
	FCK = 20 MPa	18.9*	18.9*	31.3*	31.3*	40.1	40.1
h = 9.5 cm	FCK = 15 MPa	18.6*	18.6*	30.2#	30.2#	40.3	40.3
	FCK = 18 MPa	19.5*	19.5*	32.8*	32.8*	40.4	40.4
	FCK = 20 MPa	20.1*	20.1*	33.3*	33.3*	40.4	40.4
h = 10.0 cm	FCK = 15 MPa	19.7*	19.7*	33.1*	33.1*	40.6	40.6
	FCK = 18 MPa	20.7*	20.7*	34.7*	34.7*	40.7	40.7
	FCK = 20 MPa	21.2*	21.2*	35.2*	35.2*	42.7#	42.7#
h = 10.5 cm	FCK = 15 MPa	20.7*	20.7*	34.9*	34.9*	40.9	40.9
	FCK = 18 MPa	21.8*	21.8*	36.6*	36.6*	44.7#	44.7#
	FCK = 20 MPa	22.4*	22.4*	37.1*	37.1*	47.3#	47.3#
h = 11.0 cm	FCK = 15 MPa	21.8*	21.8*	36.7*	36.7*	41.2	41.2
	FCK = 18 MPa	22.9*	22.9*	38.5*	38.5*	49.3#	49.3#
	FCK = 20 MPa	23.6*	23.6*	39.0*	39.0*	52.1#	52.1#
h = 11.5 cm	FCK = 15 MPa	22.9*	22.9*	38.5*	38.5*	45.0#	45.0#
	FCK = 18 MPa	24.0*	24.0*	40.3*	40.3*	54.1#	54.1#
	FCK = 20 MPa	24.7*	24.7*	40.9*	40.9*	55.5*	55.5*
h = 12.0 cm	FCK = 15 MPa	24.0*	24.0*	40.3*	40.3*	49.1#	49.1#
	FCK = 18 MPa	25.2*	25.2*	42.2*	42.2*	57.3*	57.3*
	FCK = 20 MPa	25.9*	25.9*	42.8*	42.8*	58.1*	58.1*
h = 12.5 cm	FCK = 15 MPa	25.0*	25.0*	42.1*	42.1*	53.5#	53.5#
	FCK = 18 MPa	26.3*	26.3*	44.1*	44.1*	59.8*	59.8*
	FCK = 20 MPa	27.0*	27.0*	44.8*	44.8*	60.7*	60.7*
h = 13.0 cm	FCK = 15 MPa	26.1*	26.1*	43.9*	43.9*	58.0#	58.0#
	FCK = 18 MPa	27.4*	27.4*	46.0*	46.0*	62.4*	62.4*
	FCK = 20 MPa	28.2*	28.2*	46.7*	46.7*	63.3*	63.3*
h = 13.5 cm	FCK = 15 MPa	27.2*	27.2*	45.7*	45.7*	60.5*	60.5*
	FCK = 18 MPa	28.5*	28.5*	47.9*	47.9*	65.0*	65.0*
	FCK = 20 MPa	29.4*	29.4*	48.6*	48.6*	65.9*	65.9*
h = 14.0 cm	FCK = 15 MPa	28.3*	28.3*	47.5*	47.5*	62.9*	62.9*
	FCK = 18 MPa	29.7*	29.7*	49.8*	49.8*	67.5*	67.5*
	FCK = 20 MPa	30.5*	30.5*	50.5*	50.5*	68.5*	68.5*
h = 14.5 cm	FCK = 15 MPa	29.3*	29.3*	49.3*	49.3*	65.3*	65.3*
	FCK = 18 MPa	30.8*	30.8*	51.7*	51.7*	70.1*	70.1*
	FCK = 20 MPa	31.7*	31.7*	52.5*	52.5*	71.1*	71.1*
h = 15.0 cm	FCK = 15 MPa	30.4*	30.4*	51.2*	51.2*	67.7*	67.7*
	FCK = 18 MPa	31.9*	31.9*	53.6*	53.6*	72.7*	72.7*
	FCK = 20 MPa	32.8*	32.8*	54.4*	54.4*	73.7*	73.7*



T E L A Q 138 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	15.5*	15.5*	31.0	31.0	46.5	46.5
	FCK = 18 MPa	16.3*	16.3*	31.1	31.1	46.6	46.6
	FCK = 20 MPa	16.5*	16.5*	31.1	31.1	46.6	46.6
h = 7.5 cm	FCK = 15 MPa	16.8*	16.8*	33.5	33.5	50.3	50.3
	FCK = 18 MPa	17.6*	17.6*	33.6	33.6	50.4	50.4
	FCK = 20 MPa	17.9*	17.9*	33.6	33.6	50.4	50.4
h = 8.0 cm	FCK = 15 MPa	18.1*	18.1*	34.4	34.4	51.5	51.5
	FCK = 18 MPa	18.9*	18.9*	34.4	34.4	51.6	51.6
	FCK = 20 MPa	19.2*	19.2*	34.5	34.5	51.7	51.7
h = 8.5 cm	FCK = 15 MPa	19.3*	19.3*	34.8	34.8	52.1	52.1
	FCK = 18 MPa	20.3*	20.3*	34.8	34.8	52.2	52.2
	FCK = 20 MPa	20.6*	20.6*	34.9	34.9	52.3	52.3
h = 9.0 cm	FCK = 15 MPa	20.6*	20.6*	35.1	35.1	52.7	52.7
	FCK = 18 MPa	21.6*	21.6*	35.2	35.2	52.8	52.8
	FCK = 20 MPa	21.9*	21.9*	35.2	35.2	52.8	52.8
h = 9.5 cm	FCK = 15 MPa	21.9*	21.9*	35.4	35.4	53.2	53.2
	FCK = 18 MPa	22.9*	22.9*	35.9#	35.9#	53.3	53.3
	FCK = 20 MPa	23.3*	23.3*	37.9#	37.9#	53.3	53.3
h = 10.0 cm	FCK = 15 MPa	23.2*	23.2*	35.7	35.7	53.6	53.6
	FCK = 18 MPa	24.3*	24.3*	39.9#	39.9#	53.7	53.7
	FCK = 20 MPa	24.6*	24.6*	41.4*	41.4*	53.8	53.8
h = 10.5 cm	FCK = 15 MPa	24.4*	24.4*	36.8#	36.8#	54.0	54.0
	FCK = 18 MPa	25.6*	25.6*	43.1*	43.1*	54.1	54.1
	FCK = 20 MPa	26.0*	26.0*	43.7*	43.7*	54.2	54.2
h = 11.0 cm	FCK = 15 MPa	25.7*	25.7*	40.6#	40.6#	54.4	54.4
	FCK = 18 MPa	26.9*	26.9*	45.3*	45.3*	54.5	54.5
	FCK = 20 MPa	27.3*	27.3*	46.0*	46.0*	54.5	54.5
h = 11.5 cm	FCK = 15 MPa	27.0*	27.0*	44.5#	44.5#	54.7	54.7
	FCK = 18 MPa	28.3*	28.3*	47.6*	47.6*	54.8	54.8
	FCK = 20 MPa	28.7*	28.7*	48.3*	48.3*	56.5#	56.5#
h = 12.0 cm	FCK = 15 MPa	28.3*	28.3*	47.5*	47.5*	55.1	55.1
	FCK = 18 MPa	29.6*	29.6*	49.8*	49.8*	58.5#	58.5#
	FCK = 20 MPa	30.0*	30.0*	50.5*	50.5*	61.8#	61.8#
h = 12.5 cm	FCK = 15 MPa	29.5*	29.5*	49.7*	49.7*	55.4	55.4
	FCK = 18 MPa	31.0*	31.0*	52.1*	52.1*	63.7#	63.7#
	FCK = 20 MPa	31.4*	31.4*	52.8*	52.8*	67.3#	67.3#
h = 13.0 cm	FCK = 15 MPa	30.8*	30.8*	51.8*	51.8*	57.5#	57.5#
	FCK = 18 MPa	32.3*	32.3*	54.3*	54.3*	69.1#	69.1#
	FCK = 20 MPa	32.8*	32.8*	55.1*	55.1*	73.0#	73.0#
h = 13.5 cm	FCK = 15 MPa	32.1*	32.1*	54.0*	54.0*	62.2#	62.2#
	FCK = 18 MPa	33.6*	33.6*	56.6*	56.6*	74.7#	74.7#
	FCK = 20 MPa	34.1*	34.1*	57.4*	57.4*	77.8*	77.8*
h = 14.0 cm	FCK = 15 MPa	33.4*	33.4*	56.1*	56.1*	67.0#	67.0#
	FCK = 18 MPa	35.0*	35.0*	58.8*	58.8*	79.4*	79.4*
	FCK = 20 MPa	35.5*	35.5*	59.7*	59.7*	80.9*	80.9*
h = 14.5 cm	FCK = 15 MPa	34.7*	34.7*	58.3*	58.3*	72.1#	72.1#
	FCK = 18 MPa	36.3*	36.3*	61.1*	61.1*	82.5*	82.5*
	FCK = 20 MPa	36.8*	36.8*	62.0*	62.0*	84.0*	84.0*
h = 15.0 cm	FCK = 15 MPa	35.9*	35.9*	60.4*	60.4*	77.3#	77.3#
	FCK = 18 MPa	37.7*	37.7*	63.3*	63.3*	85.5*	85.5*
	FCK = 20 MPa	38.2*	38.2*	64.2*	64.2*	87.1*	87.1*

T E L A Q 159 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	17.6	17.6	35.3	35.3	52.9	52.9
	FCK = 18 MPa	18.2*	18.2*	35.3	35.3	53.0	53.0
	FCK = 20 MPa	18.5*	18.5*	35.4	35.4	53.1	53.1
h = 7.5 cm	FCK = 15 MPa	19.1	19.1	38.2	38.2	57.3	57.3
	FCK = 18 MPa	19.7*	19.7*	38.3	38.3	57.4	57.4
	FCK = 20 MPa	20.0*	20.0*	38.3	38.3	57.5	57.5
h = 8.0 cm	FCK = 15 MPa	20.5	20.5	41.1	41.1	61.6	61.6
	FCK = 18 MPa	21.2*	21.2*	41.2	41.2	61.8	61.8
	FCK = 20 MPa	21.5*	21.5*	41.2	41.2	61.8	61.8
h = 8.5 cm	FCK = 15 MPa	21.7*	21.7*	42.2	42.2	63.3	63.3
	FCK = 18 MPa	22.7*	22.7*	42.3	42.3	63.4	63.4
	FCK = 20 MPa	23.1*	23.1*	42.3	42.3	63.5	63.5
h = 9.0 cm	FCK = 15 MPa	23.1*	23.1*	42.7	42.7	64.0	64.0
	FCK = 18 MPa	24.2*	24.2*	42.7	42.7	64.1	64.1
	FCK = 20 MPa	24.6*	24.6*	42.8	42.8	64.2	64.2
h = 9.5 cm	FCK = 15 MPa	24.5*	24.5*	43.1	43.1	64.7	64.7
	FCK = 18 MPa	25.7*	25.7*	43.2	43.2	64.8	64.8
	FCK = 20 MPa	26.1*	26.1*	43.2	43.2	64.8	64.8
h = 10.0 cm	FCK = 15 MPa	26.0*	26.0*	43.5	43.5	65.3	65.3
	FCK = 18 MPa	27.2*	27.2*	43.6	43.6	65.4	65.4
	FCK = 20 MPa	27.6*	27.6*	43.6	43.6	65.4	65.4
h = 10.5 cm	FCK = 15 MPa	27.4*	27.4*	43.9	43.9	65.8	65.8
	FCK = 18 MPa	28.8*	28.8*	43.9	43.9	65.9	65.9
	FCK = 20 MPa	29.2*	29.2*	46.4#	46.4#	66.0	66.0
h = 11.0 cm	FCK = 15 MPa	28.9*	28.9*	44.2	44.2	66.3	66.3
	FCK = 18 MPa	30.3*	30.3*	48.4#	48.4#	66.4	66.4
	FCK = 20 MPa	30.7*	30.7*	51.1#	51.1#	66.5	66.5
h = 11.5 cm	FCK = 15 MPa	30.3*	30.3*	44.5	44.5	66.8	66.8
	FCK = 18 MPa	31.8*	31.8*	53.1#	53.1#	66.9	66.9
	FCK = 20 MPa	32.2*	32.2*	54.2*	54.2*	66.9	66.9
h = 12.0 cm	FCK = 15 MPa	31.8*	31.8*	48.3#	48.3#	67.2	67.2
	FCK = 18 MPa	33.3*	33.3*	56.0*	56.0*	67.3	67.3
	FCK = 20 MPa	33.8*	33.8*	56.8*	56.8*	67.4	67.4
h = 12.5 cm	FCK = 15 MPa	33.2*	33.2*	52.6#	52.6#	67.6	67.6
	FCK = 18 MPa	34.8*	34.8*	58.5*	58.5*	67.7	67.7
	FCK = 20 MPa	35.3*	35.3*	59.4*	59.4*	67.8	67.8
h = 13.0 cm	FCK = 15 MPa	34.6*	34.6*	57.1#	57.1#	68.0	68.0
	FCK = 18 MPa	36.3*	36.3*	61.1*	61.1*	68.6#	68.6#
	FCK = 20 MPa	36.8*	36.8*	62.0*	62.0*	72.5#	72.5#
h = 13.5 cm	FCK = 15 MPa	36.1*	36.1*	60.7*	60.7*	68.3	68.3
	FCK = 18 MPa	37.8*	37.8*	63.6*	63.6*	74.2#	74.2#
	FCK = 20 MPa	38.4*	38.4*	64.6*	64.6*	78.4#	78.4#
h = 14.0 cm	FCK = 15 MPa	37.5*	37.5*	63.1*	63.1*	68.6	68.6
	FCK = 18 MPa	39.3*	39.3*	66.2*	66.2*	80.0#	80.0#
	FCK = 20 MPa	39.9*	39.9*	67.1*	67.1*	84.6#	84.6#
h = 14.5 cm	FCK = 15 MPa	39.0*	39.0*	65.6*	65.6*	71.6#	71.6#
	FCK = 18 MPa	40.9*	40.9*	68.7*	68.7*	86.1#	86.1#
	FCK = 20 MPa	41.5*	41.5*	69.7*	69.7*	90.9#	90.9#
h = 15.0 cm	FCK = 15 MPa	40.4*	40.4*	68.0*	68.0*	76.9#	76.9#
	FCK = 18 MPa	42.4*	42.4*	71.3*	71.3*	92.4#	92.4#
	FCK = 20 MPa	43.0*	43.0*	72.3*	72.3*	97.3*	97.3*



T E L A Q 196 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	21.3	21.3	42.6	42.6	63.9	63.9
	FCK = 18 MPa	21.4	21.4	42.7	42.7	64.1	64.1
	FCK = 20 MPa	21.4	21.4	42.8	42.8	64.1	64.1
h = 7.5 cm	FCK = 15 MPa	23.1	23.1	46.2	46.2	69.3	69.3
	FCK = 18 MPa	23.1	23.1	46.3	46.3	69.4	69.4
	FCK = 20 MPa	23.2	23.2	46.3	46.3	69.5	69.5
h = 8.0 cm	FCK = 15 MPa	24.9	24.9	49.8	49.8	74.6	74.6
	FCK = 18 MPa	24.9	24.9	49.9	49.9	74.8	74.8
	FCK = 20 MPa	25.4*	25.4*	49.9	49.9	74.9	74.9
h = 8.5 cm	FCK = 15 MPa	26.7	26.7	53.3	53.3	80.0	80.0
	FCK = 18 MPa	26.8*	26.8*	53.5	53.5	80.2	80.2
	FCK = 20 MPa	27.2*	27.2*	53.5	53.5	80.3	80.3
h = 9.0 cm	FCK = 15 MPa	28.2	28.2	56.5	56.5	84.7	84.7
	FCK = 18 MPa	28.6*	28.6*	56.6	56.6	84.9	84.9
	FCK = 20 MPa	29.1*	29.1*	56.6	56.6	85.0	85.0
h = 9.5 cm	FCK = 15 MPa	29.0*	29.0*	57.1	57.1	85.7	85.7
	FCK = 18 MPa	30.4*	30.4*	57.2	57.2	85.9	85.9
	FCK = 20 MPa	30.9*	30.9*	57.3	57.3	86.0	86.0
h = 10.0 cm	FCK = 15 MPa	30.7*	30.7*	57.7	57.7	86.6	86.6
	FCK = 18 MPa	32.2*	32.2*	57.8	57.8	86.8	86.8
	FCK = 20 MPa	32.7*	32.7*	57.9	57.9	86.9	86.9
h = 10.5 cm	FCK = 15 MPa	32.5*	32.5*	58.3	58.3	87.4	87.4
	FCK = 18 MPa	34.1*	34.1*	58.4	58.4	87.6	87.6
	FCK = 20 MPa	34.6*	34.6*	58.5	58.5	87.7	87.7
h = 11.0 cm	FCK = 15 MPa	34.2*	34.2*	58.8	58.8	88.2	88.2
	FCK = 18 MPa	35.9*	35.9*	58.9	58.9	88.4	88.4
	FCK = 20 MPa	36.4*	36.4*	59.0	59.0	88.5	88.5
h = 11.5 cm	FCK = 15 MPa	35.9*	35.9*	59.3	59.3	88.9	88.9
	FCK = 18 MPa	37.7*	37.7*	59.4	59.4	89.1	89.1
	FCK = 20 MPa	38.2*	38.2*	59.5	59.5	89.2	89.2
h = 12.0 cm	FCK = 15 MPa	37.7*	37.7*	59.7	59.7	89.6	89.6
	FCK = 18 MPa	39.5*	39.5*	59.8	59.8	89.8	89.8
	FCK = 20 MPa	40.1*	40.1*	60.6#	60.6#	89.8	89.8
h = 12.5 cm	FCK = 15 MPa	39.4*	39.4*	60.1	60.1	90.2	90.2
	FCK = 18 MPa	41.3*	41.3*	62.5#	62.5#	90.4	90.4
	FCK = 20 MPa	41.9*	41.9*	66.0#	66.0#	90.5	90.5
h = 13.0 cm	FCK = 15 MPa	41.1*	41.1*	60.5	60.5	90.8	90.8
	FCK = 18 MPa	43.1*	43.1*	67.8#	67.8#	90.9	90.9
	FCK = 20 MPa	43.7*	43.7*	71.6#	71.6#	91.0	91.0
h = 13.5 cm	FCK = 15 MPa	42.8*	42.8*	61.0#	61.0#	91.3	91.3
	FCK = 18 MPa	44.9*	44.9*	73.4#	73.4#	91.5	91.5
	FCK = 20 MPa	45.6*	45.6*	76.6*	76.6*	91.6	91.6
h = 14.0 cm	FCK = 15 MPa	44.6*	44.6*	65.9#	65.9#	91.8	91.8
	FCK = 18 MPa	46.7*	46.7*	78.6*	78.6*	92.0	92.0
	FCK = 20 MPa	47.4*	47.4*	79.7*	79.7*	92.1	92.1
h = 14.5 cm	FCK = 15 MPa	46.3*	46.3*	70.9#	70.9#	92.3	92.3
	FCK = 18 MPa	48.5*	48.5*	81.7*	81.7*	92.4	92.4
	FCK = 20 MPa	49.3*	49.3*	82.8*	82.8*	92.5	92.5
h = 15.0 cm	FCK = 15 MPa	48.0*	48.0*	76.1#	76.1#	92.7	92.7
	FCK = 18 MPa	50.4*	50.4*	84.7*	84.7*	92.9	92.9
	FCK = 20 MPa	51.1*	51.1*	85.9*	85.9*	96.6#	96.6#

T E L A Q 246 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	26.1	26.1	52.2	52.2	78.3	78.3
	FCK = 18 MPa	26.2	26.2	52.3	52.3	78.5	78.5
	FCK = 20 MPa	26.2	26.2	52.4	52.4	78.6	78.6
h = 7.5 cm	FCK = 15 MPa	28.3	28.3	56.6	56.6	85.0	85.0
	FCK = 18 MPa	28.4	28.4	56.8	56.8	85.2	85.2
	FCK = 20 MPa	28.4	28.4	56.9	56.9	85.3	85.3
h = 8.0 cm	FCK = 15 MPa	30.6	30.6	61.1	61.1	91.7	91.7
	FCK = 18 MPa	30.6	30.6	61.3	61.3	91.9	91.9
	FCK = 20 MPa	30.7	30.7	61.3	61.3	92.0	92.0
h = 8.5 cm	FCK = 15 MPa	32.8	32.8	65.6	65.6	98.4	98.4
	FCK = 18 MPa	32.9	32.9	65.7	65.7	98.6	98.6
	FCK = 20 MPa	32.9	32.9	65.8	65.8	98.7	98.7
h = 9.0 cm	FCK = 15 MPa	35.0	35.0	70.1	70.1	105.1	105.1
	FCK = 18 MPa	35.1	35.1	70.2	70.2	105.3	105.3
	FCK = 20 MPa	35.2	35.2	70.3	70.3	105.5	105.5
h = 9.5 cm	FCK = 15 MPa	37.3	37.3	74.6	74.6	111.8	111.8
	FCK = 18 MPa	37.4	37.4	74.7	74.7	112.1	112.1
	FCK = 20 MPa	37.4	37.4	74.8	74.8	112.2	112.2
h = 10.0 cm	FCK = 15 MPa	39.1	39.1	78.2	78.2	117.2	117.2
	FCK = 18 MPa	39.2	39.2	78.3	78.3	117.5	117.5
	FCK = 20 MPa	39.2*	39.2*	78.4	78.4	117.6	117.6
h = 10.5 cm	FCK = 15 MPa	39.5	39.5	79.0	79.0	118.6	118.6
	FCK = 18 MPa	40.9*	40.9*	79.2	79.2	118.8	118.8
	FCK = 20 MPa	41.5*	41.5*	79.3	79.3	119.0	119.0
h = 11.0 cm	FCK = 15 MPa	39.9	39.9	79.9	79.9	119.8	119.8
	FCK = 18 MPa	43.0*	43.0*	80.0	80.0	120.0	120.0
	FCK = 20 MPa	43.7*	43.7*	80.1	80.1	120.2	120.2
h = 11.5 cm	FCK = 15 MPa	42.9#	42.9#	80.6	80.6	120.9	120.9
	FCK = 18 MPa	45.2*	45.2*	80.8	80.8	121.2	121.2
	FCK = 20 MPa	45.9*	45.9*	80.9	80.9	121.3	121.3
h = 12.0 cm	FCK = 15 MPa	45.2*	45.2*	81.3	81.3	122.0	122.0
	FCK = 18 MPa	47.5*	47.5*	81.5	81.5	122.2	122.2
	FCK = 20 MPa	48.2*	48.2*	81.6	81.6	122.4	122.4
h = 12.5 cm	FCK = 15 MPa	47.4*	47.4*	82.0	82.0	123.0	123.0
	FCK = 18 MPa	49.7*	49.7*	82.1	82.1	123.2	123.2
	FCK = 20 MPa	50.4*	50.4*	82.2	82.2	123.3	123.3
h = 13.0 cm	FCK = 15 MPa	49.5*	49.5*	82.6	82.6	123.9	123.9
	FCK = 18 MPa	51.9*	51.9*	82.7	82.7	124.1	124.1
	FCK = 20 MPa	52.6*	52.6*	82.8	82.8	124.2	124.2
h = 13.5 cm	FCK = 15 MPa	51.6*	51.6*	83.2	83.2	124.7	124.7
	FCK = 18 MPa	54.1*	54.1*	83.3	83.3	125.0	125.0
	FCK = 20 MPa	54.9*	54.9*	83.4	83.4	125.1	125.1
h = 14.0 cm	FCK = 15 MPa	53.7*	53.7*	83.7	83.7	125.5	125.5
	FCK = 18 MPa	56.3*	56.3*	83.8	83.8	125.8	125.8
	FCK = 20 MPa	57.1*	57.1*	83.9	83.9	125.9	125.9
h = 14.5 cm	FCK = 15 MPa	55.8*	55.8*	84.2	84.2	126.3	126.3
	FCK = 18 MPa	58.5*	58.5*	84.3	84.3	126.5	126.5
	FCK = 20 MPa	59.3*	59.3*	88.9#	88.9#	126.6	126.6
h = 15.0 cm	FCK = 15 MPa	57.9*	57.9*	84.7	84.7	127.0	127.0
	FCK = 18 MPa	60.7*	60.7*	90.3#	90.3#	127.2	127.2
	FCK = 20 MPa	61.6*	61.6*	95.4#	95.4#	127.3	127.3



T E L A Q 283 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	29.5	29.5	59.0	59.0	88.5	88.5
	FCK = 18 MPa	29.6	29.6	59.2	59.2	88.8	88.8
	FCK = 20 MPa	29.6	29.6	59.3	59.3	88.9	88.9
h = 7.5 cm	FCK = 15 MPa	32.1	32.1	64.1	64.1	96.2	96.2
	FCK = 18 MPa	32.2	32.2	64.3	64.3	96.5	96.5
	FCK = 20 MPa	32.2	32.2	64.4	64.4	96.6	96.6
h = 8.0 cm	FCK = 15 MPa	34.6	34.6	69.3	69.3	103.9	103.9
	FCK = 18 MPa	34.7	34.7	69.4	69.4	104.2	104.2
	FCK = 20 MPa	34.8	34.8	69.6	69.6	104.3	104.3
h = 8.5 cm	FCK = 15 MPa	37.2	37.2	74.4	74.4	111.6	111.6
	FCK = 18 MPa	37.3	37.3	74.6	74.6	111.9	111.9
	FCK = 20 MPa	37.3	37.3	74.7	74.7	112.0	112.0
h = 9.0 cm	FCK = 15 MPa	39.8	39.8	79.6	79.6	119.3	119.3
	FCK = 18 MPa	39.9	39.9	79.7	79.7	119.6	119.6
	FCK = 20 MPa	39.9	39.9	79.9	79.9	119.8	119.8
h = 9.5 cm	FCK = 15 MPa	42.3	42.3	84.7	84.7	127.0	127.0
	FCK = 18 MPa	42.4	42.4	84.9	84.9	127.3	127.3
	FCK = 20 MPa	42.5	42.5	85.0	85.0	127.5	127.5
h = 10.0 cm	FCK = 15 MPa	44.9	44.9	89.9	89.9	134.8	134.8
	FCK = 18 MPa	45.0	45.0	90.1	90.1	135.1	135.1
	FCK = 20 MPa	45.1	45.1	90.2	90.2	135.3	135.3
h = 10.5 cm	FCK = 15 MPa	47.5	47.5	95.0	95.0	142.5	142.5
	FCK = 18 MPa	47.6	47.6	95.2	95.2	142.8	142.8
	FCK = 20 MPa	47.7	47.7	95.3	95.3	143.0	143.0
h = 11.0 cm	FCK = 15 MPa	48.1	48.1	96.2	96.2	144.4	144.4
	FCK = 18 MPa	48.2	48.2	96.5	96.5	144.7	144.7
	FCK = 20 MPa	48.9*	48.9*	96.6	96.6	144.9	144.9
h = 11.5 cm	FCK = 15 MPa	48.6	48.6	97.3	97.3	145.9	145.9
	FCK = 18 MPa	50.6*	50.6*	97.5	97.5	146.2	146.2
	FCK = 20 MPa	51.4*	51.4*	97.6	97.6	146.4	146.4
h = 12.0 cm	FCK = 15 MPa	49.1	49.1	98.2	98.2	147.3	147.3
	FCK = 18 MPa	53.1*	53.1*	98.4	98.4	147.6	147.6
	FCK = 20 MPa	53.9*	53.9*	98.5	98.5	147.8	147.8
h = 12.5 cm	FCK = 15 MPa	50.7#	50.7#	99.1	99.1	148.6	148.6
	FCK = 18 MPa	55.6*	55.6*	99.3	99.3	148.9	148.9
	FCK = 20 MPa	56.4*	56.4*	99.4	99.4	149.1	149.1
h = 13.0 cm	FCK = 15 MPa	55.1#	55.1#	99.9	99.9	149.8	149.8
	FCK = 18 MPa	58.1*	58.1*	100.1	100.1	150.1	150.1
	FCK = 20 MPa	59.0*	59.0*	100.2	100.2	150.3	150.3
h = 13.5 cm	FCK = 15 MPa	57.8*	57.8*	100.6	100.6	150.9	150.9
	FCK = 18 MPa	60.6*	60.6*	100.8	100.8	151.2	151.2
	FCK = 20 MPa	61.5*	61.5*	100.9	100.9	151.4	151.4
h = 14.0 cm	FCK = 15 MPa	60.1*	60.1*	101.3	101.3	152.0	152.0
	FCK = 18 MPa	63.1*	63.1*	101.5	101.5	152.3	152.3
	FCK = 20 MPa	64.0*	64.0*	101.6	101.6	152.5	152.5
h = 14.5 cm	FCK = 15 MPa	62.5*	62.5*	102.0	102.0	153.0	153.0
	FCK = 18 MPa	65.6*	65.6*	102.2	102.2	153.3	153.3
	FCK = 20 MPa	66.5*	66.5*	102.3	102.3	153.5	153.5
h = 15.0 cm	FCK = 15 MPa	64.9*	64.9*	102.6	102.6	153.9	153.9
	FCK = 18 MPa	68.1*	68.1*	102.8	102.8	154.2	154.2
	FCK = 20 MPa	69.1*	69.1*	102.9	102.9	154.4	154.4

T E L A Q 335 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	22.3	22.3	44.7	44.7	67.0	67.0
	FCK = 18 MPa	22.4	22.4	44.8	44.8	67.2	67.2
	FCK = 20 MPa	22.4	22.4	44.9	44.9	67.3	67.3
h = 7.5 cm	FCK = 15 MPa	23.0	23.0	47.6	47.6	71.4	71.4
	FCK = 18 MPa	23.9	23.9	47.7	47.7	71.6	71.6
	FCK = 20 MPa	23.9	23.9	47.8	47.8	71.7	71.7
h = 8.0 cm	FCK = 15 MPa	25.8	25.8	51.6	51.6	77.4	77.4
	FCK = 18 MPa	25.9	25.9	51.7	51.7	77.6	77.6
	FCK = 20 MPa	25.9	25.9	51.8	51.8	77.7	77.7
h = 8.5 cm	FCK = 15 MPa	27.8	27.8	55.6	55.6	83.5	83.5
	FCK = 18 MPa	27.9	27.9	55.8	55.8	83.7	83.7
	FCK = 20 MPa	27.9	27.9	55.9	55.9	83.8	83.8
h = 9.0 cm	FCK = 15 MPa	29.8	29.8	59.7	59.7	89.5	89.5
	FCK = 18 MPa	29.9	29.9	59.8	59.8	89.7	89.7
	FCK = 20 MPa	30.3#	30.3#	59.9	59.9	89.9	89.9
h = 9.5 cm	FCK = 15 MPa	31.9	31.9	63.7	63.7	95.6	95.6
	FCK = 18 MPa	32.3#	32.3#	63.9	63.9	95.8	95.8
	FCK = 20 MPa	34.2#	34.2#	64.0	64.0	96.0	96.0
h = 10.0 cm	FCK = 15 MPa	33.9	33.9	67.8	67.8	101.7	101.7
	FCK = 18 MPa	36.2#	36.2#	67.9	67.9	101.9	101.9
	FCK = 20 MPa	38.3#	38.3#	68.0	68.0	102.1	102.1
h = 10.5 cm	FCK = 15 MPa	35.9	35.9	71.8	71.8	107.7	107.7
	FCK = 18 MPa	40.1*	40.1*	72.0	72.0	108.0	108.0
	FCK = 20 MPa	41.2*	41.2*	72.1	72.1	108.2	108.2
h = 11.0 cm	FCK = 15 MPa	37.9	37.9	75.9	75.9	113.8	113.8
	FCK = 18 MPa	42.4*	42.4*	76.1	76.1	114.1	114.1
	FCK = 20 MPa	43.6*	43.6*	76.2	76.2	114.3	114.3
h = 11.5 cm	FCK = 15 MPa	40.8#	40.8#	80.0	80.0	119.9	119.9
	FCK = 18 MPa	44.6*	44.6*	80.1	80.1	120.2	120.2
	FCK = 20 MPa	45.9*	45.9*	80.2	80.2	120.4	120.4
h = 12.0 cm	FCK = 15 MPa	43.9*	43.9*	84.0	84.0	126.0	126.0
	FCK = 18 MPa	46.9*	46.9*	84.2	84.2	126.3	126.3
	FCK = 20 MPa	48.2*	48.2*	84.3	84.3	126.5	126.5
h = 12.5 cm	FCK = 15 MPa	46.0*	46.0*	88.1	88.1	132.1	132.1
	FCK = 18 MPa	49.2*	49.2*	88.3	88.3	132.4	132.4
	FCK = 20 MPa	50.6*	50.6*	88.4	88.4	132.6	132.6
h = 13.0 cm	FCK = 15 MPa	48.1*	48.1*	92.2	92.2	138.3	138.3
	FCK = 18 MPa	51.4*	51.4*	92.4	92.4	138.5	138.5
	FCK = 20 MPa	52.9*	52.9*	92.5	92.5	138.7	138.7
h = 13.5 cm	FCK = 15 MPa	50.3*	50.3*	96.2	96.2	144.4	144.4
	FCK = 18 MPa	53.7*	53.7*	96.5	96.5	144.7	144.7
	FCK = 20 MPa	55.2*	55.2*	96.6	96.6	144.9	144.9
h = 14.0 cm	FCK = 15 MPa	52.4*	52.4*	100.3	100.3	150.5	150.5
	FCK = 18 MPa	56.0*	56.0*	100.5	100.5	150.8	150.8
	FCK = 20 MPa	57.6*	57.6*	100.7	100.7	151.0	151.0
h = 14.5 cm	FCK = 15 MPa	54.5*	54.5*	102.4	102.4	153.6	153.6
	FCK = 18 MPa	58.3*	58.3*	102.6	102.6	154.0	154.0
	FCK = 20 MPa	59.9*	59.9*	102.8	102.8	154.1	154.1
h = 15.0 cm	FCK = 15 MPa	56.7*	56.7*	103.2	103.2	154.8	154.8
	FCK = 18 MPa	60.5*	60.5*	103.4	103.4	155.1	155.1
	FCK = 20 MPa	62.3*	62.3*	103.5	103.5	155.3	155.3



T E L A Q 396 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	39.4	39.4	78.9	78.9	118.3	118.3
	FCK = 18 MPa	39.6	39.6	79.1	79.1	118.7	118.7
	FCK = 20 MPa	39.6	39.6	79.3	79.3	118.9	118.9
h = 7.5 cm	FCK = 15 MPa	43.0	43.0	86.0	86.0	129.0	129.0
	FCK = 18 MPa	43.1	43.1	86.2	86.2	129.3	129.3
	FCK = 20 MPa	43.2	43.2	86.4	86.4	129.6	129.6
h = 8.0 cm	FCK = 15 MPa	46.5	46.5	93.1	93.1	139.6	139.6
	FCK = 18 MPa	46.7	46.7	93.4	93.4	140.0	140.0
	FCK = 20 MPa	46.8	46.8	93.5	93.5	140.3	140.3
h = 8.5 cm	FCK = 15 MPa	50.1	50.1	100.2	100.2	150.3	150.3
	FCK = 18 MPa	50.2	50.2	100.5	100.5	150.7	150.7
	FCK = 20 MPa	50.3	50.3	100.7	100.7	151.0	151.0
h = 9.0 cm	FCK = 15 MPa	53.7	53.7	107.4	107.4	161.0	161.0
	FCK = 18 MPa	53.8	53.8	107.7	107.7	161.5	161.5
	FCK = 20 MPa	53.9	53.9	107.8	107.8	161.7	161.7
h = 9.5 cm	FCK = 15 MPa	57.3	57.3	114.5	114.5	171.8	171.8
	FCK = 18 MPa	57.4	57.4	114.8	114.8	172.2	172.2
	FCK = 20 MPa	57.5	57.5	115.0	115.0	172.5	172.5
h = 10.0 cm	FCK = 15 MPa	60.8	60.8	121.7	121.7	182.5	182.5
	FCK = 18 MPa	61.0	61.0	122.0	122.0	183.0	183.0
	FCK = 20 MPa	61.1	61.1	122.2	122.2	183.3	183.3
h = 10.5 cm	FCK = 15 MPa	64.4	64.4	128.8	128.8	193.2	193.2
	FCK = 18 MPa	64.6	64.6	129.2	129.2	193.7	193.7
	FCK = 20 MPa	64.7	64.7	129.4	129.4	194.0	194.0
h = 11.0 cm	FCK = 15 MPa	68.0	68.0	136.0	136.0	204.0	204.0
	FCK = 18 MPa	68.2	68.2	136.4	136.4	204.5	204.5
	FCK = 20 MPa	68.3	68.3	136.6	136.6	204.8	204.8
h = 11.5 cm	FCK = 15 MPa	71.6	71.6	143.2	143.2	214.8	214.8
	FCK = 18 MPa	71.8	71.8	143.6	143.6	215.3	215.3
	FCK = 20 MPa	71.9	71.9	143.8	143.8	215.6	215.6
h = 12.0 cm	FCK = 15 MPa	75.2	75.2	150.4	150.4	225.4	225.4
	FCK = 18 MPa	75.4	75.4	150.8	150.8	226.1	226.1
	FCK = 20 MPa	75.5	75.5	151.0	151.0	226.4	226.4
h = 12.5 cm	FCK = 15 MPa	76.9	76.9	153.9	153.9	230.8	230.8
	FCK = 18 MPa	77.1	77.1	154.2	154.2	231.3	231.3
	FCK = 20 MPa	77.2	77.2	154.4	154.4	231.7	231.7
h = 13.0 cm	FCK = 15 MPa	77.7	77.7	155.4	155.4	233.2	233.2
	FCK = 18 MPa	77.9	77.9	155.8	155.8	233.7	233.7
	FCK = 20 MPa	78.0	78.0	156.0	156.0	234.0	234.0
h = 13.5 cm	FCK = 15 MPa	78.5	78.5	156.9	156.9	235.4	235.4
	FCK = 18 MPa	78.7	78.7	157.3	157.3	236.0	236.0
	FCK = 20 MPa	78.8	78.8	157.5	157.5	236.3	236.3
h = 14.0 cm	FCK = 15 MPa	79.2	79.2	158.3	158.3	237.5	237.5
	FCK = 18 MPa	79.4	79.4	158.7	158.7	238.1	238.1
	FCK = 20 MPa	79.9#	79.9#	158.9	158.9	238.4	238.4
h = 14.5 cm	FCK = 15 MPa	79.8	79.8	159.7	159.7	239.5	239.5
	FCK = 18 MPa	81.5#	81.5#	160.0	160.0	240.0	240.0
	FCK = 20 MPa	86.1#	86.1#	160.2	160.2	240.3	240.3
h = 15.0 cm	FCK = 15 MPa	80.5	80.5	160.9	160.9	241.4	241.4
	FCK = 18 MPa	87.5#	87.5#	161.3	161.3	241.9	241.9
	FCK = 20 MPa	90.6*	90.6*	161.5	161.5	242.2	242.2

T E L A Q 503 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	48.2	48.2	96.4	96.4	144.6	144.6
	FCK = 18 MPa	48.4	48.4	96.7	96.7	145.1	145.1
	FCK = 20 MPa	48.5	48.5	96.9	96.9	145.4	145.4
h = 7.5 cm	FCK = 15 MPa	52.7	52.7	105.3	105.3	158.0	158.0
	FCK = 18 MPa	52.8	52.8	105.7	105.7	158.5	158.5
	FCK = 20 MPa	53.0	53.0	105.9	105.9	158.9	158.9
h = 8.0 cm	FCK = 15 MPa	57.2	57.2	114.3	114.3	171.5	171.5
	FCK = 18 MPa	57.3	57.3	114.7	114.7	172.0	172.0
	FCK = 20 MPa	57.5	57.5	114.9	114.9	172.4	172.4
h = 8.5 cm	FCK = 15 MPa	61.7	61.7	123.3	123.3	185.0	185.0
	FCK = 18 MPa	61.9	61.9	123.7	123.7	185.6	185.6
	FCK = 20 MPa	62.0	62.0	123.9	123.9	185.9	185.9
h = 9.0 cm	FCK = 15 MPa	66.2	66.2	132.3	132.3	198.5	198.5
	FCK = 18 MPa	66.4	66.4	132.7	132.7	199.1	199.1
	FCK = 20 MPa	66.5	66.5	133.0	133.0	199.5	199.5
h = 9.5 cm	FCK = 15 MPa	70.7	70.7	141.4	141.4	212.0	212.0
	FCK = 18 MPa	70.9	70.9	141.8	141.8	212.7	212.7
	FCK = 20 MPa	71.0	71.0	142.0	142.0	213.0	213.0
h = 10.0 cm	FCK = 15 MPa	75.2	75.2	150.4	150.4	225.6	225.6
	FCK = 18 MPa	75.4	75.4	150.8	150.8	226.2	226.2
	FCK = 20 MPa	75.5	75.5	151.1	151.1	226.6	226.6
h = 10.5 cm	FCK = 15 MPa	79.7	79.7	159.4	159.4	239.2	239.2
	FCK = 18 MPa	80.0	80.0	159.9	159.9	239.9	239.9
	FCK = 20 MPa	80.1	80.1	160.2	160.2	240.2	240.2
h = 11.0 cm	FCK = 15 MPa	84.3	84.3	168.5	168.5	252.8	252.8
	FCK = 18 MPa	84.5	84.5	169.0	169.0	253.5	253.5
	FCK = 20 MPa	84.6	84.6	169.3	169.3	253.9	253.9
h = 11.5 cm	FCK = 15 MPa	88.8	88.8	177.6	177.6	266.4	266.4
	FCK = 18 MPa	89.0	89.0	178.1	178.1	267.1	267.1
	FCK = 20 MPa	89.2	89.2	178.4	178.4	267.5	267.5
h = 12.0 cm	FCK = 15 MPa	93.3	93.3	186.7	186.7	280.0	280.0
	FCK = 18 MPa	93.6	93.6	187.2	187.2	280.8	280.8
	FCK = 20 MPa	93.7	93.7	187.5	187.5	281.2	281.2
h = 12.5 cm	FCK = 15 MPa	97.9	97.9	195.8	195.8	293.7	293.7
	FCK = 18 MPa	98.1	98.1	196.3	196.3	294.4	294.4
	FCK = 20 MPa	98.3	98.3	196.6	196.6	294.9	294.9
h = 13.0 cm	FCK = 15 MPa	102.4	102.4	204.9	204.9	307.3	307.3
	FCK = 18 MPa	102.7	102.7	205.4	205.4	308.1	308.1
	FCK = 20 MPa	102.9	102.9	205.7	205.7	308.6	308.6
h = 13.5 cm	FCK = 15 MPa	106.7	106.7	213.4	213.4	320.1	320.1
	FCK = 18 MPa	107.0	107.0	213.9	213.9	320.9	320.9
	FCK = 20 MPa	107.1	107.1	214.2	214.2	321.4	321.4
h = 14.0 cm	FCK = 15 MPa	107.8	107.8	215.6	215.6	323.5	323.5
	FCK = 18 MPa	108.1	108.1	216.2	216.2	324.3	324.3
	FCK = 20 MPa	108.2	108.2	216.5	216.5	324.7	324.7
h = 14.5 cm	FCK = 15 MPa	108.9	108.9	217.8	217.8	326.6	326.6
	FCK = 18 MPa	109.2	109.2	218.3	218.3	327.5	327.5
	FCK = 20 MPa	109.3	109.3	218.6	218.6	327.9	327.9
h = 15.0 cm	FCK = 15 MPa	109.9	109.9	219.8	219.8	329.7	329.7
	FCK = 18 MPa	110.2	110.2	220.3	220.3	330.5	330.5
	FCK = 20 MPa	110.3	110.3	220.6	220.6	330.9	330.9



T E L A Q 636 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	58.4	58.4	116.7	116.7	175.1	175.1
	FCK = 18 MPa	58.6	58.6	117.1	117.1	175.7	175.7
	FCK = 20 MPa	58.7	58.7	117.4	117.4	176.1	176.1
h = 7.5 cm	FCK = 15 MPa	64.0	64.0	127.9	127.9	191.9	191.9
	FCK = 18 MPa	64.2	64.2	128.4	128.4	192.6	192.6
	FCK = 20 MPa	64.3	64.3	128.7	128.7	193.0	193.0
h = 8.0 cm	FCK = 15 MPa	69.6	69.6	139.2	139.2	208.8	208.8
	FCK = 18 MPa	69.8	69.8	139.7	139.7	209.5	209.5
	FCK = 20 MPa	70.0	70.0	140.0	140.0	209.9	209.9
h = 8.5 cm	FCK = 15 MPa	75.2	75.2	150.5	150.5	225.7	225.7
	FCK = 18 MPa	75.5	75.5	151.0	151.0	226.5	226.5
	FCK = 20 MPa	75.6	75.6	151.3	151.3	226.9	226.9
h = 9.0 cm	FCK = 15 MPa	80.9	80.9	161.8	161.8	242.7	242.7
	FCK = 18 MPa	81.2	81.2	162.3	162.3	243.5	243.5
	FCK = 20 MPa	81.3	81.3	162.6	162.6	244.0	244.0
h = 9.5 cm	FCK = 15 MPa	86.6	86.6	173.1	173.1	259.7	259.7
	FCK = 18 MPa	86.8	86.8	173.7	173.7	260.5	260.5
	FCK = 20 MPa	87.0	87.0	174.0	174.0	261.0	261.0
h = 10.0 cm	FCK = 15 MPa	92.2	92.2	184.5	184.5	276.7	276.7
	FCK = 18 MPa	92.5	92.5	185.1	185.1	277.6	277.6
	FCK = 20 MPa	92.7	92.7	185.4	185.4	278.1	278.1
h = 10.5 cm	FCK = 15 MPa	97.9	97.9	195.8	195.8	293.7	293.7
	FCK = 18 MPa	98.2	98.2	196.4	196.4	294.7	294.7
	FCK = 20 MPa	98.4	98.4	196.8	196.8	295.2	295.2
h = 11.0 cm	FCK = 15 MPa	103.6	103.6	207.2	207.2	310.8	310.8
	FCK = 18 MPa	103.9	103.9	207.9	207.9	311.8	311.8
	FCK = 20 MPa	104.1	104.1	208.2	208.2	312.3	312.3
h = 11.5 cm	FCK = 15 MPa	109.3	109.3	218.6	218.6	327.9	327.9
	FCK = 18 MPa	109.6	109.6	219.3	219.3	328.9	328.9
	FCK = 20 MPa	109.8	109.8	219.7	219.7	329.5	329.5
h = 12.0 cm	FCK = 15 MPa	115.0	115.0	230.0	230.0	345.1	345.1
	FCK = 18 MPa	115.4	115.4	230.7	230.7	346.1	346.1
	FCK = 20 MPa	115.6	115.6	231.1	231.1	346.7	346.7
h = 12.5 cm	FCK = 15 MPa	120.7	120.7	241.5	241.5	362.2	362.2
	FCK = 18 MPa	121.1	121.1	242.2	242.2	363.3	363.3
	FCK = 20 MPa	121.3	121.3	242.6	242.6	363.9	363.9
h = 13.0 cm	FCK = 15 MPa	126.5	126.5	252.9	252.9	379.4	379.4
	FCK = 18 MPa	126.8	126.8	253.6	253.6	380.5	380.5
	FCK = 20 MPa	127.0	127.0	254.1	254.1	381.1	381.1
h = 13.5 cm	FCK = 15 MPa	132.2	132.2	264.4	264.4	396.6	396.6
	FCK = 18 MPa	132.6	132.6	265.1	265.1	397.7	397.7
	FCK = 20 MPa	132.8	132.8	265.6	265.6	398.3	398.3
h = 14.0 cm	FCK = 15 MPa	137.9	137.9	275.9	275.9	413.8	413.8
	FCK = 18 MPa	138.3	138.3	276.6	276.6	414.9	414.9
	FCK = 20 MPa	138.5	138.5	277.1	277.1	415.6	415.6
h = 14.5 cm	FCK = 15 MPa	143.7	143.7	287.3	287.3	431.0	431.0
	FCK = 18 MPa	144.1	144.1	288.1	288.1	432.2	432.2
	FCK = 20 MPa	144.3	144.3	288.6	288.6	432.9	432.9
h = 15.0 cm	FCK = 15 MPa	147.8	147.8	295.6	295.6	443.3	443.3
	FCK = 18 MPa	148.2	148.2	296.4	296.4	444.5	444.5
	FCK = 20 MPa	148.4	148.4	296.8	296.8	445.2	445.2

T E L A QA 335 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	22.3	22.3	44.7	44.7	67.0	67.0
	FCK = 18 MPa	22.4	22.4	44.8	44.8	67.2	67.2
	FCK = 20 MPa	22.4	22.4	44.9	44.9	67.3	67.3
h = 7.5 cm	FCK = 15 MPa	23.8	23.8	47.6	47.6	71.4	71.4
	FCK = 18 MPa	23.9	23.9	47.7	47.7	71.6	71.6
	FCK = 20 MPa	23.9	23.9	47.8	47.8	71.7	71.7
h = 8.0 cm	FCK = 15 MPa	25.8	25.8	51.6	51.6	77.4	77.4
	FCK = 18 MPa	25.9	25.9	51.7	51.7	77.6	77.6
	FCK = 20 MPa	25.9	25.9	51.8	51.8	77.7	77.7
h = 8.5 cm	FCK = 15 MPa	27.8	27.8	55.6	55.6	83.5	83.5
	FCK = 18 MPa	27.9	27.9	55.8	55.8	83.7	83.7
	FCK = 20 MPa	27.9	27.9	55.9	55.9	83.8	83.8
h = 9.0 cm	FCK = 15 MPa	29.8	29.8	59.7	59.7	89.5	89.5
	FCK = 18 MPa	29.9	29.9	59.8	59.8	89.7	89.7
	FCK = 20 MPa	30.3#	30.3#	59.9	59.9	89.9	89.9
h = 9.5 cm	FCK = 15 MPa	31.9	31.9	63.7	63.7	95.6	95.6
	FCK = 18 MPa	32.3#	32.3#	63.9	63.9	95.8	95.8
	FCK = 20 MPa	34.2#	34.2#	64.0	64.0	96.0	96.0
h = 10.0 cm	FCK = 15 MPa	33.9	33.9	67.8	67.8	101.7	101.7
	FCK = 18 MPa	36.2#	36.2#	67.9	67.9	101.9	101.9
	FCK = 20 MPa	38.3#	38.3#	68.0	68.0	102.1	102.1
h = 10.5 cm	FCK = 15 MPa	35.9	35.9	71.8	71.8	107.7	107.7
	FCK = 18 MPa	40.1*	40.1*	72.0	72.0	108.0	108.0
	FCK = 20 MPa	41.2*	41.2*	72.1	72.1	108.2	108.2
h = 11.0 cm	FCK = 15 MPa	37.9	37.9	75.9	75.9	113.8	113.8
	FCK = 18 MPa	42.4*	42.4*	76.1	76.1	114.1	114.1
	FCK = 20 MPa	43.6*	43.6*	76.2	76.2	114.3	114.3
h = 11.5 cm	FCK = 15 MPa	40.8#	40.8#	80.0	80.0	119.9	119.9
	FCK = 18 MPa	44.6*	44.6*	80.1	80.1	120.2	120.2
	FCK = 20 MPa	45.9*	45.9*	80.2	80.2	120.4	120.4
h = 12.0 cm	FCK = 15 MPa	43.9*	43.9*	84.0	84.0	126.0	126.0
	FCK = 18 MPa	46.9*	46.9*	84.2	84.2	126.3	126.3
	FCK = 20 MPa	48.2*	48.2*	84.3	84.3	126.5	126.5
h = 12.5 cm	FCK = 15 MPa	46.0*	46.0*	88.1	88.1	132.1	132.1
	FCK = 18 MPa	49.2*	49.2*	88.3	88.3	132.4	132.4
	FCK = 20 MPa	50.6*	50.6*	88.4	88.4	132.6	132.6
h = 13.0 cm	FCK = 15 MPa	48.1*	48.1*	92.2	92.2	138.3	138.3
	FCK = 18 MPa	51.4*	51.4*	92.4	92.4	138.6	138.6
	FCK = 20 MPa	52.9*	52.9*	92.5	92.5	138.7	138.7
h = 13.5 cm	FCK = 15 MPa	50.3*	50.3*	96.2	96.2	144.4	144.4
	FCK = 18 MPa	53.7*	53.7*	96.5	96.5	144.7	144.7
	FCK = 20 MPa	55.2*	55.2*	96.6	96.6	144.9	144.9
h = 14.0 cm	FCK = 15 MPa	52.4*	52.4*	100.3	100.3	150.5	150.5
	FCK = 18 MPa	56.0*	56.0*	100.5	100.5	150.8	150.8
	FCK = 20 MPa	57.6*	57.6*	100.7	100.7	151.0	151.0
h = 14.5 cm	FCK = 15 MPa	54.5*	54.5*	102.4	102.4	153.6	153.6
	FCK = 18 MPa	58.3*	58.3*	102.6	102.6	154.0	154.0
	FCK = 20 MPa	59.9*	59.9*	102.8	102.8	154.1	154.1
h = 15.0 cm	FCK = 15 MPa	56.7*	56.7*	103.2	103.2	154.8	154.8
	FCK = 18 MPa	60.5*	60.5*	103.4	103.4	155.1	155.1
	FCK = 20 MPa	62.3*	62.3*	103.5	103.5	155.3	155.3



T E L A    GA 396		W = 1		W = 2		W = 3	
(momentos em tf x cm)		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	39.4	39.4	78.9	78.9	118.3	118.3
	FCK = 18 MPa	39.6	39.6	79.1	79.1	118.7	118.7
	FCK = 20 MPa	39.6	39.6	79.3	79.3	118.9	118.9
h = 7.5 cm	FCK = 15 MPa	43.0	43.0	86.0	86.0	129.0	129.0
	FCK = 18 MPa	43.1	43.1	86.2	86.2	129.3	129.3
	FCK = 20 MPa	43.2	43.2	86.4	86.4	129.6	129.6
h = 8.0 cm	FCK = 15 MPa	46.5	46.5	93.1	93.1	139.6	139.6
	FCK = 18 MPa	46.7	46.7	93.4	93.4	140.0	140.0
	FCK = 20 MPa	46.8	46.8	93.5	93.5	140.3	140.3
h = 8.5 cm	FCK = 15 MPa	50.1	50.1	100.2	100.2	150.3	150.3
	FCK = 18 MPa	50.2	50.2	100.5	100.5	150.7	150.7
	FCK = 20 MPa	50.3	50.3	100.7	100.7	151.0	151.0
h = 9.0 cm	FCK = 15 MPa	53.7	53.7	107.4	107.4	161.0	161.0
	FCK = 18 MPa	53.8	53.8	107.7	107.7	161.5	161.5
	FCK = 20 MPa	53.9	53.9	107.8	107.8	161.7	161.7
h = 9.5 cm	FCK = 15 MPa	57.3	57.3	114.5	114.5	171.8	171.8
	FCK = 18 MPa	57.4	57.4	114.8	114.8	172.2	172.2
	FCK = 20 MPa	57.5	57.5	115.0	115.0	172.5	172.5
h = 10.0 cm	FCK = 15 MPa	60.8	60.8	121.7	121.7	182.5	182.5
	FCK = 18 MPa	61.0	61.0	122.0	122.0	183.0	183.0
	FCK = 20 MPa	61.1	61.1	122.2	122.2	183.3	183.3
h = 10.5 cm	FCK = 15 MPa	64.4	64.4	128.8	128.8	193.2	193.2
	FCK = 18 MPa	64.6	64.6	129.2	129.2	193.7	193.7
	FCK = 20 MPa	64.7	64.7	129.4	129.4	194.0	194.0
h = 11.0 cm	FCK = 15 MPa	68.0	68.0	136.0	136.0	204.0	204.0
	FCK = 18 MPa	68.2	68.2	136.4	136.4	204.5	204.5
	FCK = 20 MPa	68.3	68.3	136.6	136.6	204.8	204.8
h = 11.5 cm	FCK = 15 MPa	71.6	71.6	143.2	143.2	214.8	214.8
	FCK = 18 MPa	71.8	71.8	143.6	143.6	215.3	215.3
	FCK = 20 MPa	71.9	71.9	143.8	143.8	215.6	215.6
h = 12.0 cm	FCK = 15 MPa	75.2	75.2	150.4	150.4	225.6	225.6
	FCK = 18 MPa	75.4	75.4	150.8	150.8	226.1	226.1
	FCK = 20 MPa	75.5	75.5	151.0	151.0	226.4	226.4
h = 12.5 cm	FCK = 15 MPa	76.9	76.9	153.9	153.9	230.8	230.8
	FCK = 18 MPa	77.1	77.1	154.2	154.2	231.3	231.3
	FCK = 20 MPa	77.2	77.2	154.4	154.4	231.7	231.7
h = 13.0 cm	FCK = 15 MPa	77.7	77.7	155.4	155.4	233.2	233.2
	FCK = 18 MPa	77.9	77.9	155.8	155.8	233.7	233.7
	FCK = 20 MPa	78.0	78.0	156.0	156.0	234.0	234.0
h = 13.5 cm	FCK = 15 MPa	78.5	78.5	156.9	156.9	235.4	235.4
	FCK = 18 MPa	78.7	78.7	157.3	157.3	236.0	236.0
	FCK = 20 MPa	78.8	78.8	157.5	157.5	236.3	236.3
h = 14.0 cm	FCK = 15 MPa	79.2	79.2	158.3	158.3	237.5	237.5
	FCK = 18 MPa	79.4	79.4	158.7	158.7	238.1	238.1
	FCK = 20 MPa	79.9#	79.9#	158.9	158.9	238.4	238.4
h = 14.5 cm	FCK = 15 MPa	79.8	79.8	159.7	159.7	239.5	239.5
	FCK = 18 MPa	81.5#	81.5#	160.0	160.0	240.0	240.0
	FCK = 20 MPa	86.1#	86.1#	160.2	160.2	240.3	240.3
h = 15.0 cm	FCK = 15 MPa	80.5	80.5	160.9	160.9	241.4	241.4
	FCK = 18 MPa	87.5#	87.5#	161.3	161.3	241.9	241.9
	FCK = 20 MPa	90.6*	90.6*	161.5	161.5	242.2	242.2

T E L A    GA 503		W = 1		W = 2		W = 3	
(momentos em tf x cm)		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	48.2	48.2	96.4	96.4	144.6	144.6
	FCK = 18 MPa	48.4	48.4	96.7	96.7	145.1	145.1
	FCK = 20 MPa	48.5	48.5	96.9	96.9	145.4	145.4
h = 7.5 cm	FCK = 15 MPa	52.7	52.7	105.3	105.3	158.0	158.0
	FCK = 18 MPa	52.8	52.8	105.7	105.7	158.5	158.5
	FCK = 20 MPa	53.0	53.0	105.9	105.9	158.9	158.9
h = 8.0 cm	FCK = 15 MPa	57.2	57.2	114.3	114.3	171.5	171.5
	FCK = 18 MPa	57.3	57.3	114.7	114.7	172.0	172.0
	FCK = 20 MPa	57.5	57.5	114.9	114.9	172.4	172.4
h = 8.5 cm	FCK = 15 MPa	61.7	61.7	123.3	123.3	185.0	185.0
	FCK = 18 MPa	61.9	61.9	123.7	123.7	185.6	185.6
	FCK = 20 MPa	62.0	62.0	123.9	123.9	185.9	185.9
h = 9.0 cm	FCK = 15 MPa	66.2	66.2	132.3	132.3	198.5	198.5
	FCK = 18 MPa	66.4	66.4	132.7	132.7	199.1	199.1
	FCK = 20 MPa	66.5	66.5	133.0	133.0	199.5	199.5
h = 9.5 cm	FCK = 15 MPa	70.7	70.7	141.4	141.4	212.0	212.0
	FCK = 18 MPa	70.9	70.9	141.8	141.8	212.7	212.7
	FCK = 20 MPa	71.0	71.0	142.0	142.0	213.0	213.0
h = 10.0 cm	FCK = 15 MPa	75.2	75.2	150.4	150.4	225.6	225.6
	FCK = 18 MPa	75.4	75.4	150.8	150.8	226.2	226.2
	FCK = 20 MPa	75.5	75.5	151.1	151.1	226.6	226.6
h = 10.5 cm	FCK = 15 MPa	79.7	79.7	159.4	159.4	239.2	239.2
	FCK = 18 MPa	80.0	80.0	159.9	159.9	239.9	239.9
	FCK = 20 MPa	80.1	80.1	160.2	160.2	240.2	240.2
h = 11.0 cm	FCK = 15 MPa	84.3	84.3	168.5	168.5	252.8	252.8
	FCK = 18 MPa	84.5	84.5	169.0	169.0	253.5	253.5
	FCK = 20 MPa	84.6	84.6	169.3	169.3	253.9	253.9
h = 11.5 cm	FCK = 15 MPa	88.8	88.8	177.6	177.6	266.4	266.4
	FCK = 18 MPa	89.0	89.0	178.1	178.1	267.1	267.1
	FCK = 20 MPa	89.2	89.2	178.4	178.4	267.5	267.5
h = 12.0 cm	FCK = 15 MPa	93.3	93.3	186.7	186.7	280.0	280.0
	FCK = 18 MPa	93.6	93.6	187.2	187.2	280.8	280.8
	FCK = 20 MPa	93.7	93.7	187.5	187.5	281.2	281.2
h = 12.5 cm	FCK = 15 MPa	97.9	97.9	195.8	195.8	293.7	293.7
	FCK = 18 MPa	98.1	98.1	196.3	196.3	294.4	294.4
	FCK = 20 MPa	98.3	98.3	196.6	196.6	294.9	294.9
h = 13.0 cm	FCK = 15 MPa	102.4	102.4	204.9	204.9	307.3	307.3
	FCK = 18 MPa	102.7	102.7	205.4	205.4	308.1	308.1
	FCK = 20 MPa	102.9	102.9	205.7	205.7	308.6	308.6
h = 13.5 cm	FCK = 15 MPa	106.7	106.7	213.4	213.4	320.1	320.1
	FCK = 18 MPa	107.0	107.0	213.9	213.9	320.9	320.9
	FCK = 20 MPa	107.1	107.1	214.2	214.2	321.4	321.4
h = 14.0 cm	FCK = 15 MPa	107.8	107.8	215.6	215.6	323.5	323.5
	FCK = 18 MPa	108.1	108.1	216.2	216.2	324.3	324.3
	FCK = 20 MPa	108.2	108.2	216.5	216.5	324.7	324.7
h = 14.5 cm	FCK = 15 MPa	108.9	108.9	217.8	217.8	326.6	326.6
	FCK = 18 MPa	109.2	109.2	218.3	218.3	327.5	327.5
	FCK = 20 MPa	109.3	109.3	218.6	218.6	327.9	327.9
h = 15.0 cm	FCK = 15 MPa	109.9	109.9	219.8	219.8	329.7	329.7
	FCK = 18 MPa	110.2	110.2	220.3	220.3	330.5	330.5
	FCK = 20 MPa	110.3	110.3	220.6	220.6	330.9	330.9



T E L A    Q A 636 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	58.4	58.4	116.7	116.7	175.1	175.1
	FCK = 18 MPa	58.6	58.6	117.1	117.1	175.7	175.7
	FCK = 20 MPa	58.7	58.7	117.4	117.4	176.1	176.1
h = 7.5 cm	FCK = 15 MPa	64.0	64.0	127.9	127.9	191.9	191.9
	FCK = 18 MPa	64.2	64.2	128.4	128.4	192.6	192.6
	FCK = 20 MPa	64.3	64.3	128.7	128.7	193.0	193.0
h = 8.0 cm	FCK = 15 MPa	69.6	69.6	139.2	139.2	208.8	208.8
	FCK = 18 MPa	69.8	69.8	139.7	139.7	209.5	209.5
	FCK = 20 MPa	70.0	70.0	140.0	140.0	209.9	209.9
h = 8.5 cm	FCK = 15 MPa	75.2	75.2	150.5	150.5	225.7	225.7
	FCK = 18 MPa	75.5	75.5	151.0	151.0	226.5	226.5
	FCK = 20 MPa	75.6	75.6	151.3	151.3	226.9	226.9
h = 9.0 cm	FCK = 15 MPa	80.9	80.9	161.8	161.8	242.7	242.7
	FCK = 18 MPa	81.2	81.2	162.3	162.3	243.5	243.5
	FCK = 20 MPa	81.3	81.3	162.6	162.6	244.0	244.0
h = 9.5 cm	FCK = 15 MPa	86.6	86.6	173.1	173.1	259.7	259.7
	FCK = 18 MPa	86.8	86.8	173.7	173.7	260.5	260.5
	FCK = 20 MPa	87.0	87.0	174.0	174.0	261.0	261.0
h = 10.0 cm	FCK = 15 MPa	92.2	92.2	184.5	184.5	276.7	276.7
	FCK = 18 MPa	92.5	92.5	185.1	185.1	277.6	277.6
	FCK = 20 MPa	92.7	92.7	185.4	185.4	278.1	278.1
h = 10.5 cm	FCK = 15 MPa	97.9	97.9	195.8	195.8	293.7	293.7
	FCK = 18 MPa	98.2	98.2	196.4	196.4	294.7	294.7
	FCK = 20 MPa	98.4	98.4	196.8	196.8	295.2	295.2
h = 11.0 cm	FCK = 15 MPa	103.6	103.6	207.2	207.2	310.8	310.8
	FCK = 18 MPa	103.9	103.9	207.9	207.9	311.8	311.8
	FCK = 20 MPa	104.1	104.1	208.2	208.2	312.3	312.3
h = 11.5 cm	FCK = 15 MPa	109.3	109.3	218.6	218.6	327.9	327.9
	FCK = 18 MPa	109.6	109.6	219.3	219.3	328.9	328.9
	FCK = 20 MPa	109.8	109.8	219.7	219.7	329.5	329.5
h = 12.0 cm	FCK = 15 MPa	115.0	115.0	230.0	230.0	345.1	345.1
	FCK = 18 MPa	115.4	115.4	230.7	230.7	346.1	346.1
	FCK = 20 MPa	115.6	115.6	231.1	231.1	346.7	346.7
h = 12.5 cm	FCK = 15 MPa	120.7	120.7	241.5	241.5	362.2	362.2
	FCK = 18 MPa	121.1	121.1	242.2	242.2	363.3	363.3
	FCK = 20 MPa	121.3	121.3	242.6	242.6	363.9	363.9
h = 13.0 cm	FCK = 15 MPa	126.5	126.5	252.9	252.9	379.4	379.4
	FCK = 18 MPa	126.8	126.8	253.6	253.6	380.5	380.5
	FCK = 20 MPa	127.0	127.0	254.1	254.1	381.1	381.1
h = 13.5 cm	FCK = 15 MPa	132.2	132.2	264.4	264.4	396.6	396.6
	FCK = 18 MPa	132.6	132.6	265.1	265.1	397.7	397.7
	FCK = 20 MPa	132.8	132.8	265.6	265.6	398.3	398.3
h = 14.0 cm	FCK = 15 MPa	137.9	137.9	275.9	275.9	413.8	413.8
	FCK = 18 MPa	138.3	138.3	276.6	276.6	414.9	414.9
	FCK = 20 MPa	138.5	138.5	277.1	277.1	415.6	415.6
h = 14.5 cm	FCK = 15 MPa	143.7	143.7	287.3	287.3	431.0	431.0
	FCK = 18 MPa	144.1	144.1	288.1	288.1	432.2	432.2
	FCK = 20 MPa	144.3	144.3	288.6	288.6	432.9	432.9
h = 15.0 cm	FCK = 15 MPa	147.8	147.8	295.6	295.6	443.3	443.3
	FCK = 18 MPa	148.2	148.2	296.4	296.4	444.5	444.5
	FCK = 20 MPa	148.4	148.4	296.8	296.8	445.2	445.2

T E L A    Q A 785 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	71.3	71.3	142.7	142.7	214.0	214.0
	FCK = 18 MPa	71.6	71.6	143.2	143.2	214.8	214.8
	FCK = 20 MPa	71.8	71.8	143.6	143.6	215.4	215.4
h = 7.5 cm	FCK = 15 MPa	75.8	75.8	151.5	151.5	227.3	227.3
	FCK = 18 MPa	76.1	76.1	152.1	152.1	228.2	228.2
	FCK = 20 MPa	76.2	76.2	152.5	152.5	228.7	228.7
h = 8.0 cm	FCK = 15 MPa	82.7	82.7	165.3	165.3	248.0	248.0
	FCK = 18 MPa	83.0	83.0	166.0	166.0	248.9	248.9
	FCK = 20 MPa	83.2	83.2	166.3	166.3	249.5	249.5
h = 8.5 cm	FCK = 15 MPa	89.6	89.6	179.1	179.1	268.7	268.7
	FCK = 18 MPa	89.9	89.9	179.8	179.8	269.7	269.7
	FCK = 20 MPa	90.1	90.1	180.2	180.2	270.3	270.3
h = 9.0 cm	FCK = 15 MPa	96.5	96.5	193.0	193.0	289.5	289.5
	FCK = 18 MPa	96.8	96.8	193.7	193.7	290.5	290.5
	FCK = 20 MPa	97.1	97.1	194.1	194.1	291.2	291.2
h = 9.5 cm	FCK = 15 MPa	103.4	103.4	206.9	206.9	310.3	310.3
	FCK = 18 MPa	103.8	103.8	207.6	207.6	311.4	311.4
	FCK = 20 MPa	104.0	104.0	208.0	208.0	312.1	312.1
h = 10.0 cm	FCK = 15 MPa	110.4	110.4	220.8	220.8	331.2	331.2
	FCK = 18 MPa	110.8	110.8	221.6	221.6	332.3	332.3
	FCK = 20 MPa	111.0	111.0	222.0	222.0	333.0	333.0
h = 10.5 cm	FCK = 15 MPa	117.4	117.4	234.7	234.7	352.1	352.1
	FCK = 18 MPa	117.8	117.8	235.5	235.5	353.3	353.3
	FCK = 20 MPa	118.0	118.0	236.0	236.0	354.0	354.0
h = 11.0 cm	FCK = 15 MPa	124.3	124.3	248.7	248.7	373.0	373.0
	FCK = 18 MPa	124.8	124.8	249.5	249.5	374.3	374.3
	FCK = 20 MPa	125.0	125.0	250.0	250.0	375.0	375.0
h = 11.5 cm	FCK = 15 MPa	131.3	131.3	262.7	262.7	394.0	394.0
	FCK = 18 MPa	131.8	131.8	263.5	263.5	395.3	395.3
	FCK = 20 MPa	132.0	132.0	264.0	264.0	396.1	396.1
h = 12.0 cm	FCK = 15 MPa	138.3	138.3	276.7	276.7	415.0	415.0
	FCK = 18 MPa	138.8	138.8	277.6	277.6	416.4	416.4
	FCK = 20 MPa	139.1	139.1	278.1	278.1	417.2	417.2
h = 12.5 cm	FCK = 15 MPa	145.4	145.4	290.7	290.7	436.1	436.1
	FCK = 18 MPa	145.8	145.8	291.6	291.6	437.5	437.5
	FCK = 20 MPa	146.1	146.1	292.2	292.2	438.3	438.3
h = 13.0 cm	FCK = 15 MPa	152.4	152.4	304.8	304.8	457.1	457.1
	FCK = 18 MPa	152.9	152.9	305.7	305.7	458.6	458.6
	FCK = 20 MPa	153.1	153.1	306.3	306.3	459.4	459.4
h = 13.5 cm	FCK = 15 MPa	159.4	159.4	318.8	318.8	478.2	478.2
	FCK = 18 MPa	159.9	159.9	319.8	319.8	479.7	479.7
	FCK = 20 MPa	160.2	160.2	320.4	320.4	480.6	480.6
h = 14.0 cm	FCK = 15 MPa	166.4	166.4	332.9	332.9	499.3	499.3
	FCK = 18 MPa	167.0	167.0	333.9	333.9	500.9	500.9
	FCK = 20 MPa	167.2	167.2	334.5	334.5	501.7	501.7
h = 14.5 cm	FCK = 15 MPa	173.5	173.5	347.0	347.0	520.5	520.5
	FCK = 18 MPa	174.0	174.0	348.0	348.0	522.0	522.0
	FCK = 20 MPa	174.3	174.3	348.6	348.6	522.9	522.9
h = 15.0 cm	FCK = 15 MPa	180.5	180.5	361.1	361.1	541.6	541.6
	FCK = 18 MPa	181.1	181.1	362.2	362.2	543.2	543.2
	FCK = 20 MPa	181.4	181.4	362.8	362.8	544.2	544.2



T E L A L 61 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	7.4*	3.7*	10.5*	5.2*	12.8*	7.0*
	FCK = 18 MPa	8.1*	4.0*	11.5*	5.7*	14.1*	7.3*
	FCK = 20 MPa	8.4*	4.2*	11.8*	5.9*	14.5*	7.4*
h = 7.5 cm	FCK = 15 MPa	8.0*	4.0*	11.3*	5.6*	13.9*	7.5*
	FCK = 18 MPa	8.8*	4.4*	12.4*	6.2*	15.2*	7.9*
	FCK = 20 MPa	9.0*	4.5*	12.8*	6.3*	15.6*	8.0*
h = 8.0 cm	FCK = 15 MPa	8.6*	4.3*	12.1*	6.0*	14.9*	8.1*
	FCK = 18 MPa	9.4*	4.7*	13.3*	6.6*	16.3*	8.5*
	FCK = 20 MPa	9.7*	4.8*	13.7*	6.8*	16.8*	8.6*
h = 8.5 cm	FCK = 15 MPa	9.2*	4.6*	13.0*	6.4*	15.9*	8.6*
	FCK = 18 MPa	10.1*	5.0*	14.2*	7.1*	17.4*	9.0*
	FCK = 20 MPa	10.3*	5.1*	14.6*	7.3*	17.9*	9.2*
h = 9.0 cm	FCK = 15 MPa	9.8*	4.8*	13.8*	6.9*	16.9*	9.2*
	FCK = 18 MPa	10.7*	5.3*	15.1*	7.5*	18.5*	9.6*
	FCK = 20 MPa	11.0*	5.5*	15.6*	7.7*	19.1*	9.7*
h = 9.5 cm	FCK = 15 MPa	10.4*	5.1*	14.6*	7.3*	17.9*	9.7*
	FCK = 18 MPa	11.4*	5.6*	16.1*	8.0*	19.7*	10.2*
	FCK = 20 MPa	11.7*	5.8*	16.5*	8.2*	20.2*	10.3*
h = 10.0 cm	FCK = 15 MPa	10.9*	5.4*	15.5*	7.7*	19.0*	10.3*
	FCK = 18 MPa	12.0*	6.0*	17.0*	8.4*	20.8*	10.8*
	FCK = 20 MPa	12.3*	6.1*	17.4*	8.7*	21.4*	10.9*
h = 10.5 cm	FCK = 15 MPa	11.5*	5.7*	16.3*	8.1*	20.0*	10.8*
	FCK = 18 MPa	12.6*	6.3*	17.9*	8.9*	21.9*	11.3*
	FCK = 20 MPa	13.0*	6.4*	18.4*	9.1*	22.5*	11.5*
h = 11.0 cm	FCK = 15 MPa	12.1*	6.0*	17.1*	8.5*	21.0*	11.4*
	FCK = 18 MPa	13.3*	6.6*	18.8*	9.3*	23.0*	11.9*
	FCK = 20 MPa	13.7*	6.8*	19.3*	9.6*	23.7*	12.1*
h = 11.5 cm	FCK = 15 MPa	12.7*	6.3*	18.0*	8.9*	22.0*	11.9*
	FCK = 18 MPa	13.9*	6.9*	19.7*	9.8*	24.1*	12.5*
	FCK = 20 MPa	14.3*	7.1*	20.3*	10.0*	24.8*	12.7*
h = 12.0 cm	FCK = 15 MPa	13.3*	6.6*	18.8*	9.3*	23.0*	12.5*
	FCK = 18 MPa	14.6*	7.2*	20.6*	10.2*	25.3*	13.1*
	FCK = 20 MPa	15.0*	7.4*	21.2*	10.5*	26.0*	13.3*
h = 12.5 cm	FCK = 15 MPa	13.9*	6.9*	19.6*	9.7*	24.1*	13.0*
	FCK = 18 MPa	15.2*	7.6*	21.5*	10.7*	26.4*	13.6*
	FCK = 20 MPa	15.7*	7.8*	22.1*	11.0*	27.1*	13.8*
h = 13.0 cm	FCK = 15 MPa	14.5*	7.2*	20.5*	10.2*	25.1*	13.6*
	FCK = 18 MPa	15.9*	7.9*	22.5*	11.1*	27.5*	14.2*
	FCK = 20 MPa	16.3*	8.1*	23.1*	11.4*	28.3*	14.4*
h = 13.5 cm	FCK = 15 MPa	15.1*	7.5*	21.3*	10.6*	26.1*	14.1*
	FCK = 18 MPa	16.5*	8.2*	23.4*	11.6*	28.6*	14.8*
	FCK = 20 MPa	17.0*	8.4*	24.0*	11.9*	29.4*	15.0*
h = 14.0 cm	FCK = 15 MPa	15.7*	7.8*	22.2*	11.0*	27.1*	14.7*
	FCK = 18 MPa	17.2*	8.5*	24.3*	12.0*	29.8*	15.4*
	FCK = 20 MPa	17.7*	8.7*	25.0*	12.4*	30.6*	15.6*
h = 14.5 cm	FCK = 15 MPa	16.3*	8.1*	23.0*	11.4*	28.2*	15.2*
	FCK = 18 MPa	17.8*	8.8*	25.2*	12.5*	30.9*	16.0*
	FCK = 20 MPa	18.3*	9.1*	25.9*	12.8*	31.7*	16.2*
h = 15.0 cm	FCK = 15 MPa	16.8*	8.3*	23.8*	11.8*	29.2*	15.8*
	FCK = 18 MPa	18.5*	9.2*	26.1*	12.9*	32.0*	16.5*
	FCK = 20 MPa	19.0*	9.4*	26.9*	13.3*	32.9*	16.8*

T E L A L 75 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	8.5*	3.7*	12.0*	5.2*	14.7*	7.0*
	FCK = 18 MPa	9.3*	4.0*	13.2*	5.7*	16.1*	7.3*
	FCK = 20 MPa	9.6*	4.2*	13.5*	5.9*	16.6*	7.4*
h = 7.5 cm	FCK = 15 MPa	9.2*	4.0*	13.0*	5.6*	15.9*	7.5*
	FCK = 18 MPa	10.1*	4.4*	14.2*	6.2*	17.4*	7.9*
	FCK = 20 MPa	10.3*	4.5*	14.6*	6.3*	17.9*	8.0*
h = 8.0 cm	FCK = 15 MPa	9.9*	4.3*	13.9*	6.0*	17.1*	8.1*
	FCK = 18 MPa	10.8*	4.7*	15.3*	6.6*	18.7*	8.5*
	FCK = 20 MPa	11.1*	4.8*	15.7*	6.8*	19.3*	8.6*
h = 8.5 cm	FCK = 15 MPa	10.5*	4.6*	14.9*	6.4*	18.3*	8.6*
	FCK = 18 MPa	11.6*	5.0*	16.3*	7.1*	20.0*	9.0*
	FCK = 20 MPa	11.9*	5.1*	16.8*	7.3*	20.6*	9.2*
h = 9.0 cm	FCK = 15 MPa	11.2*	4.8*	15.9*	6.9*	19.4*	9.2*
	FCK = 18 MPa	12.3*	5.3*	17.4*	7.5*	21.3*	9.6*
	FCK = 20 MPa	12.7*	5.5*	17.9*	7.7*	21.9*	9.7*
h = 9.5 cm	FCK = 15 MPa	11.9*	5.1*	16.8*	7.3*	20.6*	9.7*
	FCK = 18 MPa	13.1*	5.6*	18.5*	8.0*	22.6*	10.2*
	FCK = 20 MPa	13.4*	5.8*	19.0*	8.2*	23.3*	10.3*
h = 10.0 cm	FCK = 15 MPa	12.6*	5.4*	17.8*	7.7*	21.8*	10.3*
	FCK = 18 MPa	13.8*	6.0*	19.5*	8.4*	23.9*	10.8*
	FCK = 20 MPa	14.2*	6.1*	20.1*	8.7*	24.6*	10.9*
h = 10.5 cm	FCK = 15 MPa	13.3*	5.7*	18.8*	8.1*	23.0*	10.8*
	FCK = 18 MPa	14.6*	6.3*	20.6*	8.9*	25.2*	11.3*
	FCK = 20 MPa	15.0*	6.4*	21.2*	9.1*	25.9*	11.5*
h = 11.0 cm	FCK = 15 MPa	14.0*	6.0*	19.7*	8.5*	24.2*	11.4*
	FCK = 18 MPa	15.3*	6.6*	21.7*	9.3*	26.5*	11.9*
	FCK = 20 MPa	15.7*	6.8*	22.3*	9.6*	27.3*	12.1*
h = 11.5 cm	FCK = 15 MPa	14.6*	6.3*	20.7*	8.9*	25.4*	11.9*
	FCK = 18 MPa	16.1*	6.9*	22.7*	9.8*	27.8*	12.5*
	FCK = 20 MPa	16.5*	7.1*	23.4*	10.0*	28.6*	12.7*
h = 12.0 cm	FCK = 15 MPa	15.3*	6.6*	21.7*	9.3*	26.6*	12.5*
	FCK = 18 MPa	16.8*	7.2*	23.8*	10.2*	29.1*	13.1*
	FCK = 20 MPa	17.3*	7.4*	24.4*	10.5*	29.9*	13.3*
h = 12.5 cm	FCK = 15 MPa	16.0*	6.9*	22.6*	9.7*	27.7*	13.0*
	FCK = 18 MPa	17.6*	7.6*	24.8*	10.7*	30.4*	13.6*
	FCK = 20 MPa	18.1*	7.8*	25.5*	11.0*	31.3*	13.8*
h = 13.0 cm	FCK = 15 MPa	16.7*	7.2*	23.6*	10.2*	28.9*	13.6*
	FCK = 18 MPa	18.3*	7.9*	25.9*	11.1*	31.7*	14.2*
	FCK = 20 MPa	18.8*	8.1*	26.6*	11.4*	32.6*	14.4*
h = 13.5 cm	FCK = 15 MPa	17.4*	7.5*	24.6*	10.6*	30.1*	14.1*
	FCK = 18 MPa	19.1*	8.2*	27.0*	11.6*	33.0*	14.8*
	FCK = 20 MPa	19.6*	8.4*	27.7*	11.9*	34.0*	15.0*
h = 14.0 cm	FCK = 15 MPa	18.1*	7.8*	25.6*	11.0*	31.3*	14.7*
	FCK = 18 MPa	19.8*	8.5*	28.0*	12.0*	34.3*	15.4*
	FCK = 20 MPa	20.4*	8.7*	28.8*	12.4*	35.3*	15.6*
h = 14.5 cm	FCK = 15 MPa	18.8*	8.1*	26.5*	11.4*	32.5*	15.2*
	FCK = 18 MPa	20.6*	8.8*	29.1*	12.5*	35.6*	16.0*
	FCK = 20 MPa	21.1*	9.1*	29.9*	12.8*	36.6*	16.2*
h = 15.0 cm	FCK = 15 MPa	19.4*	8.3*	27.5*	11.8*	33.7*	15.8*
	FCK = 18 MPa	21.3*	9.2*	30.2*	12.9*	36.9*	16.5*
	FCK = 20 MPa	21.9*	9.4*	31.0*	13.3*	38.0*	16.8*



T E L A L 92 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	9.8*	3.7*	13.8*	5.2*	15.7*	7.0*
	FCK = 18 MPa	10.7*	4.0*	15.1*	5.7*	18.5*	7.3*
	FCK = 20 MPa	11.0*	4.2*	15.6*	5.9*	19.1*	7.4*
h = 7.5 cm	FCK = 15 MPa	10.6*	4.0*	14.9*	5.6*	18.2*	7.5*
	FCK = 18 MPa	11.6*	4.4*	16.4*	6.2*	20.1*	7.9*
	FCK = 20 MPa	11.9*	4.5*	16.8*	6.3*	20.6*	8.0*
h = 8.0 cm	FCK = 15 MPa	11.3*	4.3*	16.0*	6.0*	19.7*	8.1*
	FCK = 18 MPa	12.4*	4.7*	17.6*	6.6*	21.6*	8.5*
	FCK = 20 MPa	12.8*	4.8*	18.1*	6.8*	22.2*	8.6*
h = 8.5 cm	FCK = 15 MPa	12.1*	4.6*	17.2*	6.4*	21.0*	8.6*
	FCK = 18 MPa	13.3*	5.0*	18.8*	7.1*	23.1*	9.0*
	FCK = 20 MPa	13.7*	5.1*	19.4*	7.3*	23.7*	9.2*
h = 9.0 cm	FCK = 15 MPa	12.9*	4.8*	18.3*	6.9*	22.4*	9.2*
	FCK = 18 MPa	14.2*	5.3*	20.1*	7.5*	24.6*	9.6*
	FCK = 20 MPa	14.6*	5.5*	20.6*	7.7*	25.3*	9.7*
h = 9.5 cm	FCK = 15 MPa	13.7*	5.1*	19.4*	7.3*	23.8*	9.7*
	FCK = 18 MPa	15.1*	5.6*	21.3*	8.0*	26.1*	10.2*
	FCK = 20 MPa	15.5*	5.8*	21.9*	8.2*	26.8*	10.3*
h = 10.0 cm	FCK = 15 MPa	14.5*	5.4*	20.5*	7.7*	25.2*	10.3*
	FCK = 18 MPa	15.9*	6.0*	22.5*	8.4*	27.6*	10.8*
	FCK = 20 MPa	16.4*	6.1*	23.2*	8.7*	28.4*	10.9*
h = 10.5 cm	FCK = 15 MPa	15.3*	5.7*	21.7*	8.1*	26.5*	10.8*
	FCK = 18 MPa	16.8*	6.3*	23.8*	8.9*	29.1*	11.3*
	FCK = 20 MPa	17.3*	6.4*	24.4*	9.1*	29.9*	11.5*
h = 11.0 cm	FCK = 15 MPa	16.1*	6.0*	22.8*	8.5*	27.9*	11.4*
	FCK = 18 MPa	17.7*	6.6*	25.0*	9.3*	30.6*	11.9*
	FCK = 20 MPa	18.2*	6.8*	25.7*	9.6*	31.5*	12.1*
h = 11.5 cm	FCK = 15 MPa	16.9*	6.3*	23.9*	8.9*	29.3*	11.9*
	FCK = 18 MPa	18.6*	6.9*	26.2*	9.8*	32.1*	12.5*
	FCK = 20 MPa	19.1*	7.1*	27.0*	10.0*	33.1*	12.7*
h = 12.0 cm	FCK = 15 MPa	17.7*	6.6*	25.1*	9.3*	30.7*	12.5*
	FCK = 18 MPa	19.4*	7.2*	27.5*	10.2*	33.7*	13.1*
	FCK = 20 MPa	20.0*	7.4*	28.3*	10.5*	34.6*	13.3*
h = 12.5 cm	FCK = 15 MPa	18.5*	6.9*	26.2*	9.7*	32.1*	13.0*
	FCK = 18 MPa	20.3*	7.6*	28.7*	10.7*	35.2*	13.6*
	FCK = 20 MPa	20.9*	7.8*	29.5*	11.0*	36.2*	13.8*
h = 13.0 cm	FCK = 15 MPa	19.3*	7.2*	27.3*	10.2*	33.5*	13.6*
	FCK = 18 MPa	21.2*	7.9*	30.0*	11.1*	36.7*	14.2*
	FCK = 20 MPa	21.8*	8.1*	30.8*	11.4*	37.7*	14.4*
h = 13.5 cm	FCK = 15 MPa	20.1*	7.5*	28.4*	10.6*	34.8*	14.1*
	FCK = 18 MPa	22.1*	8.2*	31.2*	11.6*	38.2*	14.8*
	FCK = 20 MPa	22.7*	8.4*	32.1*	11.9*	39.3*	15.0*
h = 14.0 cm	FCK = 15 MPa	20.9*	7.8*	29.6*	11.0*	36.2*	14.7*
	FCK = 18 MPa	22.9*	8.5*	32.4*	12.0*	39.7*	15.4*
	FCK = 20 MPa	23.6*	8.7*	33.4*	12.4*	40.8*	15.6*
h = 14.5 cm	FCK = 15 MPa	21.7*	8.1*	30.7*	11.4*	37.6*	15.2*
	FCK = 18 MPa	23.8*	8.8*	33.7*	12.5*	41.2*	16.0*
	FCK = 20 MPa	24.5*	9.1*	34.6*	12.8*	42.4*	16.2*
h = 15.0 cm	FCK = 15 MPa	22.5*	8.3*	31.8*	11.8*	39.0*	15.8*
	FCK = 18 MPa	24.7*	9.2*	34.9*	12.9*	42.8*	16.5*
	FCK = 20 MPa	25.4*	9.4*	35.9*	13.3*	44.0*	16.8*

T E L A L 113 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	12.7*	4.5*	15.8*	7.6*	21.3	10.1*
	FCK = 18 MPa	13.9*	4.8*	19.1*	8.0*	21.3	10.9*
	FCK = 20 MPa	14.3*	4.9*	20.1*	8.1*	21.3	11.0*
h = 7.5 cm	FCK = 15 MPa	13.7*	4.9*	18.3*	8.3*	21.6	10.9*
	FCK = 18 MPa	15.0*	5.2*	21.3*	8.7*	22.1*	11.7*
	FCK = 20 MPa	15.5*	5.3*	21.9*	8.8*	23.3*	11.9*
h = 8.0 cm	FCK = 15 MPa	14.7*	5.3*	20.8*	8.9*	21.8	11.7*
	FCK = 18 MPa	16.2*	5.5*	22.8*	9.3*	25.3*	12.6*
	FCK = 20 MPa	16.6*	5.7*	23.5*	9.4*	26.7*	12.8*
h = 8.5 cm	FCK = 15 MPa	15.7*	5.6*	22.3*	9.5*	23.9*	12.5*
	FCK = 18 MPa	17.3*	5.9*	24.4*	9.9*	28.7*	13.5*
	FCK = 20 MPa	17.8*	6.1*	25.1*	10.1*	30.4*	13.7*
h = 9.0 cm	FCK = 15 MPa	16.8*	6.0*	23.7*	10.1*	27.0*	13.4*
	FCK = 18 MPa	18.4*	6.3*	26.0*	10.6*	31.9*	14.3*
	FCK = 20 MPa	18.9*	6.5*	26.8*	10.7*	32.8*	14.5*
h = 9.5 cm	FCK = 15 MPa	17.8*	6.4*	25.2*	10.7*	30.2*	14.2*
	FCK = 18 MPa	19.5*	6.7*	27.6*	11.2*	33.8*	15.2*
	FCK = 20 MPa	20.1*	6.9*	28.4*	11.4*	34.8*	15.4*
h = 10.0 cm	FCK = 15 MPa	18.8*	6.7*	26.6*	11.3*	32.6*	15.0*
	FCK = 18 MPa	20.7*	7.1*	29.2*	11.9*	35.8*	16.1*
	FCK = 20 MPa	21.2*	7.3*	30.0*	12.0*	36.8*	16.3*
h = 10.5 cm	FCK = 15 MPa	19.9*	7.1*	28.1*	11.9*	34.4*	15.8*
	FCK = 18 MPa	21.8*	7.4*	30.8*	12.5*	37.7*	16.9*
	FCK = 20 MPa	22.4*	7.7*	31.7*	12.7*	38.8*	17.2*
h = 11.0 cm	FCK = 15 MPa	20.9*	7.5*	29.5*	12.5*	36.2*	16.6*
	FCK = 18 MPa	22.9*	7.8*	32.4*	13.1*	39.7*	17.8*
	FCK = 20 MPa	23.6*	8.0*	33.3*	13.3*	40.8*	18.1*
h = 11.5 cm	FCK = 15 MPa	21.9*	7.8*	31.0*	13.2*	37.9*	17.4*
	FCK = 18 MPa	24.0*	8.2*	34.0*	13.8*	41.6*	18.7*
	FCK = 20 MPa	24.7*	8.4*	34.9*	14.0*	42.8*	18.9*
h = 12.0 cm	FCK = 15 MPa	22.9*	8.2*	32.4*	13.8*	39.7*	18.2*
	FCK = 18 MPa	25.2*	8.6*	35.6*	14.4*	43.6*	19.6*
	FCK = 20 MPa	25.9*	8.8*	36.6*	14.6*	44.8*	19.8*
h = 12.5 cm	FCK = 15 MPa	24.0*	8.6*	33.9*	14.4*	41.5*	19.0*
	FCK = 18 MPa	26.3*	9.0*	37.2*	15.1*	45.5*	20.4*
	FCK = 20 MPa	27.0*	9.2*	38.2*	15.3*	46.8*	20.7*
h = 13.0 cm	FCK = 15 MPa	25.0*	8.9*	35.3*	15.0*	43.3*	19.8*
	FCK = 18 MPa	27.4*	9.4*	38.8*	15.7*	47.5*	21.3*
	FCK = 20 MPa	28.2*	9.6*	39.9*	15.9*	48.8*	21.6*
h = 13.5 cm	FCK = 15 MPa	26.0*	9.3*	36.8*	15.6*	45.1*	20.6*
	FCK = 18 MPa	28.5*	9.7*	40.4*	16.4*	49.4*	22.2*
	FCK = 20 MPa	29.4*	10.0*	41.5*	16.6*	50.8*	22.5*
h = 14.0 cm	FCK = 15 MPa	27.1*	9.6*	38.3*	16.2*	46.9*	21.5*
	FCK = 18 MPa	29.7*	10.1*	42.0*	17.0*	51.4*	23.0*
	FCK = 20 MPa	30.5*	10.4*	43.2*	17.2*	52.8*	23.4*
h = 14.5 cm	FCK = 15 MPa	28.1*	10.0*	39.7*	16.8*	48.6*	22.3*
	FCK = 18 MPa	30.8*	10.5*	43.6*	17.6*	53.4*	23.9*
	FCK = 20 MPa	31.7*	10.8*	44.8*	17.9*	54.9*	24.2*
h = 15.0 cm	FCK = 15 MPa	29.1*	10.4*	41.2*	17.5*	50.4*	23.1*
	FCK = 18 MPa	31.9*	10.9*	45.2*	18.3*	55.3*	24.8*
	FCK = 20 MPa	32.8*	11.2*	46.4*	18.5*	56.9*	25.1*



T E L A L 138 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	14.5*	5.3*	18.6	8.9*	27.8	11.5*
	FCK = 18 MPa	15.9*	5.5*	18.8#	9.3*	27.9	12.6*
	FCK = 20 MPa	16.4*	5.6*	19.8#	9.5*	27.9	12.8*
h = 7.5 cm	FCK = 15 MPa	15.7*	5.7*	18.8	9.6*	28.3	12.4*
	FCK = 18 MPa	17.2*	6.0*	21.7#	10.1*	28.3	13.6*
	FCK = 20 MPa	17.7*	6.1*	23.0#	10.2*	28.3	13.9*
h = 8.0 cm	FCK = 15 MPa	16.9*	6.2*	20.7#	10.3*	28.6	13.3*
	FCK = 18 MPa	18.5*	6.4*	24.9#	10.8*	28.7	14.6*
	FCK = 20 MPa	19.0*	6.5*	26.3#	11.0*	28.7	14.9*
h = 8.5 cm	FCK = 15 MPa	18.0*	6.6*	23.6#	11.1*	29.0	14.3*
	FCK = 18 MPa	19.8*	6.9*	28.0#	11.6*	29.0	15.7*
	FCK = 20 MPa	20.4*	7.0*	28.8#	11.8*	30.0#	15.9*
h = 9.0 cm	FCK = 15 MPa	19.2*	7.0*	26.6#	11.8*	29.3	15.2*
	FCK = 18 MPa	21.1*	7.3*	29.9#	12.4*	32.0#	16.7*
	FCK = 20 MPa	21.7*	7.4*	30.7#	12.5*	33.0#	17.0*
h = 9.5 cm	FCK = 15 MPa	20.4*	7.4*	28.9#	12.5*	29.8#	16.1*
	FCK = 18 MPa	22.4*	7.8*	31.7#	13.1*	35.9#	17.7*
	FCK = 20 MPa	23.0*	7.9*	32.6#	13.3*	37.9#	18.0*
h = 10.0 cm	FCK = 15 MPa	21.6*	7.9*	30.6#	13.2*	33.2#	17.1*
	FCK = 18 MPa	23.7*	8.2*	33.5#	13.9*	39.9#	18.7*
	FCK = 20 MPa	24.4*	8.4*	34.5#	14.1*	42.2#	19.1*
h = 10.5 cm	FCK = 15 MPa	22.8*	8.3*	32.3#	14.0*	36.6#	18.0*
	FCK = 18 MPa	25.0*	8.7*	35.4#	14.6*	43.3#	19.7*
	FCK = 20 MPa	25.7*	8.8*	36.4#	14.8*	44.6#	20.1*
h = 11.0 cm	FCK = 15 MPa	24.0*	8.7*	33.9#	14.7*	40.6#	18.9*
	FCK = 18 MPa	26.3*	9.1*	37.2#	15.4*	45.6#	20.8*
	FCK = 20 MPa	27.1*	9.3*	38.3#	15.6*	46.9#	21.1*
h = 11.5 cm	FCK = 15 MPa	25.2*	9.2*	35.6#	15.4*	43.6#	19.9*
	FCK = 18 MPa	27.6*	9.6*	39.1#	16.1*	47.9#	21.8*
	FCK = 20 MPa	28.4*	9.7*	40.2#	16.4*	49.2#	22.2*
h = 12.0 cm	FCK = 15 MPa	26.4*	9.6*	37.3#	16.1*	45.7#	20.8*
	FCK = 18 MPa	28.9*	10.0*	40.9#	16.9*	50.1#	22.8*
	FCK = 20 MPa	29.8*	10.2*	42.1#	17.1*	51.5#	23.2*
h = 12.5 cm	FCK = 15 MPa	27.6*	10.0*	39.0#	16.8*	47.8#	21.7*
	FCK = 18 MPa	30.2*	10.5*	42.8#	17.6*	52.4#	23.8*
	FCK = 20 MPa	31.1*	10.6*	44.0#	17.9*	53.9#	24.3*
h = 13.0 cm	FCK = 15 MPa	28.8*	10.4*	40.7#	17.6*	49.8#	22.7*
	FCK = 18 MPa	31.6*	10.9*	44.6#	18.4*	54.7#	24.8*
	FCK = 20 MPa	32.4*	11.1*	45.9#	18.7*	56.2#	25.3*
h = 13.5 cm	FCK = 15 MPa	30.0*	10.9*	42.4#	18.3*	51.9#	23.6*
	FCK = 18 MPa	32.9*	11.4*	46.5#	19.2*	56.9#	25.9*
	FCK = 20 MPa	33.8*	11.6*	47.8#	19.4*	58.5#	26.3*
h = 14.0 cm	FCK = 15 MPa	31.2*	11.3*	44.1#	19.0*	54.0#	24.5*
	FCK = 18 MPa	34.2*	11.8*	48.3#	19.9*	59.2#	26.9*
	FCK = 20 MPa	35.1*	12.0*	49.7#	20.2*	60.9#	27.4*
h = 14.5 cm	FCK = 15 MPa	32.3*	11.7*	45.7#	19.7*	56.0#	25.5*
	FCK = 18 MPa	35.5*	12.3*	50.2#	20.7*	61.5#	27.9*
	FCK = 20 MPa	36.5*	12.5*	51.6#	21.0*	63.2#	28.4*
h = 15.0 cm	FCK = 15 MPa	33.5*	12.2*	47.4#	20.5*	58.1#	26.4*
	FCK = 18 MPa	36.8*	12.7*	52.0#	21.4*	63.7#	28.9*
	FCK = 20 MPa	37.8*	12.9*	53.5#	21.7*	65.5#	29.5*

T E L A L 159 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	15.4#	5.3*	22.4	8.9*	33.7	11.5*
	FCK = 18 MPa	17.5*	5.5*	22.5	9.3*	33.7	12.6*
	FCK = 20 MPa	18.0*	5.6*	22.5	9.5*	33.8	12.8*
h = 7.5 cm	FCK = 15 MPa	17.3*	5.7*	22.8	9.6*	34.2	12.4*
	FCK = 18 MPa	18.9*	6.0*	22.9	10.1*	34.3	13.6*
	FCK = 20 MPa	19.5*	6.1*	22.9	10.2*	34.3	13.9*
h = 8.0 cm	FCK = 15 MPa	18.6*	6.2*	23.1	10.3*	34.7	13.3*
	FCK = 18 MPa	20.4*	6.4*	24.7#	10.8*	34.8	14.6*
	FCK = 20 MPa	21.0*	6.5*	26.1#	11.0*	34.8	14.9*
h = 8.5 cm	FCK = 15 MPa	19.9*	6.6*	23.4	11.1*	35.2	14.3*
	FCK = 18 MPa	21.8*	6.9*	28.1#	11.6*	35.2	15.7*
	FCK = 20 MPa	22.4*	7.0*	29.7#	11.8*	35.3	15.9*
h = 9.0 cm	FCK = 15 MPa	21.2*	7.0*	26.4#	11.8*	35.6	15.2*
	FCK = 18 MPa	23.3*	7.3*	31.7#	12.4*	35.6	16.7*
	FCK = 20 MPa	23.9*	7.4*	33.5#	12.5*	35.7	17.0*
h = 9.5 cm	FCK = 15 MPa	22.5*	7.4*	29.6#	12.5*	35.9	16.1*
	FCK = 18 MPa	24.7*	7.8*	35.0*	13.1*	36.0	17.7*
	FCK = 20 MPa	25.4*	7.9*	36.0*	13.3*	37.5#	18.0*
h = 10.0 cm	FCK = 15 MPa	23.8*	7.9*	32.9#	13.2*	36.3	17.1*
	FCK = 18 MPa	26.2*	8.2*	37.0*	13.9*	39.6#	18.7*
	FCK = 20 MPa	26.9*	8.4*	38.1*	14.1*	41.8#	19.1*
h = 10.5 cm	FCK = 15 MPa	25.2*	8.3*	35.6*	14.0*	36.6	18.0*
	FCK = 18 MPa	27.6*	8.7*	39.1*	14.6*	43.9#	19.7*
	FCK = 20 MPa	28.4*	8.8*	40.2*	14.8*	46.4#	20.1*
h = 11.0 cm	FCK = 15 MPa	26.5*	8.7*	37.5*	14.7*	40.2#	18.9*
	FCK = 18 MPa	29.1*	9.1*	41.1*	15.4*	48.4#	20.8*
	FCK = 20 MPa	29.9*	9.3*	42.3*	15.6*	51.1#	21.1*
h = 11.5 cm	FCK = 15 MPa	27.8*	9.2*	39.3*	15.4*	44.2#	19.9*
	FCK = 18 MPa	30.5*	9.6*	43.2*	16.1*	52.9#	21.8*
	FCK = 20 MPa	31.4*	9.7*	44.4*	16.4*	54.4*	22.2*
h = 12.0 cm	FCK = 15 MPa	29.1*	9.6*	41.2*	16.1*	48.3#	20.8*
	FCK = 18 MPa	32.0*	10.0*	45.2*	16.9*	55.4*	22.8*
	FCK = 20 MPa	32.9*	10.2*	46.5*	17.1*	56.9*	23.2*
h = 12.5 cm	FCK = 15 MPa	30.5*	10.0*	43.1*	16.8*	52.6#	21.7*
	FCK = 18 MPa	33.4*	10.5*	47.3*	17.6*	57.9*	23.8*
	FCK = 20 MPa	34.4*	10.6*	48.6*	17.9*	59.5*	24.3*
h = 13.0 cm	FCK = 15 MPa	31.8*	10.4*	45.0*	17.6*	55.1*	22.7*
	FCK = 18 MPa	34.9*	10.9*	49.3*	18.4*	60.4*	24.8*
	FCK = 20 MPa	35.9*	11.1*	50.7*	18.7*	62.1*	25.3*
h = 13.5 cm	FCK = 15 MPa	33.1*	10.9*	46.8*	18.3*	57.4*	23.6*
	FCK = 18 MPa	36.3*	11.4*	51.4*	19.2*	62.9*	25.9*
	FCK = 20 MPa	37.4*	11.6*	52.8*	19.4*	64.7*	26.3*
h = 14.0 cm	FCK = 15 MPa	34.4*	11.3*	48.7*	19.0*	59.7*	24.5*
	FCK = 18 MPa	37.8*	11.8*	53.4*	19.9*	65.5*	26.9*
	FCK = 20 MPa	38.9*	12.0*	55.0*	20.2*	67.3*	27.4*
h = 14.5 cm	FCK = 15 MPa	35.8*	11.7*	50.6*	19.7*	62.0*	25.5*
	FCK = 18 MPa	39.2*	12.3*	55.5*	20.7*	68.0*	27.9*
	FCK = 20 MPa	40.4*	12.5*	57.1*	21.0*	69.9*	28.4*
h = 15.0 cm	FCK = 15 MPa	37.1*	12.2*	52.5*	20.5*	64.3*	26.4*
	FCK = 18 MPa	40.7*	12.7*	57.6*	21.4*	70.5*	28.9*
	FCK = 20 MPa	41.9*	12.9*	59.2*	21.7*	72.5*	29.5*



T E L A L 196 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	15.1#	5.3*	29.4	8.9*	44.1	11.5*
	FCK = 18 MPa	18.2#	5.5*	29.5	9.3*	44.2	12.6*
	FCK = 20 MPa	19.2#	5.6*	29.5	9.5*	44.3	12.8*
h = 7.5 cm	FCK = 15 MPa	17.5#	5.7*	30.0	9.6*	45.0	12.4*
	FCK = 18 MPa	21.1#	6.0*	30.1	10.1*	45.1	13.6*
	FCK = 20 MPa	22.3#	6.1*	30.1	10.2*	45.1	13.9*
h = 8.0 cm	FCK = 15 MPa	20.1#	6.2*	30.5	10.3*	45.7	13.3*
	FCK = 18 MPa	23.4*	6.4*	30.6	10.8*	45.8	14.6*
	FCK = 20 MPa	24.1*	6.5*	30.6	11.0*	45.9	14.9*
h = 8.5 cm	FCK = 15 MPa	22.9*	6.6*	31.0	11.1*	46.4	14.3*
	FCK = 18 MPa	25.1*	6.9*	31.0	11.6*	46.5	15.7*
	FCK = 20 MPa	25.8*	7.0*	31.1	11.8*	46.6	15.9*
h = 9.0 cm	FCK = 15 MPa	24.4*	7.0*	31.4	11.8*	47.0	15.2*
	FCK = 18 MPa	26.8*	7.3*	31.4	12.4*	47.1	16.7*
	FCK = 20 MPa	27.6*	7.4*	31.0#	12.5*	47.2	17.0*
h = 9.5 cm	FCK = 15 MPa	25.9*	7.4*	31.7	12.5*	47.6	16.1*
	FCK = 18 MPa	28.5*	7.8*	35.0#	13.1*	47.7	17.7*
	FCK = 20 MPa	29.3*	7.9*	37.0#	13.3*	47.8	18.0*
h = 10.0 cm	FCK = 15 MPa	27.5*	7.9*	32.4#	13.2*	48.1	17.1*
	FCK = 18 MPa	30.2*	8.2*	39.0#	13.9*	48.2	18.7*
	FCK = 20 MPa	31.0*	8.4*	41.2#	14.1*	48.3	19.1*
h = 10.5 cm	FCK = 15 MPa	29.0*	8.3*	36.0#	14.0*	48.6	18.0*
	FCK = 18 MPa	31.9*	8.7*	43.3#	14.6*	48.7	19.7*
	FCK = 20 MPa	32.8*	8.8*	45.7#	14.8*	48.7	20.1*
h = 11.0 cm	FCK = 15 MPa	30.6*	8.7*	39.7#	14.7*	49.0	18.9*
	FCK = 18 MPa	33.5*	9.1*	47.4*	15.4*	49.1	20.8*
	FCK = 20 MPa	34.5*	9.3*	48.8*	15.6*	50.4#	21.1*
h = 11.5 cm	FCK = 15 MPa	32.1*	9.2*	43.6#	15.4*	49.4	19.9*
	FCK = 18 MPa	35.2*	9.6*	49.8*	16.1*	52.4#	21.8*
	FCK = 20 MPa	36.2*	9.7*	51.3*	16.4*	55.4#	22.2*
h = 12.0 cm	FCK = 15 MPa	33.7*	9.6*	47.6*	16.1*	49.8	20.8*
	FCK = 18 MPa	36.9*	10.0*	52.2*	16.9*	57.3#	22.8*
	FCK = 20 MPa	38.0*	10.2*	53.7*	17.1*	60.6#	23.2*
h = 12.5 cm	FCK = 15 MPa	35.2*	10.0*	49.8*	16.8*	52.0#	21.7*
	FCK = 18 MPa	38.6*	10.5*	54.6*	17.6*	62.5#	23.8*
	FCK = 20 MPa	39.7*	10.6*	56.2*	17.9*	66.0#	24.3*
h = 13.0 cm	FCK = 15 MPa	36.7*	10.4*	52.0*	17.6*	56.4#	22.7*
	FCK = 18 MPa	40.3*	10.9*	57.0*	18.4*	67.8#	24.8*
	FCK = 20 MPa	41.5*	11.1*	58.6*	18.7*	71.6#	25.3*
h = 13.5 cm	FCK = 15 MPa	38.3*	10.9*	54.2*	18.3*	61.0#	23.6*
	FCK = 18 MPa	42.0*	11.4*	59.4*	19.2*	72.8*	25.9*
	FCK = 20 MPa	43.2*	11.6*	61.1*	19.4*	74.8*	26.3*
h = 14.0 cm	FCK = 15 MPa	39.8*	11.3*	56.3*	19.0*	65.9#	24.5*
	FCK = 18 MPa	43.7*	11.8*	61.8*	19.9*	75.7*	26.9*
	FCK = 20 MPa	45.0*	12.0*	63.6*	20.2*	77.9*	27.4*
h = 14.5 cm	FCK = 15 MPa	41.4*	11.7*	58.5*	19.7*	70.9#	25.5*
	FCK = 18 MPa	45.4*	12.3*	64.2*	20.7*	78.7*	27.9*
	FCK = 20 MPa	46.7*	12.5*	66.0*	21.0*	80.9*	28.4*
h = 15.0 cm	FCK = 15 MPa	42.9*	12.2*	60.7*	20.5*	74.4*	26.4*
	FCK = 18 MPa	47.1*	12.7*	66.6*	21.4*	81.6*	28.9*
	FCK = 20 MPa	48.4*	12.9*	68.5*	21.7*	83.9*	29.5*

T E L A L 246 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	19.6	5.9*	39.3	10.0*	58.9	12.7*
	FCK = 18 MPa	19.7	6.2*	39.4	10.5*	59.0	13.9*
	FCK = 20 MPa	19.7	6.3*	39.4	10.6*	59.1	14.3*
h = 7.5 cm	FCK = 15 MPa	20.1	6.4*	40.1	10.8*	60.2	13.7*
	FCK = 18 MPa	20.6#	6.7*	40.2	11.3*	60.4	15.0*
	FCK = 20 MPa	21.8#	6.8*	40.3	11.5*	60.5	15.4*
h = 8.0 cm	FCK = 15 MPa	20.5	6.7*	40.9	11.6*	61.4	14.7*
	FCK = 18 MPa	23.7#	7.2*	41.0	12.2*	61.6	16.1*
	FCK = 20 MPa	25.1#	7.3*	41.0	12.3*	61.6	16.6*
h = 8.5 cm	FCK = 15 MPa	22.5#	7.4*	41.7	12.4*	62.5	15.8*
	FCK = 18 MPa	27.0#	7.7*	41.7	13.0*	62.6	17.3*
	FCK = 20 MPa	28.6#	7.9*	41.8	13.2*	62.7	17.8*
h = 9.0 cm	FCK = 15 MPa	25.4#	7.9*	42.3	13.2*	63.4	16.8*
	FCK = 18 MPa	30.6#	8.2*	42.4	13.9*	63.6	18.4*
	FCK = 20 MPa	32.1*	8.4*	42.4	14.1*	63.7	18.7*
h = 9.5 cm	FCK = 15 MPa	28.6#	8.4*	42.9	14.1*	64.3	17.8*
	FCK = 18 MPa	33.2*	8.8*	43.0	14.7*	64.5	19.5*
	FCK = 20 MPa	34.1*	8.9*	43.0	14.9*	64.5	20.1*
h = 10.0 cm	FCK = 15 MPa	31.9#	8.8*	43.4	14.9*	65.1	18.9*
	FCK = 18 MPa	35.1*	9.3*	43.5	15.6*	65.3	20.7*
	FCK = 20 MPa	36.2*	9.4*	43.6	15.8*	65.4	21.3*
h = 10.5 cm	FCK = 15 MPa	33.8*	9.3*	43.9	15.7*	65.9	19.9*
	FCK = 18 MPa	37.1*	9.8*	44.0	16.4*	66.0	21.8*
	FCK = 20 MPa	38.2*	9.9*	45.0#	16.7*	66.1	22.4*
h = 11.0 cm	FCK = 15 MPa	35.7*	9.8*	44.4	16.5*	66.6	20.9*
	FCK = 18 MPa	39.1*	10.3*	47.0#	17.3*	66.7	22.9*
	FCK = 20 MPa	40.3*	10.4*	49.6#	17.5*	66.8	23.6*
h = 11.5 cm	FCK = 15 MPa	37.5*	10.3*	44.8	17.3*	67.2	22.0*
	FCK = 18 MPa	41.1*	10.8*	51.6#	18.1*	67.3	24.1*
	FCK = 20 MPa	42.3*	10.9*	54.5#	18.4*	67.4	24.8*
h = 12.0 cm	FCK = 15 MPa	39.3*	10.8*	47.0#	18.1*	67.8	23.0*
	FCK = 18 MPa	43.1*	11.3*	56.5#	19.0*	67.9	25.2*
	FCK = 20 MPa	44.4*	11.5*	59.7#	19.3*	68.0	25.9*
h = 12.5 cm	FCK = 15 MPa	41.1*	11.3*	51.2#	19.0*	68.3	24.0*
	FCK = 18 MPa	45.2*	11.8*	61.6#	19.9*	68.4	26.4*
	FCK = 20 MPa	46.4*	12.0*	65.1#	20.1*	68.5	27.1*
h = 13.0 cm	FCK = 15 MPa	43.0*	11.8*	55.6#	19.8*	68.8	25.1*
	FCK = 18 MPa	47.2*	12.3*	66.7*	20.7*	68.9	27.5*
	FCK = 20 MPa	48.5*	12.5*	68.6*	21.0*	70.7#	28.3*
h = 13.5 cm	FCK = 15 MPa	44.8*	12.2*	60.2#	20.6*	69.3	26.1*
	FCK = 18 MPa	49.2*	12.8*	69.5*	21.6*	72.4#	28.6*
	FCK = 20 MPa	50.6*	13.0*	71.5*	21.9*	76.5#	29.4*
h = 14.0 cm	FCK = 15 MPa	46.6*	12.7*	65.0#	21.4*	69.7	27.2*
	FCK = 18 MPa	51.2*	13.3*	72.4*	22.4*	78.1#	29.8*
	FCK = 20 MPa	52.6*	13.5*	74.4*	22.8*	82.6#	30.6*
h = 14.5 cm	FCK = 15 MPa	48.5*	13.2*	68.5*	22.2*	70.2	28.2*
	FCK = 18 MPa	53.2*	13.8*	75.2*	23.3*	84.1#	30.9*
	FCK = 20 MPa	54.7*	14.0*	77.3*	23.6*	88.9#	31.8*
h = 15.0 cm	FCK = 15 MPa	50.3*	13.7*	71.1*	23.1*	75.1#	29.2*
	FCK = 18 MPa	55.2*	14.4*	78.0*	24.1*	90.3#	32.0*
	FCK = 20 MPa	56.8*	14.6*	80.3*	24.5*	95.4#	32.9*



T E L A L 283 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	23.4	5.9*	46.7	10.0*	70.1	12.7*
	FCK = 18 MPa	23.4	6.2*	46.9	10.5*	70.3	13.9*
	FCK = 20 MPa	23.5	6.3*	46.9	10.6*	70.4	14.3*
h = 7.5 cm	FCK = 15 MPa	23.9	6.4*	47.9	10.8*	71.8	13.7*
	FCK = 18 MPa	24.0	6.7*	48.0	11.3*	72.0	15.0*
	FCK = 20 MPa	24.0	6.8*	48.1	11.5*	72.1	15.4*
h = 8.0 cm	FCK = 15 MPa	24.5	6.9*	48.9	11.6*	73.4	14.7*
	FCK = 18 MPa	24.5	7.2*	49.1	12.2*	73.6	16.1*
	FCK = 20 MPa	24.7#	7.3*	49.1	12.3*	73.7	16.6*
h = 8.5 cm	FCK = 15 MPa	24.9	7.4*	49.9	12.4*	74.8	15.8*
	FCK = 18 MPa	26.7#	7.7*	50.0	13.0*	75.0	17.3*
	FCK = 20 MPa	28.2#	7.9*	50.1	13.2*	75.1	17.8*
h = 9.0 cm	FCK = 15 MPa	25.4	7.9*	50.7	13.2*	76.1	16.8*
	FCK = 18 MPa	30.2#	8.2*	50.8	13.9*	76.3	18.4*
	FCK = 20 MPa	31.9#	8.4*	50.9	14.1*	76.4	18.9*
h = 9.5 cm	FCK = 15 MPa	28.2#	8.4*	51.5	14.1*	77.3	17.8*
	FCK = 18 MPa	33.9#	8.8*	51.6	14.7*	77.4	19.5*
	FCK = 20 MPa	35.9#	8.9*	51.7	14.9*	77.5	20.1*
h = 10.0 cm	FCK = 15 MPa	31.5#	8.8*	52.2	14.9*	78.3	18.9*
	FCK = 18 MPa	37.9#	9.3*	52.3	15.6*	78.5	20.7*
	FCK = 20 MPa	39.7*	9.4*	52.4	15.8*	78.6	21.3*
h = 10.5 cm	FCK = 15 MPa	35.0#	9.3*	52.9	15.7*	79.3	19.9*
	FCK = 18 MPa	40.8*	9.8*	53.0	16.4*	79.5	21.8*
	FCK = 20 MPa	42.0*	9.9*	53.1	16.7*	79.6	22.4*
h = 11.0 cm	FCK = 15 MPa	38.6#	9.8*	53.5	16.5*	80.2	20.9*
	FCK = 18 MPa	43.0*	10.3*	53.6	17.3*	80.4	22.9*
	FCK = 20 MPa	44.3*	10.4*	53.7	17.5*	80.5	23.6*
h = 11.5 cm	FCK = 15 MPa	41.2*	10.3*	54.0	17.3*	81.0	22.0*
	FCK = 18 MPa	45.3*	10.8*	54.1	18.1*	81.2	24.1*
	FCK = 20 MPa	46.5*	10.9*	54.2	18.4*	81.3	24.8*
h = 12.0 cm	FCK = 15 MPa	43.2*	10.8*	54.5	18.1*	81.8	23.0*
	FCK = 18 MPa	47.5*	11.3*	55.9#	19.0*	82.0	25.2*
	FCK = 20 MPa	48.8*	11.5*	59.1#	19.3*	82.1	25.9*
h = 12.5 cm	FCK = 15 MPa	45.3*	11.3*	55.0	19.0*	82.5	24.0*
	FCK = 18 MPa	49.7*	11.8*	61.0#	19.9*	82.7	26.4*
	FCK = 20 MPa	51.1*	12.0*	64.4#	20.1*	82.8	27.1*
h = 13.0 cm	FCK = 15 MPa	47.3*	11.8*	55.5	19.8*	83.2	25.1*
	FCK = 18 MPa	51.9*	12.3*	66.2#	20.7*	83.4	27.5*
	FCK = 20 MPa	53.4*	12.5*	70.0#	21.0*	83.5	28.3*
h = 13.5 cm	FCK = 15 MPa	49.3*	12.2*	59.7#	20.6*	83.9	26.1*
	FCK = 18 MPa	54.1*	12.8*	71.7#	21.6*	84.0	28.6*
	FCK = 20 MPa	55.7*	13.0*	75.8#	21.9*	84.1	29.4*
h = 14.0 cm	FCK = 15 MPa	51.4*	12.7*	64.4#	21.4*	84.4	27.2*
	FCK = 18 MPa	56.4*	13.3*	77.4#	22.4*	84.6	29.8*
	FCK = 20 MPa	58.0*	13.5*	81.8#	22.8*	84.7	30.6*
h = 14.5 cm	FCK = 15 MPa	53.4*	13.2*	69.4#	22.2*	85.0	28.2*
	FCK = 18 MPa	58.6*	13.8*	82.9*	23.3*	85.2	30.9*
	FCK = 20 MPa	60.3*	14.0*	85.2*	23.6*	88.1#	31.8*
h = 15.0 cm	FCK = 15 MPa	55.4*	13.7*	74.5#	23.1*	85.5	29.2*
	FCK = 18 MPa	60.8*	14.4*	86.0*	24.1*	89.5#	32.0*
	FCK = 20 MPa	62.6*	14.6*	88.5*	24.5*	94.6#	32.9*

T E L A L 335 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	22.3	6.2*	44.7	9.6*	67.0	13.0*
	FCK = 18 MPa	22.4	6.8*	44.8	10.0*	67.2	13.6*
	FCK = 20 MPa	22.4	7.0*	44.9	10.2*	67.3	13.8*
h = 7.5 cm	FCK = 15 MPa	23.0	6.7*	46.1	10.4*	69.1	14.0*
	FCK = 18 MPa	23.1	7.4*	46.2	10.9*	69.3	14.7*
	FCK = 20 MPa	23.1	7.6*	46.3	11.0*	69.4	14.9*
h = 8.0 cm	FCK = 15 MPa	23.7	7.3*	47.3	11.1*	71.0	15.1*
	FCK = 18 MPa	23.7	8.0*	47.5	11.7*	71.2	15.8*
	FCK = 20 MPa	23.8	8.2*	47.6	11.9*	71.3	16.1*
h = 8.5 cm	FCK = 15 MPa	24.2	7.8*	48.5	11.9*	72.7	16.2*
	FCK = 18 MPa	25.3#	8.5*	48.6	12.5*	72.9	17.0*
	FCK = 20 MPa	26.7#	8.8*	48.7	12.7*	73.1	17.2*
h = 9.0 cm	FCK = 15 MPa	24.8	8.3*	49.5	12.7*	74.3	17.3*
	FCK = 18 MPa	28.7#	9.1*	49.7	13.3*	74.5	18.1*
	FCK = 20 MPa	30.3#	9.3*	49.7	13.5*	74.6	18.3*
h = 9.5 cm	FCK = 15 MPa	26.9#	8.8*	50.5	13.5*	75.8	18.3*
	FCK = 18 MPa	32.3#	9.7*	50.6	14.2*	75.9	19.2*
	FCK = 20 MPa	34.2#	9.9*	50.7	14.4*	76.1	19.5*
h = 10.0 cm	FCK = 15 MPa	30.1#	9.3*	51.4	14.3*	77.1	19.4*
	FCK = 18 MPa	36.2#	10.2*	51.5	15.0*	77.3	20.3*
	FCK = 20 MPa	38.3#	10.5*	51.6	15.2*	77.4	20.6*
h = 10.5 cm	FCK = 15 MPa	33.5#	9.8*	52.2	15.1*	78.3	20.5*
	FCK = 18 MPa	40.1*	10.8*	52.3	15.8*	78.5	21.5*
	FCK = 20 MPa	41.2*	11.1*	52.4	16.1*	78.6	21.8*
h = 11.0 cm	FCK = 15 MPa	37.1#	10.4*	52.9	15.9*	79.4	21.6*
	FCK = 18 MPa	42.4*	11.4*	53.1	16.7*	79.6	22.6*
	FCK = 20 MPa	43.6*	11.7*	53.1	16.9*	79.7	22.9*
h = 11.5 cm	FCK = 15 MPa	40.6*	10.9*	53.6	16.7*	80.4	22.7*
	FCK = 18 MPa	44.6*	11.9*	53.7	17.5*	80.6	23.7*
	FCK = 20 MPa	45.9*	12.3*	53.8	17.8*	80.7	24.1*
h = 12.0 cm	FCK = 15 MPa	42.7*	11.4*	54.3	17.5*	81.4	23.7*
	FCK = 18 MPa	46.9*	12.5*	54.4	18.3*	81.6	24.9*
	FCK = 20 MPa	48.2*	12.8*	56.9#	18.6*	81.7	25.2*
h = 12.5 cm	FCK = 15 MPa	44.8*	11.9*	54.9	18.3*	82.3	24.8*
	FCK = 18 MPa	49.2*	13.1*	58.8#	19.2*	82.5	26.0*
	FCK = 20 MPa	50.6*	13.4*	62.2#	19.5*	82.6	26.4*
h = 13.0 cm	FCK = 15 MPa	46.8*	12.4*	55.4	19.1*	83.1	25.9*
	FCK = 18 MPa	51.4*	13.6*	64.0#	20.0*	83.3	27.1*
	FCK = 20 MPa	52.9*	14.0*	67.7#	20.3*	83.4	27.5*
h = 13.5 cm	FCK = 15 MPa	48.9*	13.0*	57.7#	19.9*	83.9	27.0*
	FCK = 18 MPa	53.7*	14.2*	69.4#	20.8*	84.1	28.3*
	FCK = 20 MPa	55.2*	14.6*	73.4#	21.1*	84.2	28.7*
h = 14.0 cm	FCK = 15 MPa	51.0*	13.5*	62.4#	20.7*	84.7	28.1*
	FCK = 18 MPa	56.0*	14.8*	75.0#	21.7*	84.8	29.4*
	FCK = 20 MPa	57.6*	15.2*	79.3#	22.0*	84.9	29.8*
h = 14.5 cm	FCK = 15 MPa	53.1*	14.0*	67.3#	21.5*	85.4	29.1*
	FCK = 18 MPa	58.3*	15.3*	80.9#	22.5*	85.5	30.5*
	FCK = 20 MPa	59.9*	15.8*	84.7*	22.8*	85.6	31.0*
h = 15.0 cm	FCK = 15 MPa	55.1*	14.5*	72.3#	22.3*	86.0	30.2*
	FCK = 18 MPa	60.5*	15.9*	85.6*	23.4*	86.9#	31.7*
	FCK = 20 MPa	62.3*	16.4*	88.1*	23.7*	91.9#	32.1*



T E L A L 396 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	34.8	8.4*	69.6	13.8*	104.4	15.2#
	FCK = 18 MPa	34.9	8.8*	69.8	14.7*	104.7	18.2#
	FCK = 20 MPa	35.0	8.9*	69.9	14.9*	104.9	19.0#
h = 7.5 cm	FCK = 15 MPa	35.9	9.1*	71.7	14.9*	107.6	17.6#
	FCK = 18 MPa	36.0	9.5*	72.0	16.0*	107.9	20.1*
	FCK = 20 MPa	36.0	9.5*	72.1	16.2*	108.1	20.6*
h = 8.0 cm	FCK = 15 MPa	36.9	9.8*	73.7	16.1*	110.6	19.7*
	FCK = 18 MPa	37.0	10.2*	73.9	17.2*	110.9	21.6*
	FCK = 20 MPa	37.0	10.4*	74.1	17.5*	111.1	22.2*
h = 8.5 cm	FCK = 15 MPa	37.8	10.5*	75.5	17.3*	113.2	21.1*
	FCK = 18 MPa	37.9	11.0*	75.7	18.5*	113.6	23.2*
	FCK = 20 MPa	37.9	11.1*	75.8	18.7*	113.8	23.9*
h = 9.0 cm	FCK = 15 MPa	38.6	11.2*	77.1	18.4*	115.7	22.6*
	FCK = 18 MPa	38.7	11.7*	77.3	19.7*	116.0	24.8*
	FCK = 20 MPa	38.7	11.9*	77.5	20.0*	116.2	25.5*
h = 9.5 cm	FCK = 15 MPa	39.3	11.9*	78.6	19.6*	117.9	24.0*
	FCK = 18 MPa	39.4	12.5*	78.8	21.0*	118.2	26.3*
	FCK = 20 MPa	39.5	12.6*	79.0	21.3*	118.4	27.1*
h = 10.0 cm	FCK = 15 MPa	40.0	12.6*	80.0	20.8*	120.0	25.4*
	FCK = 18 MPa	40.1	13.2*	80.2	22.2*	120.3	27.9*
	FCK = 20 MPa	40.2	13.4*	80.3	22.5*	120.5	28.7*
h = 10.5 cm	FCK = 15 MPa	40.6	13.3*	81.3	21.9*	121.9	26.9*
	FCK = 18 MPa	40.8#	13.9*	81.5	23.5*	122.2	29.5*
	FCK = 20 MPa	43.1#	14.1*	81.6	23.8*	122.4	30.3*
h = 11.0 cm	FCK = 15 MPa	41.2	14.0*	82.4	23.1*	123.6	28.3*
	FCK = 18 MPa	45.1#	14.7*	82.6	24.7*	124.0	31.0*
	FCK = 20 MPa	47.7#	14.9*	82.8	25.1*	124.1	31.9*
h = 11.5 cm	FCK = 15 MPa	41.8	14.7*	83.5	24.3*	125.3	29.7*
	FCK = 18 MPa	49.6#	15.4*	83.7	26.0*	125.6	32.6*
	FCK = 20 MPa	52.5#	15.7*	83.8	26.3*	125.8	33.5*
h = 12.0 cm	FCK = 15 MPa	45.2#	15.4*	84.5	25.4*	126.8	31.2*
	FCK = 18 MPa	54.4#	16.2*	84.7	27.2*	127.1	34.2*
	FCK = 20 MPa	57.5#	16.4*	84.9	27.6*	127.3	35.1*
h = 12.5 cm	FCK = 15 MPa	49.3#	16.1*	85.5	26.6*	128.2	32.6*
	FCK = 18 MPa	59.4#	16.9*	85.7	28.5*	128.5	35.7*
	FCK = 20 MPa	62.7#	17.2*	85.8	28.9*	128.7	36.8*
h = 13.0 cm	FCK = 15 MPa	53.7#	16.9*	86.4	27.8*	129.5	34.0*
	FCK = 18 MPa	64.6#	17.7*	86.6	29.7*	129.8	37.3*
	FCK = 20 MPa	67.0*	17.9*	86.7	30.1*	130.0	38.4*
h = 13.5 cm	FCK = 15 MPa	58.2#	17.6*	87.2	29.0*	130.8	35.5*
	FCK = 18 MPa	67.9*	18.4*	87.4	31.0*	131.1	38.9*
	FCK = 20 MPa	69.9*	18.7*	87.5	31.4*	131.3	40.0*
h = 14.0 cm	FCK = 15 MPa	62.9#	18.3*	88.0	30.1*	132.0	36.9*
	FCK = 18 MPa	70.8*	19.2*	88.2	32.2*	132.3	40.5*
	FCK = 20 MPa	72.8*	19.4*	88.3	32.7*	132.4	41.6*
h = 14.5 cm	FCK = 15 MPa	67.1*	19.0*	88.7	31.3*	133.1	38.3*
	FCK = 18 MPa	73.6*	19.9*	88.9	33.5*	133.4	42.0*
	FCK = 20 MPa	75.7*	20.2*	89.0	33.9*	133.5	43.2*
h = 15.0 cm	FCK = 15 MPa	69.7*	19.7*	89.4	32.5*	134.1	39.8*
	FCK = 18 MPa	76.5*	20.6*	89.6	34.7*	134.4	43.6*
	FCK = 20 MPa	78.7*	20.9*	92.5#	35.2*	134.6	44.8*

T E L A L 503 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	45.4	9.3*	90.9	15.0#	136.0	16.0
	FCK = 18 MPa	45.6	9.7*	91.2	16.4*	136.9	18.0#
	FCK = 20 MPa	45.7	9.9*	91.4	16.6*	137.0	19.0#
h = 7.5 cm	FCK = 15 MPa	47.1	10.1*	94.2	16.0*	141.3	17.4#
	FCK = 18 MPa	47.3	10.6*	94.5	17.8*	141.8	20.9#
	FCK = 20 MPa	47.4	10.7*	94.7	18.0*	142.1	22.1#
h = 8.0 cm	FCK = 15 MPa	48.6	10.9*	97.3	17.6*	145.9	20.0#
	FCK = 18 MPa	48.8	11.4*	97.6	19.2*	146.4	23.7*
	FCK = 20 MPa	48.9	11.6*	97.8	19.4*	146.7	24.3*
h = 8.5 cm	FCK = 15 MPa	50.0	11.7*	100.0	18.9*	150.1	22.8#
	FCK = 18 MPa	50.2	12.3*	100.4	20.6*	150.5	25.4*
	FCK = 20 MPa	50.3	12.4*	100.5	20.9*	150.8	26.1*
h = 9.0 cm	FCK = 15 MPa	51.3	12.5*	102.6	20.2*	153.9	24.7*
	FCK = 18 MPa	51.5	13.1*	102.9	22.0*	154.4	27.1*
	FCK = 20 MPa	51.5	13.2*	103.1	22.3*	154.6	27.9*
h = 9.5 cm	FCK = 15 MPa	52.5	13.3*	104.9	21.5*	157.4	26.3*
	FCK = 18 MPa	52.6	13.9*	105.2	23.4*	157.9	28.9*
	FCK = 20 MPa	52.7	14.1*	105.4	23.7*	158.1	29.7*
h = 10.0 cm	FCK = 15 MPa	53.5	14.1*	107.1	22.8*	160.6	27.9*
	FCK = 18 MPa	53.7	14.7*	107.4	24.8*	161.1	30.6*
	FCK = 20 MPa	53.8	14.9*	107.6	25.1*	161.4	31.4*
h = 10.5 cm	FCK = 15 MPa	54.5	14.8*	109.1	24.1*	163.6	29.5*
	FCK = 18 MPa	54.7	15.6*	109.4	26.2*	164.1	32.3*
	FCK = 20 MPa	54.8	15.8*	109.6	26.6*	164.4	33.2*
h = 11.0 cm	FCK = 15 MPa	55.5	15.6*	110.9	25.3*	166.4	31.0*
	FCK = 18 MPa	55.6	16.4*	111.3	27.6*	166.9	34.1*
	FCK = 20 MPa	55.7	16.6*	111.4	28.0*	167.2	35.0*
h = 11.5 cm	FCK = 15 MPa	56.3	16.4*	112.7	26.6*	169.0	32.6*
	FCK = 18 MPa	56.5	17.2*	113.0	29.0*	169.5	35.8*
	FCK = 20 MPa	56.6	17.5*	113.2	29.4*	169.7	36.8*
h = 12.0 cm	FCK = 15 MPa	57.1	17.2*	114.3	27.9*	171.4	34.2*
	FCK = 18 MPa	57.3	18.1*	114.6	30.4*	171.9	37.5*
	FCK = 20 MPa	57.4	18.3*	114.8	30.8*	172.2	38.6*
h = 12.5 cm	FCK = 15 MPa	57.9	18.0*	115.8	29.2*	173.7	35.8*
	FCK = 18 MPa	58.1#	18.9*	116.1	31.8*	174.2	39.3*
	FCK = 20 MPa	61.4#	19.2*	116.3	32.3*	174.4	40.4*
h = 13.0 cm	FCK = 15 MPa	58.6	18.8*	117.2	30.5*	175.8	37.4*
	FCK = 18 MPa	63.2#	19.7*	117.5	33.2*	176.3	41.0*
	FCK = 20 MPa	66.8#	20.0*	117.7	33.7*	176.5	42.2*
h = 13.5 cm	FCK = 15 MPa	59.3	19.6*	118.5	31.8*	177.8	39.0*
	FCK = 18 MPa	68.5#	20.6*	118.8	34.6*	178.3	42.7*
	FCK = 20 MPa	72.5#	20.9*	119.0	35.1*	178.5	43.9*
h = 14.0 cm	FCK = 15 MPa	61.6#	20.4*	119.8	33.1*	179.7	40.6*
	FCK = 18 MPa	74.1#	21.4*	120.1	36.0*	180.1	44.5*
	FCK = 20 MPa	78.3#	21.7*	120.3	36.5*	180.4	45.7*
h = 14.5 cm	FCK = 15 MPa	66.4#	21.2*	121.0	34.4*	181.5	42.1*
	FCK = 18 MPa	79.9#	22.3*	121.3	37.4*	181.9	46.2*
	FCK = 20 MPa	84.5#	22.6*	121.5	38.0*	182.2	47.5*
h = 15.0 cm	FCK = 15 MPa	71.4#	22.0*	122.1	35.7*	183.1	43.7*
	FCK = 18 MPa	85.9#	23.1*	122.4	38.8*	183.6	48.0*
	FCK = 20 MPa	90.8#	23.4*	122.6	39.4*	183.8	49.3*



T E L A L 636 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	58.1	9.3*	116.1	15.0*	174.2	16.0
	FCK = 18 MPa	58.3	9.7*	116.6	16.4*	174.9	18.0*
	FCK = 20 MPa	58.4	9.9*	116.8	16.6*	175.3	19.0*
h = 7.5 cm	FCK = 15 MPa	60.6	10.1*	121.2	16.3*	181.8	17.4*
	FCK = 18 MPa	60.6	10.6*	121.6	17.8*	182.4	20.9*
	FCK = 20 MPa	60.9	10.7*	121.9	18.0*	182.8	22.1*
h = 8.0 cm	FCK = 15 MPa	62.9	10.9*	125.8	17.6*	188.4	20.0*
	FCK = 18 MPa	63.1	11.4*	126.2	19.2*	189.3	23.7*
	FCK = 20 MPa	63.2	11.6*	126.5	19.4*	189.7	24.3*
h = 8.5 cm	FCK = 15 MPa	65.0	11.7*	130.0	18.9*	195.0	22.8*
	FCK = 18 MPa	65.2	12.2*	130.4	20.6*	195.4	25.4*
	FCK = 20 MPa	65.3	12.4*	130.7	20.9*	196.0	26.1*
h = 9.0 cm	FCK = 15 MPa	66.9	12.5*	133.9	20.2*	200.8	24.7*
	FCK = 18 MPa	67.2	13.1*	134.3	22.0*	201.5	27.1*
	FCK = 20 MPa	67.3	13.2*	134.6	22.3*	201.9	27.9*
h = 9.5 cm	FCK = 15 MPa	68.7	13.3*	137.4	21.5*	206.2	26.3*
	FCK = 18 MPa	68.9	13.9*	137.9	23.4*	206.8	28.9*
	FCK = 20 MPa	69.1	14.1*	138.2	23.7*	207.2	29.7*
h = 10.0 cm	FCK = 15 MPa	70.4	14.1*	140.8	22.8*	211.1	27.9*
	FCK = 18 MPa	70.6	14.7*	141.2	24.8*	211.8	30.6*
	FCK = 20 MPa	70.7	14.9*	141.5	25.1*	212.2	31.4*
h = 10.5 cm	FCK = 15 MPa	71.9	14.8*	143.8	24.1*	215.8	29.5*
	FCK = 18 MPa	72.1	15.6*	144.3	26.2*	216.4	32.3*
	FCK = 20 MPa	72.3	15.8*	144.6	26.6*	216.8	33.2*
h = 11.0 cm	FCK = 15 MPa	73.4	15.6*	146.7	25.3*	220.1	31.0*
	FCK = 18 MPa	73.6	16.4*	147.2	27.6*	220.8	34.1*
	FCK = 20 MPa	73.7	16.6*	147.4	28.0*	221.2	35.0*
h = 11.5 cm	FCK = 15 MPa	74.7	16.4*	149.4	26.6*	224.1	32.6*
	FCK = 18 MPa	74.9	17.2*	149.9	29.0*	224.8	35.8*
	FCK = 20 MPa	75.1	17.5*	150.1	29.4*	225.2	36.8*
h = 12.0 cm	FCK = 15 MPa	76.0	17.2*	151.9	27.9*	227.9	34.2*
	FCK = 18 MPa	76.2	18.1*	152.4	30.4*	228.6	37.5*
	FCK = 20 MPa	76.3	18.3*	152.6	30.8*	229.0	38.6*
h = 12.5 cm	FCK = 15 MPa	77.1	18.0*	154.3	29.2*	231.4	35.8*
	FCK = 18 MPa	77.4	18.9*	154.7	31.8*	232.1	39.3*
	FCK = 20 MPa	77.5	19.2*	155.0	32.3*	232.5	40.4*
h = 13.0 cm	FCK = 15 MPa	78.2	18.8*	156.5	30.5*	234.7	37.4*
	FCK = 18 MPa	78.5	19.7*	156.9	33.2*	235.4	41.0*
	FCK = 20 MPa	78.6	20.0*	157.2	33.7*	235.8	42.2*
h = 13.5 cm	FCK = 15 MPa	79.3	19.6*	158.6	31.8*	237.9	39.0*
	FCK = 18 MPa	79.5	20.6*	159.0	34.6*	238.6	42.7*
	FCK = 20 MPa	79.6	20.9*	159.3	35.1*	238.9	43.9*
h = 14.0 cm	FCK = 15 MPa	80.3	20.4*	160.6	33.1*	240.8	40.6*
	FCK = 18 MPa	80.5	21.4*	161.0	36.0*	241.5	44.5*
	FCK = 20 MPa	80.6	21.7*	161.3	36.5*	241.9	45.7*
h = 14.5 cm	FCK = 15 MPa	81.2	21.2*	162.4	34.4*	243.6	42.1*
	FCK = 18 MPa	81.4	22.3*	162.9	37.4*	244.3	46.2*
	FCK = 20 MPa	82.7*	22.6*	163.1	38.0*	244.7	47.5*
h = 15.0 cm	FCK = 15 MPa	82.1	22.0*	164.2	35.7*	246.3	43.7*
	FCK = 18 MPa	84.1*	23.1*	164.6	38.8*	247.0	48.0*
	FCK = 20 MPa	88.9*	23.4*	164.9	39.4*	247.3	49.3*

T E L A LA 335 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	22.3	6.2*	44.7	9.6*	67.0	13.0*
	FCK = 18 MPa	22.4	6.8*	44.8	10.0*	67.2	13.6*
	FCK = 20 MPa	22.4	7.0*	44.9	10.2*	67.3	13.8*
h = 7.5 cm	FCK = 15 MPa	23.0	6.7*	46.1	10.4*	69.1	14.0*
	FCK = 18 MPa	23.1	7.4*	46.2	10.9*	69.3	14.7*
	FCK = 20 MPa	23.1	7.6*	46.3	11.0*	69.4	14.9*
h = 8.0 cm	FCK = 15 MPa	23.7	7.3*	47.3	11.1*	71.0	15.1*
	FCK = 18 MPa	23.7	8.0*	47.5	11.7*	71.2	15.8*
	FCK = 20 MPa	23.8	8.2*	47.6	11.9*	71.3	16.1*
h = 8.5 cm	FCK = 15 MPa	24.2	7.8*	48.5	11.9*	72.7	16.2*
	FCK = 18 MPa	25.3*	8.5*	48.6	12.5*	72.9	17.0*
	FCK = 20 MPa	26.7*	8.8*	48.7	12.7*	73.1	17.2*
h = 9.0 cm	FCK = 15 MPa	24.8	8.3*	49.5	12.7*	74.3	17.3*
	FCK = 18 MPa	28.7*	9.1*	49.7	13.3*	74.5	18.1*
	FCK = 20 MPa	30.3*	9.3*	49.7	13.5*	74.6	18.3*
h = 9.5 cm	FCK = 15 MPa	26.9*	8.8*	50.5	13.5*	75.8	18.3*
	FCK = 18 MPa	32.3*	9.7*	50.6	14.2*	75.9	19.2*
	FCK = 20 MPa	34.2*	9.9*	50.7	14.4*	76.1	19.5*
h = 10.0 cm	FCK = 15 MPa	30.1*	9.3*	51.4	14.3*	77.1	19.4*
	FCK = 18 MPa	36.2*	10.2*	51.5	15.0*	77.3	20.3*
	FCK = 20 MPa	38.3*	10.5*	51.6	15.2*	77.4	20.6*
h = 10.5 cm	FCK = 15 MPa	33.5*	9.8*	52.2	15.1*	78.3	20.5*
	FCK = 18 MPa	40.1*	10.8*	52.3	15.8*	78.5	21.5*
	FCK = 20 MPa	41.2*	11.1*	52.4	16.1*	78.6	21.8*
h = 11.0 cm	FCK = 15 MPa	37.1*	10.4*	52.9	15.9*	79.4	21.6*
	FCK = 18 MPa	42.4*	11.4*	53.1	16.7*	79.6	22.6*
	FCK = 20 MPa	43.6*	11.7*	53.1	16.9*	79.7	22.9*
h = 11.5 cm	FCK = 15 MPa	40.6*	10.9*	53.6	16.7*	80.4	22.7*
	FCK = 18 MPa	44.6*	11.9*	53.7	17.5*	80.6	23.7*
	FCK = 20 MPa	45.9*	12.3*	53.8	17.8*	80.7	24.1*
h = 12.0 cm	FCK = 15 MPa	42.7*	11.4*	54.3	17.5*	81.4	23.7*
	FCK = 18 MPa	46.9*	12.5*	54.4	18.3*	81.6	24.9*
	FCK = 20 MPa	48.2*	12.8*	56.9*	18.6*	81.7	25.2*
h = 12.5 cm	FCK = 15 MPa	44.8*	11.9*	54.9	18.3*	82.3	24.8*
	FCK = 18 MPa	49.2*	13.1*	58.8*	19.2*	82.5	26.0*
	FCK = 20 MPa	50.6*	13.4*	62.2*	19.5*	82.6	26.4*
h = 13.0 cm	FCK = 15 MPa	46.8*	12.4*	55.4	19.1*	83.1	25.9*
	FCK = 18 MPa	51.4*	13.6*	64.0*	20.0*	83.3	27.1*
	FCK = 20 MPa	52.9*	14.0*	67.7*	20.3*	83.4	27.5*
h = 13.5 cm	FCK = 15 MPa	48.9*	13.0*	57.7*	19.9*	83.9	27.0*
	FCK = 18 MPa	53.7*	14.2*	69.4*	20.8*	84.1	28.3*
	FCK = 20 MPa	55.2*	14.6*	73.4*	21.1*	84.2	28.7*
h = 14.0 cm	FCK = 15 MPa	51.0*	13.5*	62.4*	20.7*	84.7	28.1*
	FCK = 18 MPa	56.0*	14.8*	75.0*	21.7*	84.8	29.4*
	FCK = 20 MPa	57.6*	15.2*	79.3*	22.0*	84.9	29.8*
h = 14.5 cm	FCK = 15 MPa	53.1*	14.0*	67.3*	21.5*	85.4	29.1*
	FCK = 18 MPa	58.3*	15.3*	80.9*	22.5*	85.5	30.5*
	FCK = 20 MPa	59.9*	15.6*	84.7*	22.8*	85.6	31.0*
h = 15.0 cm	FCK = 15 MPa	55.1*	14.5*	72.3*	22.3*	86.0	30.2*
	FCK = 18 MPa	60.5*	15.9*	85.6*	23.4*	86.9*	31.7*
	FCK = 20 MPa	62.3*	16.4*	88.1*	23.7*	91.9*	32.1*



T E L A LA 396 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	34.8	8.4*	69.6	13.8*	104.4	15.2#
	FCK = 18 MPa	34.9	8.8*	69.8	14.7*	104.7	18.2#
	FCK = 20 MPa	35.0	8.9*	69.9	14.9*	104.9	19.0*
h = 7.5 cm	FCK = 15 MPa	35.9	9.1*	71.7	14.9*	107.6	17.6#
	FCK = 18 MPa	36.0	9.5*	72.0	16.0*	107.9	20.1*
	FCK = 20 MPa	36.0	9.6*	72.1	16.2*	108.1	20.6*
h = 8.0 cm	FCK = 15 MPa	36.9	9.8*	73.7	16.1*	110.6	19.7*
	FCK = 18 MPa	37.0	10.2*	73.9	17.2*	110.9	21.6*
	FCK = 20 MPa	37.0	10.4*	74.1	17.5*	111.1	22.2*
h = 8.5 cm	FCK = 15 MPa	37.8	10.5*	75.5	17.3*	113.2	21.1*
	FCK = 18 MPa	37.9	11.0*	75.7	18.5*	113.6	23.2*
	FCK = 20 MPa	37.9	11.1*	75.8	18.7*	113.8	23.9*
h = 9.0 cm	FCK = 15 MPa	38.6	11.2*	77.1	18.4*	115.7	22.6*
	FCK = 18 MPa	38.7	11.7*	77.3	19.7*	116.0	24.8*
	FCK = 20 MPa	38.7	11.9*	77.5	20.0*	116.2	25.5*
h = 9.5 cm	FCK = 15 MPa	39.3	11.9*	78.6	19.6*	117.9	24.0*
	FCK = 18 MPa	39.4	12.5*	78.8	21.0*	118.2	26.3*
	FCK = 20 MPa	39.5	12.6*	79.0	21.3*	118.4	27.1*
h = 10.0 cm	FCK = 15 MPa	40.0	12.6*	80.0	20.8*	120.0	25.4*
	FCK = 18 MPa	40.1	13.2*	80.2	22.2*	120.3	27.9*
	FCK = 20 MPa	40.2	13.4*	80.3	22.5*	120.5	28.7*
h = 10.5 cm	FCK = 15 MPa	40.6	13.3*	81.3	21.9*	121.9	26.9*
	FCK = 18 MPa	40.8#	13.9*	81.5	23.5*	122.2	29.5*
	FCK = 20 MPa	43.1#	14.1*	81.6	23.8*	122.4	30.3*
h = 11.0 cm	FCK = 15 MPa	41.2	14.0*	82.4	23.1*	123.6	28.3*
	FCK = 18 MPa	45.1#	14.7*	82.6	24.7*	124.0	31.0*
	FCK = 20 MPa	47.7#	14.9*	82.8	25.1*	124.1	31.9*
h = 11.5 cm	FCK = 15 MPa	41.8	14.7*	83.5	24.3*	125.3	29.7*
	FCK = 18 MPa	49.6#	15.4*	83.7	26.0*	125.6	32.6*
	FCK = 20 MPa	52.5#	15.7*	83.8	26.3*	125.8	33.5*
h = 12.0 cm	FCK = 15 MPa	45.2#	15.4*	84.5	25.4*	126.8	31.2*
	FCK = 18 MPa	54.4#	16.2*	84.7	27.2*	127.1	34.2*
	FCK = 20 MPa	57.5#	16.4*	84.9	27.6*	127.3	35.1*
h = 12.5 cm	FCK = 15 MPa	49.3#	16.1*	85.5	26.6*	128.2	32.6*
	FCK = 18 MPa	59.4#	16.9*	85.7	28.5*	128.5	35.7*
	FCK = 20 MPa	62.7#	17.2*	85.8	28.9*	128.7	36.8*
h = 13.0 cm	FCK = 15 MPa	53.7#	16.9*	86.4	27.8*	129.5	34.0*
	FCK = 18 MPa	64.6#	17.7*	86.6	29.7*	129.8	37.3*
	FCK = 20 MPa	67.0*	17.9*	86.7	30.1*	130.0	38.4*
h = 13.5 cm	FCK = 15 MPa	58.2#	17.6*	87.2	29.0*	130.8	35.5*
	FCK = 18 MPa	67.9#	18.4*	87.4	31.0*	131.1	38.9*
	FCK = 20 MPa	69.9*	18.7*	87.5	31.4*	131.3	40.0*
h = 14.0 cm	FCK = 15 MPa	62.9#	18.3*	88.0	30.1*	132.0	36.9*
	FCK = 18 MPa	70.8#	19.2*	88.2	32.2*	132.3	40.5*
	FCK = 20 MPa	72.8*	19.4*	88.3	32.7*	132.4	41.6*
h = 14.5 cm	FCK = 15 MPa	67.1*	19.0*	88.7	31.3*	133.1	38.3*
	FCK = 18 MPa	73.6*	19.9*	88.9	33.5*	133.4	42.0*
	FCK = 20 MPa	75.7*	20.2*	89.0	33.9*	133.5	43.2*
h = 15.0 cm	FCK = 15 MPa	69.7*	19.7*	89.4	32.5*	134.1	39.8*
	FCK = 18 MPa	76.5*	20.6*	89.6	34.7*	134.4	43.6*
	FCK = 20 MPa	78.7*	20.9*	92.5#	35.2*	134.6	44.8*

T E L A LA 503 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	45.4	9.3*	90.9	15.0#	136.3	16.0
	FCK = 18 MPa	45.6	9.7*	91.2	16.4*	136.8	18.0#
	FCK = 20 MPa	45.7	9.9*	91.4	16.6*	137.0	19.0#
h = 7.5 cm	FCK = 15 MPa	47.1	10.1*	94.2	16.3*	141.3	17.4#
	FCK = 18 MPa	47.3	10.6*	94.5	17.8*	141.8	20.9#
	FCK = 20 MPa	47.4	10.7*	94.7	18.0*	142.1	22.1#
h = 8.0 cm	FCK = 15 MPa	48.6	10.9*	97.3	17.6*	145.9	20.0#
	FCK = 18 MPa	48.8	11.4*	97.6	19.2*	146.4	23.7*
	FCK = 20 MPa	48.9	11.6*	97.8	19.4*	146.7	24.3*
h = 8.5 cm	FCK = 15 MPa	50.0	11.7*	100.0	18.9*	150.1	22.8#
	FCK = 18 MPa	50.2	12.2*	100.4	20.6*	150.5	25.4*
	FCK = 20 MPa	50.3	12.4*	100.5	20.9*	150.8	26.1*
h = 9.0 cm	FCK = 15 MPa	51.3	12.5*	102.6	20.2*	153.9	24.7*
	FCK = 18 MPa	51.5	13.1*	102.9	22.0*	154.4	27.1*
	FCK = 20 MPa	51.5	13.2*	103.1	22.3*	154.6	27.9*
h = 9.5 cm	FCK = 15 MPa	52.5	13.3*	104.9	21.5*	157.4	26.3*
	FCK = 18 MPa	52.6	13.9*	105.2	23.4*	157.9	28.9*
	FCK = 20 MPa	52.7	14.1*	105.4	23.7*	158.1	29.7*
h = 10.0 cm	FCK = 15 MPa	53.5	14.1*	107.1	22.8*	160.6	27.9*
	FCK = 18 MPa	53.7	14.7*	107.4	24.8*	161.1	30.6*
	FCK = 20 MPa	53.8	14.9*	107.6	25.1*	161.4	31.4*
h = 10.5 cm	FCK = 15 MPa	54.5	14.8*	109.1	24.1*	163.6	29.5*
	FCK = 18 MPa	54.7	15.6*	109.4	26.2*	164.1	32.3*
	FCK = 20 MPa	54.8	15.8*	109.6	26.6*	164.4	33.2*
h = 11.0 cm	FCK = 15 MPa	55.5	15.6*	110.9	25.3*	166.4	31.0*
	FCK = 18 MPa	55.6	16.4*	111.3	27.6*	166.9	34.1*
	FCK = 20 MPa	55.7	16.6*	111.4	28.0*	167.2	35.0*
h = 11.5 cm	FCK = 15 MPa	56.3	16.4*	112.7	26.6*	169.0	32.6*
	FCK = 18 MPa	56.5	17.2*	113.0	29.0*	169.5	35.8*
	FCK = 20 MPa	56.6	17.5*	113.2	29.4*	169.7	36.8*
h = 12.0 cm	FCK = 15 MPa	57.1	17.2*	114.3	27.9*	171.4	34.2*
	FCK = 18 MPa	57.3	18.1*	114.6	30.4*	171.9	37.5*
	FCK = 20 MPa	57.4	18.3*	114.8	30.8*	172.2	38.6*
h = 12.5 cm	FCK = 15 MPa	57.9	18.0*	115.8	29.2*	173.7	35.8*
	FCK = 18 MPa	58.1#	18.9*	116.1	31.8*	174.2	39.3*
	FCK = 20 MPa	61.4#	19.2*	116.3	32.3*	174.4	40.4*
h = 13.0 cm	FCK = 15 MPa	58.6	18.8*	117.2	30.5*	175.8	37.4*
	FCK = 18 MPa	63.2#	19.7*	117.5	33.2*	176.3	41.0*
	FCK = 20 MPa	66.8#	20.0*	117.7	33.7*	176.5	42.2*
h = 13.5 cm	FCK = 15 MPa	59.3	19.6*	118.5	31.8*	177.8	39.0*
	FCK = 18 MPa	68.5#	20.6*	118.8	34.6*	178.3	42.7*
	FCK = 20 MPa	72.5#	20.9*	119.0	35.1*	178.5	43.9*
h = 14.0 cm	FCK = 15 MPa	61.4#	20.4*	119.8	33.1*	179.7	40.6*
	FCK = 18 MPa	74.1#	21.4*	120.1	36.0*	180.1	44.5*
	FCK = 20 MPa	78.3#	21.7*	120.3	36.5*	180.4	45.7*
h = 14.5 cm	FCK = 15 MPa	66.4#	21.2*	121.0	34.4*	181.5	42.1*
	FCK = 18 MPa	79.9#	22.3*	121.3	37.4*	181.9	46.2*
	FCK = 20 MPa	84.5#	22.6*	121.5	38.0*	182.2	47.5*
h = 15.0 cm	FCK = 15 MPa	71.4#	22.0*	122.1	35.7*	183.1	43.7*
	FCK = 18 MPa	85.9#	23.1*	122.4	38.8*	183.6	48.0*
	FCK = 20 MPa	90.8#	23.4*	122.6	39.4*	183.8	49.3*



T E L A LA 636 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	58.1	9.3*	116.1	15.0#	174.2	16.0
	FCK = 18 MPa	58.3	9.7*	116.6	16.4*	174.9	18.0#
	FCK = 20 MPa	58.4	9.9*	116.8	16.6*	175.3	19.0#
h = 7.5 cm	FCK = 15 MPa	60.6	10.1*	121.2	16.3*	181.8	17.4#
	FCK = 18 MPa	60.6	10.6*	121.6	17.9*	182.4	20.9#
	FCK = 20 MPa	60.9	10.7*	121.9	18.0*	182.8	22.1#
h = 8.0 cm	FCK = 15 MPa	62.9	10.9*	125.8	17.6*	188.6	20.0#
	FCK = 18 MPa	63.1	11.4*	126.2	19.2*	189.3	23.7*
	FCK = 20 MPa	63.2	11.6*	126.5	19.4*	189.7	24.3*
h = 8.5 cm	FCK = 15 MPa	65.0	11.7*	130.0	18.9*	195.0	22.8#
	FCK = 18 MPa	65.2	12.2*	130.4	20.6*	195.6	25.4*
	FCK = 20 MPa	65.3	12.4*	130.7	20.9*	196.0	26.1*
h = 9.0 cm	FCK = 15 MPa	66.9	12.5*	133.9	20.2*	200.8	24.7*
	FCK = 18 MPa	67.2	13.1*	134.3	22.0*	201.5	27.1*
	FCK = 20 MPa	67.3	13.2*	134.6	22.3*	201.9	27.9*
h = 9.5 cm	FCK = 15 MPa	68.7	13.3*	137.4	21.5*	206.2	26.3*
	FCK = 18 MPa	68.9	13.9*	137.9	23.4*	206.8	28.9*
	FCK = 20 MPa	69.1	14.1*	138.2	23.7*	207.2	29.7*
h = 10.0 cm	FCK = 15 MPa	70.4	14.1*	140.8	22.8*	211.1	27.9*
	FCK = 18 MPa	70.6	14.7*	141.2	24.8*	211.8	30.6*
	FCK = 20 MPa	70.7	14.9*	141.5	25.1*	212.2	31.4*
h = 10.5 cm	FCK = 15 MPa	71.9	14.8*	143.8	24.1*	215.8	29.5*
	FCK = 18 MPa	72.1	15.6*	144.3	26.2*	216.4	32.3*
	FCK = 20 MPa	72.3	15.8*	144.6	26.6*	216.8	33.2*
h = 11.0 cm	FCK = 15 MPa	73.4	15.6*	146.7	25.3*	220.1	31.0*
	FCK = 18 MPa	73.6	16.4*	147.2	27.6*	220.8	34.1*
	FCK = 20 MPa	73.7	16.6*	147.4	28.0*	221.2	35.0*
h = 11.5 cm	FCK = 15 MPa	74.7	16.4*	149.4	26.6*	224.1	32.6*
	FCK = 18 MPa	74.9	17.2*	149.9	29.0*	224.8	35.8*
	FCK = 20 MPa	75.1	17.5*	150.1	29.4*	225.2	36.8*
h = 12.0 cm	FCK = 15 MPa	76.0	17.2*	151.9	27.9*	227.9	34.2*
	FCK = 18 MPa	76.2	18.1*	152.4	30.4*	228.6	37.5*
	FCK = 20 MPa	76.3	18.3*	152.6	30.8*	229.0	38.6*
h = 12.5 cm	FCK = 15 MPa	77.1	18.0*	154.3	29.2*	231.4	35.8*
	FCK = 18 MPa	77.4	18.9*	154.7	31.8*	232.1	39.3*
	FCK = 20 MPa	77.5	19.2*	155.0	32.3*	232.5	40.4*
h = 13.0 cm	FCK = 15 MPa	78.2	18.8*	156.5	30.5*	234.7	37.4*
	FCK = 18 MPa	78.5	19.7*	156.9	33.2*	235.4	41.0*
	FCK = 20 MPa	78.6	20.0*	157.2	33.7*	235.8	42.2*
h = 13.5 cm	FCK = 15 MPa	79.3	19.6*	158.6	31.8*	237.9	39.0*
	FCK = 18 MPa	79.5	20.6*	159.0	34.6*	238.6	42.7*
	FCK = 20 MPa	79.6	20.9*	159.3	35.1*	238.9	43.9*
h = 14.0 cm	FCK = 15 MPa	80.3	20.4*	160.6	33.1*	240.8	40.6*
	FCK = 18 MPa	80.5	21.4*	161.0	36.0*	241.5	44.5*
	FCK = 20 MPa	80.6	21.7*	161.3	36.5*	241.9	45.7*
h = 14.5 cm	FCK = 15 MPa	81.2	21.2*	162.4	34.4*	243.6	42.1*
	FCK = 18 MPa	81.4	22.3*	162.9	37.4*	244.3	46.2*
	FCK = 20 MPa	82.7#	22.6*	163.1	38.0*	244.7	47.5*
h = 15.0 cm	FCK = 15 MPa	82.1	22.0*	164.2	35.7*	246.3	43.7*
	FCK = 18 MPa	84.1#	23.1*	164.6	38.8*	247.0	48.0*
	FCK = 20 MPa	88.9#	23.4*	164.9	39.4*	247.3	49.3*

T E L A LA 785 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	71.3	9.3*	142.7	15.0#	214.0	16.0
	FCK = 18 MPa	71.6	9.7*	143.2	16.4*	214.8	18.0#
	FCK = 20 MPa	71.8	9.9*	143.6	16.6*	215.4	19.0#
h = 7.5 cm	FCK = 15 MPa	74.9	10.1*	149.8	16.3*	224.6	17.4#
	FCK = 18 MPa	75.2	10.6*	150.4	17.8*	225.5	20.9#
	FCK = 20 MPa	75.3	10.7*	150.7	18.0*	226.0	22.1#
h = 8.0 cm	FCK = 15 MPa	78.1	10.9*	156.3	17.6*	234.4	20.0#
	FCK = 18 MPa	78.4	11.4*	156.9	19.2*	235.3	23.7*
	FCK = 20 MPa	78.6	11.6*	157.2	19.4*	235.9	24.3*
h = 8.5 cm	FCK = 15 MPa	81.2	11.7*	162.3	18.9*	243.5	22.8#
	FCK = 18 MPa	81.5	12.2*	162.9	20.6*	244.4	25.4*
	FCK = 20 MPa	81.6	12.4*	163.3	20.9*	244.9	26.1*
h = 9.0 cm	FCK = 15 MPa	83.9	12.5*	167.9	20.2*	251.8	24.7*
	FCK = 18 MPa	84.3	13.1*	168.5	22.0*	252.8	27.1*
	FCK = 20 MPa	84.4	13.2*	168.9	22.3*	253.3	27.9*
h = 9.5 cm	FCK = 15 MPa	86.5	13.3*	173.1	21.5*	259.6	26.3*
	FCK = 18 MPa	86.8	13.9*	173.7	23.4*	260.5	28.9*
	FCK = 20 MPa	87.0	14.1*	174.0	23.7*	261.1	29.7*
h = 10.0 cm	FCK = 15 MPa	88.9	14.1*	177.9	22.8*	266.8	27.9*
	FCK = 18 MPa	89.3	14.7*	178.5	24.8*	267.8	30.6*
	FCK = 20 MPa	89.4	14.9*	178.9	25.1*	268.3	31.4*
h = 10.5 cm	FCK = 15 MPa	91.2	14.8*	182.4	24.1*	273.6	29.5*
	FCK = 18 MPa	91.5	15.6*	183.0	26.2*	274.5	32.3*
	FCK = 20 MPa	91.7	15.8*	183.4	26.6*	275.0	33.2*
h = 11.0 cm	FCK = 15 MPa	93.3	15.6*	186.6	25.3*	279.9	31.0*
	FCK = 18 MPa	93.6	16.4*	187.2	27.6*	280.8	34.1*
	FCK = 20 MPa	93.8	16.6*	187.6	28.0*	281.4	35.0*
h = 11.5 cm	FCK = 15 MPa	95.3	16.4*	190.5	26.6*	285.8	32.6*
	FCK = 18 MPa	95.6	17.2*	191.1	29.0*	286.7	35.8*
	FCK = 20 MPa	95.8	17.5*	191.5	29.4*	287.3	36.8*
h = 12.0 cm	FCK = 15 MPa	97.1	17.2*	194.2	27.9*	291.3	34.2*
	FCK = 18 MPa	97.4	18.1*	194.8	30.4*	292.3	37.5*
	FCK = 20 MPa	97.6	18.3*	195.2	30.8*	292.8	38.6*
h = 12.5 cm	FCK = 15 MPa	98.8	18.0*	197.7	29.2*	296.5	35.8*
	FCK = 18 MPa	99.2	18.9*	198.3	31.8*	297.5	39.3*
	FCK = 20 MPa	99.3	19.2*	198.7	32.3*	298.0	40.4*
h = 13.0 cm	FCK = 15 MPa	100.5	18.8*	201.0	30.5*	301.5	37.4*
	FCK = 18 MPa	100.8	19.7*	201.6	33.2*	302.4	41.0*
	FCK = 20 MPa	101.0	20.0*	202.0	33.7*	303.0	42.2*
h = 13.5 cm	FCK = 15 MPa	102.0	19.6*	204.1	31.8*	306.1	39.0*
	FCK = 18 MPa	102.4	20.6*	204.7	34.6*	307.1	42.7*
	FCK = 20 MPa	102.5	20.9*	205.1	35.1*	307.6	43.9*
h = 14.0 cm	FCK = 15 MPa	103.5	20.4*	207.0	33.1*	310.5	40.6*
	FCK = 18 MPa	103.8	21.4*	207.6	36.0*	311.5	44.5*
	FCK = 20 MPa	104.0	21.7*	208.0	36.5*	312.0	45.7*
h = 14.5 cm	FCK = 15 MPa	104.9	21.2*	209.8	34.4*	314.7	42.1*
	FCK = 18 MPa	105.2	22.3*	210.4	37.4*	315.6	46.2*
	FCK = 20 MPa	105.4	22.6*	210.8	38.0*	316.2	47.5*
h = 15.0 cm	FCK = 15 MPa	106.2	22.0*	212.4	35.7*	318.7	43.7*
	FCK = 18 MPa	106.5	23.1*	213.1	38.8*	319.6	48.0*
	FCK = 20 MPa	106.7	23.4*	213.4	39.4*	320.1	49.3*



T E L A LA 985 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	87.5	12.0*	175.0	16.7	262.5	25.1
	FCK = 18 MPa	87.9	12.6*	175.7	17.3#	263.6	25.1
	FCK = 20 MPa	88.1	12.8*	176.2	18.2#	264.3	25.1
h = 7.5 cm	FCK = 15 MPa	92.5	13.1*	185.1	17.1	277.6	25.6
	FCK = 18 MPa	92.9	13.7*	185.9	20.1#	278.8	25.6
	FCK = 20 MPa	93.2	13.9*	186.4	21.3#	279.5	25.7
h = 8.0 cm	FCK = 15 MPa	97.2	14.1*	194.5	19.3#	291.7	26.1
	FCK = 18 MPa	97.6	14.8*	195.3	23.2#	292.9	26.1
	FCK = 20 MPa	97.9	15.0*	195.8	24.5#	293.6	26.1
h = 8.5 cm	FCK = 15 MPa	101.6	15.2*	203.2	22.1#	304.8	26.5
	FCK = 18 MPa	102.0	15.9*	204.0	25.9*	306.0	26.5
	FCK = 20 MPa	102.2	16.2*	204.5	26.6*	306.7	28.0#
h = 9.0 cm	FCK = 15 MPa	105.6	16.3*	211.3	25.0#	316.9	26.9
	FCK = 18 MPa	106.1	17.0*	212.1	27.7*	318.2	30.1#
	FCK = 20 MPa	106.3	17.3*	212.6	28.5*	318.9	31.8#
h = 9.5 cm	FCK = 15 MPa	109.4	17.3*	218.8	26.9*	328.2	28.1#
	FCK = 18 MPa	109.8	18.2*	219.7	29.5*	329.5	33.8#
	FCK = 20 MPa	110.1	18.4*	220.2	30.4*	330.3	35.7#
h = 10.0 cm	FCK = 15 MPa	112.9	18.4*	225.9	28.6*	338.8	31.5#
	FCK = 18 MPa	113.4	19.3*	226.8	31.3*	340.1	37.8#
	FCK = 20 MPa	113.6	19.6*	227.3	32.2*	340.9	39.5*
h = 10.5 cm	FCK = 15 MPa	116.3	19.5*	232.5	30.2*	348.8	34.9#
	FCK = 18 MPa	116.7	20.4*	233.4	33.2*	350.1	40.6*
	FCK = 20 MPa	116.9	20.7*	233.9	34.1*	350.8	41.8*
h = 11.0 cm	FCK = 15 MPa	119.4	20.5*	238.7	31.9*	358.1	38.6#
	FCK = 18 MPa	119.8	21.5*	239.6	35.0*	359.4	42.8*
	FCK = 20 MPa	120.1	21.8*	240.1	36.0*	360.2	44.1*
h = 11.5 cm	FCK = 15 MPa	122.3	21.6*	244.6	33.5*	366.9	41.1*
	FCK = 18 MPa	122.7	22.6*	245.5	36.8*	368.2	45.1*
	FCK = 20 MPa	123.0	23.0*	246.0	37.8*	369.0	46.4*
h = 12.0 cm	FCK = 15 MPa	125.1	22.7*	250.1	35.2*	375.2	43.1*
	FCK = 18 MPa	125.5	23.8*	251.0	38.6*	376.5	47.3*
	FCK = 20 MPa	125.8	24.1*	251.5	39.7*	377.3	48.7*
h = 12.5 cm	FCK = 15 MPa	127.7	23.7*	255.3	36.9*	383.0	45.2*
	FCK = 18 MPa	128.1	24.9*	256.2	40.5*	384.3	49.5*
	FCK = 20 MPa	128.4	25.2*	256.7	41.6*	385.1	50.9*
h = 13.0 cm	FCK = 15 MPa	130.1	24.8*	260.3	38.5*	390.4	47.2*
	FCK = 18 MPa	130.6	26.0*	261.2	42.3*	391.8	51.8*
	FCK = 20 MPa	130.8	26.4*	261.7	43.5*	392.5	53.2*
h = 13.5 cm	FCK = 15 MPa	132.5	25.9*	265.0	40.2*	397.4	49.2*
	FCK = 18 MPa	132.9	27.1*	265.8	44.1*	398.8	54.0*
	FCK = 20 MPa	133.2	27.5*	266.4	45.4*	399.6	55.5*
h = 14.0 cm	FCK = 15 MPa	134.7	27.0*	269.4	41.9*	404.1	51.3*
	FCK = 18 MPa	135.1	28.3*	270.3	45.9*	405.4	56.3*
	FCK = 20 MPa	135.4	28.7*	270.8	47.2*	406.2	57.8*
h = 14.5 cm	FCK = 15 MPa	136.8	28.0*	273.6	43.5*	410.4	53.3*
	FCK = 18 MPa	137.3	29.4*	274.5	47.8*	411.8	58.5*
	FCK = 20 MPa	137.5	29.8*	275.0	49.1*	412.5	60.2*
h = 15.0 cm	FCK = 15 MPa	138.8	29.1*	277.6	45.2*	416.4	55.4*
	FCK = 18 MPa	139.3	30.5*	278.5	49.6*	417.8	60.7*
	FCK = 20 MPa	139.5	30.9*	279.0	51.0*	418.6	62.5*

T E L A LA 1227 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	104.6	12.0*	209.1	16.7	313.7	25.1
	FCK = 18 MPa	105.0	12.6*	210.1	17.3#	315.1	25.1
	FCK = 20 MPa	105.3	12.8*	210.7	18.2#	316.0	25.1
h = 7.5 cm	FCK = 15 MPa	111.5	13.1*	223.0	17.1	334.6	25.6
	FCK = 18 MPa	112.0	13.7*	224.1	20.1#	336.1	25.6
	FCK = 20 MPa	112.3	13.9*	224.7	21.3#	337.0	25.7
h = 8.0 cm	FCK = 15 MPa	118.0	14.1*	236.1	19.3#	354.1	26.1
	FCK = 18 MPa	118.6	14.8*	237.1	23.2#	355.7	26.1
	FCK = 20 MPa	118.9	15.0*	237.7	24.5#	356.6	26.1
h = 8.5 cm	FCK = 15 MPa	124.1	15.2*	248.2	22.1#	372.3	26.5
	FCK = 18 MPa	124.6	15.9*	249.3	25.9*	373.9	26.5
	FCK = 20 MPa	125.0	16.2*	249.9	26.6*	374.9	28.0#
h = 9.0 cm	FCK = 15 MPa	129.8	16.3*	259.6	25.0#	389.4	26.9
	FCK = 18 MPa	130.4	17.0*	260.7	27.7*	391.1	30.1#
	FCK = 20 MPa	130.7	17.3*	261.4	28.5*	392.0	31.8#
h = 9.5 cm	FCK = 15 MPa	135.1	17.3*	270.3	26.9*	405.4	28.1#
	FCK = 18 MPa	135.7	18.2*	271.4	29.5*	407.1	33.8#
	FCK = 20 MPa	136.0	18.4*	272.1	30.4*	408.1	35.7#
h = 10.0 cm	FCK = 15 MPa	140.2	18.4*	280.3	28.6*	420.5	31.5#
	FCK = 18 MPa	140.7	19.3*	281.5	31.3*	422.2	37.8#
	FCK = 20 MPa	141.1	19.6*	282.2	32.2*	423.3	39.5*
h = 10.5 cm	FCK = 15 MPa	144.9	19.5*	289.8	30.2*	434.7	34.9#
	FCK = 18 MPa	145.5	20.4*	291.0	33.2*	436.5	40.6*
	FCK = 20 MPa	145.8	20.7*	291.7	34.1*	437.5	41.8*
h = 11.0 cm	FCK = 15 MPa	149.4	20.5*	298.7	31.9*	448.1	38.6#
	FCK = 18 MPa	150.0	21.5*	299.9	35.0*	449.9	42.8*
	FCK = 20 MPa	150.3	21.8*	300.6	36.0*	450.9	44.1*
h = 11.5 cm	FCK = 15 MPa	153.6	21.6*	307.2	33.5*	460.8	41.1*
	FCK = 18 MPa	154.2	22.6*	308.4	36.8*	462.6	45.1*
	FCK = 20 MPa	154.5	23.0*	309.1	37.8*	463.6	46.4*
h = 12.0 cm	FCK = 15 MPa	157.6	22.7*	315.2	35.2*	472.8	43.1*
	FCK = 18 MPa	158.2	23.8*	316.4	38.6*	474.6	47.3*
	FCK = 20 MPa	158.6	24.1*	317.1	39.7*	475.7	48.7*
h = 12.5 cm	FCK = 15 MPa	161.4	23.7*	322.8	36.9*	484.2	45.2*
	FCK = 18 MPa	162.0	24.9*	324.0	40.5*	486.0	49.5*
	FCK = 20 MPa	162.4	25.2*	324.7	41.6*	487.1	50.9*
h = 13.0 cm	FCK = 15 MPa	165.0	24.8*	330.0	38.5*	495.0	47.2*
	FCK = 18 MPa	165.6	26.0*	331.2	42.3*	496.8	51.8*
	FCK = 20 MPa	166.0	26.4*	331.9	43.5*	497.9	53.2*
h = 13.5 cm	FCK = 15 MPa	168.4	25.9*	336.8	40.2*	505.3	49.2*
	FCK = 18 MPa	169.0	27.1*	338.1	44.1*	507.1	54.0*
	FCK = 20 MPa	169.4	27.5*	338.8	45.4*	508.2	55.5*
h = 14.0 cm	FCK = 15 MPa	171.7	27.0*	343.4	41.9*	515.0	51.3*
	FCK = 18 MPa	172.3	28.3*	344.6	45.9*	516.9	56.3*
	FCK = 20 MPa	172.7	28.7*	345.3	47.2*	518.0	57.8*
h = 14.5 cm	FCK = 15 MPa	174.8	28.0*	349.6	43.5*	524.4	53.3*
	FCK = 18 MPa	175.4	29.4*	350.8	47.8*	526.2	58.5*
	FCK = 20 MPa	175.8	29.8*	351.5	49.1*	527.3	60.2*
h = 15.0 cm	FCK = 15 MPa	177.8	29.1*	355.5	45.2*	533.3	55.4*
	FCK = 18 MPa	178.4	30.5*	356.8	49.6*	535.1	60.7*
	FCK = 20 MPa	178.7	30.9*	357.5	51.0*	536.2	62.5*



TELA T 75 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	3.7*	8.5*	5.2*	12.0*	7.0*	14.7*
	FCK = 18 MPa	4.0*	9.3*	5.7*	13.2*	7.3*	16.1*
	FCK = 20 MPa	4.2*	9.6*	5.9*	13.5*	7.4*	16.6*
h = 7.5 cm	FCK = 15 MPa	4.0*	9.2*	5.6*	13.0*	7.5*	15.9*
	FCK = 18 MPa	4.4*	10.1*	6.2*	14.2*	7.9*	17.4*
	FCK = 20 MPa	4.5*	10.3*	6.3*	14.5*	8.0*	17.9*
h = 8.0 cm	FCK = 15 MPa	4.3*	9.9*	6.0*	13.9*	8.1*	17.1*
	FCK = 18 MPa	4.7*	10.8*	6.6*	15.3*	8.5*	18.7*
	FCK = 20 MPa	4.8*	11.1*	6.8*	15.7*	8.6*	19.3*
h = 8.5 cm	FCK = 15 MPa	4.6*	10.5*	6.4*	14.9*	8.6*	18.3*
	FCK = 18 MPa	5.0*	11.6*	7.1*	16.3*	9.0*	20.0*
	FCK = 20 MPa	5.1*	11.9*	7.3*	16.8*	9.2*	20.6*
h = 9.0 cm	FCK = 15 MPa	4.8*	11.2*	6.9*	15.9*	9.2*	19.4*
	FCK = 18 MPa	5.3*	12.3*	7.5*	17.4*	9.6*	21.3*
	FCK = 20 MPa	5.5*	12.7*	7.7*	17.9*	9.7*	21.9*
h = 9.5 cm	FCK = 15 MPa	5.1*	11.9*	7.3*	16.8*	9.7*	20.6*
	FCK = 18 MPa	5.6*	13.1*	8.0*	18.5*	10.2*	22.6*
	FCK = 20 MPa	5.8*	13.4*	8.2*	19.0*	10.3*	23.3*
h = 10.0 cm	FCK = 15 MPa	5.4*	12.6*	7.7*	17.8*	10.3*	21.8*
	FCK = 18 MPa	6.0*	13.8*	8.4*	19.5*	10.8*	23.9*
	FCK = 20 MPa	6.1*	14.2*	8.7*	20.1*	10.9*	24.6*
h = 10.5 cm	FCK = 15 MPa	5.7*	13.3*	8.1*	18.8*	10.8*	23.0*
	FCK = 18 MPa	6.3*	14.6*	8.9*	20.6*	11.3*	25.2*
	FCK = 20 MPa	6.4*	15.0*	9.1*	21.2*	11.5*	25.9*
h = 11.0 cm	FCK = 15 MPa	6.0*	14.0*	8.5*	19.7*	11.4*	24.2*
	FCK = 18 MPa	6.6*	15.3*	9.3*	21.7*	11.9*	26.5*
	FCK = 20 MPa	6.8*	15.7*	9.6*	22.3*	12.1*	27.3*
h = 11.5 cm	FCK = 15 MPa	6.3*	14.6*	8.9*	20.7*	11.9*	25.4*
	FCK = 18 MPa	6.9*	16.1*	9.8*	22.7*	12.5*	27.8*
	FCK = 20 MPa	7.1*	16.5*	10.0*	23.4*	12.7*	28.6*
h = 12.0 cm	FCK = 15 MPa	6.6*	15.3*	9.3*	21.7*	12.5*	26.6*
	FCK = 18 MPa	7.2*	16.8*	10.2*	23.8*	13.1*	29.1*
	FCK = 20 MPa	7.4*	17.3*	10.5*	24.4*	13.3*	29.9*
h = 12.5 cm	FCK = 15 MPa	6.9*	16.0*	9.7*	22.6*	13.0*	27.7*
	FCK = 18 MPa	7.6*	17.6*	10.7*	24.8*	13.6*	30.4*
	FCK = 20 MPa	7.8*	18.1*	11.0*	25.5*	13.8*	31.3*
h = 13.0 cm	FCK = 15 MPa	7.2*	16.7*	10.2*	23.6*	13.6*	28.9*
	FCK = 18 MPa	7.9*	18.3*	11.1*	25.9*	14.2*	31.7*
	FCK = 20 MPa	8.1*	18.8*	11.4*	26.6*	14.4*	32.6*
h = 13.5 cm	FCK = 15 MPa	7.5*	17.4*	10.6*	24.6*	14.1*	30.1*
	FCK = 18 MPa	8.2*	19.1*	11.6*	27.0*	14.8*	33.0*
	FCK = 20 MPa	8.4*	19.6*	11.9*	27.7*	15.0*	34.0*
h = 14.0 cm	FCK = 15 MPa	7.8*	18.1*	11.0*	25.6*	14.7*	31.3*
	FCK = 18 MPa	8.5*	19.8*	12.0*	28.0*	15.4*	34.3*
	FCK = 20 MPa	8.7*	20.4*	12.4*	28.8*	15.6*	35.3*
h = 14.5 cm	FCK = 15 MPa	8.1*	18.8*	11.4*	26.5*	15.2*	32.5*
	FCK = 18 MPa	8.8*	20.6*	12.5*	29.1*	16.0*	35.6*
	FCK = 20 MPa	9.1*	21.1*	12.8*	29.9*	16.2*	36.6*
h = 15.0 cm	FCK = 15 MPa	8.3*	19.4*	11.8*	27.5*	15.8*	33.7*
	FCK = 18 MPa	9.2*	21.3*	12.9*	30.2*	16.5*	36.9*
	FCK = 20 MPa	9.4*	21.9*	13.3*	31.0*	16.8*	38.0*

TELA T 92 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	3.7*	9.8*	5.2*	13.8*	7.0*	15.7*
	FCK = 18 MPa	4.0*	10.7*	5.7*	15.1*	7.3*	18.5*
	FCK = 20 MPa	4.2*	11.0*	5.9*	15.6*	7.4*	19.1*
h = 7.5 cm	FCK = 15 MPa	4.0*	10.6*	5.6*	14.9*	7.5*	18.2*
	FCK = 18 MPa	4.4*	11.6*	6.2*	16.4*	7.9*	20.1*
	FCK = 20 MPa	4.5*	11.9*	6.3*	16.8*	8.0*	20.6*
h = 8.0 cm	FCK = 15 MPa	4.3*	11.3*	6.0*	15.0*	8.1*	19.7*
	FCK = 18 MPa	4.7*	12.4*	6.6*	16.6*	8.5*	21.6*
	FCK = 20 MPa	4.8*	12.8*	6.8*	17.1*	8.6*	22.2*
h = 8.5 cm	FCK = 15 MPa	4.6*	12.1*	6.4*	17.2*	8.6*	21.0*
	FCK = 18 MPa	5.0*	13.3*	7.1*	18.8*	9.0*	23.1*
	FCK = 20 MPa	5.1*	13.7*	7.3*	19.4*	9.2*	23.7*
h = 9.0 cm	FCK = 15 MPa	4.8*	12.9*	6.9*	18.3*	9.2*	22.4*
	FCK = 18 MPa	5.3*	14.2*	7.5*	20.1*	9.6*	24.6*
	FCK = 20 MPa	5.5*	14.6*	7.7*	20.6*	9.7*	25.3*
h = 9.5 cm	FCK = 15 MPa	5.1*	13.7*	7.3*	19.4*	9.7*	23.8*
	FCK = 18 MPa	5.6*	15.1*	8.0*	21.3*	10.2*	26.1*
	FCK = 20 MPa	5.8*	15.5*	8.2*	21.9*	10.3*	26.8*
h = 10.0 cm	FCK = 15 MPa	5.4*	14.5*	7.7*	20.5*	10.3*	25.2*
	FCK = 18 MPa	6.0*	15.9*	8.4*	22.5*	10.8*	27.6*
	FCK = 20 MPa	6.1*	16.4*	8.7*	23.2*	10.9*	28.4*
h = 10.5 cm	FCK = 15 MPa	5.7*	15.3*	8.1*	21.7*	10.8*	26.5*
	FCK = 18 MPa	6.3*	16.8*	8.9*	23.8*	11.3*	29.1*
	FCK = 20 MPa	6.4*	17.3*	9.1*	24.4*	11.5*	29.9*
h = 11.0 cm	FCK = 15 MPa	6.0*	16.1*	8.5*	22.8*	11.4*	27.9*
	FCK = 18 MPa	6.6*	17.7*	9.3*	25.0*	11.9*	30.6*
	FCK = 20 MPa	6.8*	18.2*	9.6*	25.7*	12.1*	31.5*
h = 11.5 cm	FCK = 15 MPa	6.3*	16.9*	8.9*	23.9*	11.9*	29.3*
	FCK = 18 MPa	6.9*	18.6*	9.8*	26.2*	12.5*	32.1*
	FCK = 20 MPa	7.1*	19.1*	10.0*	27.0*	12.7*	33.1*
h = 12.0 cm	FCK = 15 MPa	6.6*	17.7*	9.3*	25.1*	12.5*	30.7*
	FCK = 18 MPa	7.2*	19.4*	10.2*	27.5*	13.1*	33.7*
	FCK = 20 MPa	7.4*	20.0*	10.5*	28.3*	13.3*	34.6*
h = 12.5 cm	FCK = 15 MPa	6.9*	18.5*	9.7*	26.2*	13.0*	32.1*
	FCK = 18 MPa	7.6*	20.3*	10.7*	28.7*	13.6*	35.2*
	FCK = 20 MPa	7.8*	20.9*	11.0*	29.5*	13.8*	36.2*
h = 13.0 cm	FCK = 15 MPa	7.2*	19.3*	10.2*	27.3*	13.6*	33.5*
	FCK = 18 MPa	7.9*	21.2*	11.1*	30.0*	14.2*	36.7*
	FCK = 20 MPa	8.1*	21.8*	11.4*	30.8*	14.4*	37.7*
h = 13.5 cm	FCK = 15 MPa	7.5*	20.1*	10.6*	28.4*	14.1*	34.8*
	FCK = 18 MPa	8.2*	22.1*	11.6*	31.2*	14.8*	38.2*
	FCK = 20 MPa	8.4*	22.7*	11.9*	32.1*	15.0*	39.3*
h = 14.0 cm	FCK = 15 MPa	7.8*	20.9*	11.0*	29.6*	14.7*	36.2*
	FCK = 18 MPa	8.5*	22.9*	12.0*	32.4*	15.4*	39.7*
	FCK = 20 MPa	8.7*	23.6*	12.4*	33.4*	15.6*	40.8*
h = 14.5 cm	FCK = 15 MPa	8.1*	21.7*	11.4*	30.7*	15.2*	37.6*
	FCK = 18 MPa	8.8*	23.8*	12.5*	33.7*	16.0*	41.2*
	FCK = 20 MPa	9.1*	24.5*	12.8*	34.6*	16.2*	42.4*
h = 15.0 cm	FCK = 15 MPa	8.3*	22.5*	11.8*	31.8*	15.8*	39.0*
	FCK = 18 MPa	9.2*	24.7*	12.9*	34.9*	16.5*	42.8*
	FCK = 20 MPa	9.4*	25.4*	13.3*	35.9*	16.8*	44.0*



T E L A T 113 (momentos em tf x cm)	W = 1		W = 2		W = 3	
	M1	M2	M1	M2	M1	M2
h = 7.0 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	3.7*	12.7*	6.3*	15.8#	8.5*	21.3
	4.0*	13.9*	6.6*	17.1#	8.9*	21.3
	4.2*	14.3*	6.7*	20.1#	9.1*	21.3
h = 7.5 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	4.0*	13.7*	6.8*	18.3#	9.2*	21.6
	4.4*	15.0*	7.1*	21.3*	9.6*	22.1#
	4.5*	15.5*	7.2*	21.9*	9.8*	23.3#
h = 8.0 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	4.3*	14.7*	7.3*	20.8*	9.9*	21.8
	4.7*	16.2*	7.4*	22.8*	10.4*	25.3#
	4.8*	16.6*	7.7*	23.5*	10.5*	26.7#
h = 8.5 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	4.6*	15.7*	7.8*	22.3*	10.6*	23.9#
	5.0*	17.3*	8.2*	24.4*	11.1*	28.7#
	5.1*	17.8*	8.3*	25.1*	11.2*	30.4#
h = 9.0 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	4.9*	16.8*	8.3*	23.7*	11.2*	27.0#
	5.3*	18.4*	8.7*	26.0*	11.8*	31.9*
	5.5*	18.9*	8.8*	26.8*	11.9*	32.8*
h = 9.5 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	5.2*	17.8*	8.8*	25.2*	11.9*	30.2#
	5.6*	19.5*	9.2*	27.6*	12.5*	33.8*
	5.8*	20.1*	9.3*	28.4*	12.6*	34.8*
h = 10.0 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	5.5*	18.8*	9.3*	26.6*	12.6*	32.6*
	6.0*	20.7*	9.7*	29.2*	13.2*	35.8*
	6.1*	21.2*	9.9*	30.0*	13.4*	36.8*
h = 10.5 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	5.8*	19.9*	9.8*	28.1*	13.3*	34.4*
	6.3*	21.8*	10.2*	30.8*	13.9*	37.7*
	6.4*	22.4*	10.4*	31.7*	14.1*	38.8*
h = 11.0 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	6.1*	20.9*	10.3*	29.5*	13.9*	36.2*
	6.6*	22.9*	10.8*	32.4*	14.6*	39.7*
	6.8*	23.6*	10.9*	33.3*	14.8*	40.8*
h = 11.5 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	6.4*	21.9*	10.8*	31.0*	14.6*	37.9*
	6.9*	24.0*	11.3*	34.0*	15.3*	41.6*
	7.1*	24.7*	11.4*	34.9*	15.5*	42.8*
h = 12.0 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	6.7*	22.9*	11.3*	32.4*	15.3*	39.7*
	7.2*	25.2*	11.8*	35.6*	16.0*	43.6*
	7.4*	25.9*	12.0*	36.6*	16.2*	44.8*
h = 12.5 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	7.0*	24.0*	11.8*	33.9*	16.0*	41.5*
	7.6*	26.3*	12.3*	37.2*	16.7*	45.5*
	7.8*	27.0*	12.5*	38.2*	16.9*	46.8*
h = 13.0 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	7.3*	25.0*	12.3*	35.3*	16.6*	43.3*
	7.9*	27.4*	12.9*	38.8*	17.4*	47.5*
	8.1*	28.2*	13.0*	39.9*	17.7*	48.8*
h = 13.5 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	7.6*	26.0*	12.8*	36.8*	17.3*	45.1*
	8.2*	28.5*	13.4*	40.4*	18.1*	49.4*
	8.4*	29.4*	13.6*	41.5*	18.4*	50.8*
h = 14.0 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	7.9*	27.1*	13.3*	38.3*	18.0*	46.9*
	8.5*	29.7*	13.9*	42.0*	18.8*	51.4*
	8.7*	30.5*	14.1*	43.2*	19.1*	52.8*
h = 14.5 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	8.2*	28.1*	13.8*	39.7*	18.7*	48.6*
	8.8*	30.8*	14.4*	43.6*	19.5*	53.4*
	9.1*	31.7*	14.6*	44.8*	19.8*	54.9*
h = 15.0 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	8.5*	29.1*	14.3*	41.2*	19.3*	50.4*
	9.2*	31.9*	14.9*	45.2*	20.3*	55.3*
	9.4*	32.8*	15.1*	46.4*	20.5*	56.9*

T E L A T 138 (momentos em tf x cm)	W = 1		W = 2		W = 3	
	M1	M2	M1	M2	M1	M2
h = 7.0 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	4.5*	14.5*	7.6*	18.6	10.1*	27.8
	4.8*	15.9*	8.0*	18.8#	10.7*	27.9
	4.9*	16.4*	8.1*	19.8#	11.0*	27.9
h = 7.5 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	4.9*	15.7*	8.3*	18.8	10.9*	28.3
	5.2*	17.2*	8.7*	21.7#	11.7*	28.3
	5.3*	17.7*	8.8*	23.0#	11.9*	28.3
h = 8.0 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	5.3*	16.9*	8.9*	20.7#	11.7*	28.6
	5.5*	18.5*	9.3*	24.9#	12.6*	28.7
	5.7*	19.0*	9.4*	26.3#	12.8*	28.7
h = 8.5 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	5.6*	18.0*	9.5*	23.6#	12.5*	29.0
	5.9*	19.8*	9.9*	28.0*	13.5*	29.0
	6.1*	20.4*	10.1*	28.6*	13.7*	30.0#
h = 9.0 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	6.0*	19.2*	10.1*	26.6#	13.4*	29.3
	6.3*	21.1*	10.6*	29.9*	14.3*	32.0#
	6.5*	21.7*	10.7*	30.7*	14.5*	33.8#
h = 9.5 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	6.4*	20.4*	10.7*	28.9*	14.2*	29.8#
	6.7*	22.4*	11.2*	31.7*	15.2*	35.9#
	6.9*	23.0*	11.4*	32.6*	15.4*	37.9#
h = 10.0 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	6.7*	21.6*	11.3*	30.6*	15.0*	33.2#
	7.1*	23.7*	11.9*	33.5*	16.1*	39.9#
	7.3*	24.4*	12.0*	34.5*	16.3*	42.2#
h = 10.5 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	7.1*	22.8*	11.9*	32.3*	15.8*	36.8#
	7.4*	25.0*	12.5*	35.4*	16.9*	43.3*
	7.7*	25.7*	12.7*	36.4*	17.2*	44.6*
h = 11.0 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	7.5*	24.0*	12.5*	33.9*	16.6*	40.6#
	7.8*	26.3*	13.1*	37.2*	17.8*	45.6*
	8.0*	27.1*	13.3*	38.3*	18.1*	46.9*
h = 11.5 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	7.8*	25.2*	13.2*	35.6*	17.4*	43.6*
	8.2*	27.6*	13.8*	39.1*	18.7*	47.9*
	8.4*	28.4*	14.0*	40.2*	18.9*	49.2*
h = 12.0 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	8.2*	26.4*	13.8*	37.3*	18.2*	45.7*
	8.6*	28.9*	14.4*	40.9*	19.6*	50.1*
	8.8*	29.8*	14.6*	42.1*	19.8*	51.5*
h = 12.5 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	8.6*	27.6*	14.4*	39.0*	19.0*	47.8*
	9.0*	30.2*	15.1*	42.8*	20.4*	52.4*
	9.2*	31.1*	15.3*	44.0*	20.7*	53.9*
h = 13.0 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	8.9*	28.8*	15.0*	40.7*	19.8*	49.8*
	9.4*	31.6*	15.7*	44.6*	21.3*	54.7*
	9.6*	32.4*	15.9*	45.9*	21.6*	56.2*
h = 13.5 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	9.3*	30.0*	15.6*	42.4*	20.6*	51.9*
	9.7*	32.9*	16.4*	46.5*	22.2*	56.9*
	10.0*	33.8*	16.6*	47.8*	22.5*	58.5*
h = 14.0 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	9.6*	31.2*	16.2*	44.1*	21.5*	54.0*
	10.1*	34.2*	17.0*	48.3*	23.0*	59.2*
	10.4*	35.1*	17.2*	49.7*	23.4*	60.9*
h = 14.5 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	10.0*	32.3*	16.8*	45.7*	22.3*	56.0*
	10.5*	35.5*	17.6*	50.2*	23.9*	61.5*
	10.8*	36.5*	17.9*	51.6*	24.2*	63.2*
h = 15.0 cm FCK = 15 MPa FCK = 18 MPa FCK = 20 MPa	10.4*	33.5*	17.5*	47.4*	23.1*	58.1*
	10.9*	36.8*	18.3*	52.0*	24.8*	63.7*
	11.2*	37.8*	18.5*	53.5*	25.1*	65.5*



T E L A T 159 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	4.5*	15.4#	7.6*	22.4	10.1*	33.7
	FCK = 18 MPa	4.8*	17.5*	8.0*	22.5	10.9*	33.7
	FCK = 20 MPa	4.9*	18.0*	8.1*	22.5	11.0*	33.8
h = 7.5 cm	FCK = 15 MPa	4.9*	17.3*	8.3*	22.8	10.9*	34.2
	FCK = 18 MPa	5.2*	18.9*	8.7*	22.9	11.7*	34.3
	FCK = 20 MPa	5.3*	19.5*	8.8*	22.9	11.9*	34.3
h = 8.0 cm	FCK = 15 MPa	5.3*	18.6*	8.9*	23.1	11.7*	34.7
	FCK = 18 MPa	5.5*	20.4*	9.3*	24.7#	12.6*	34.8
	FCK = 20 MPa	5.7*	21.0*	9.4*	24.1#	12.8*	34.8
h = 8.5 cm	FCK = 15 MPa	5.6*	19.9*	9.5*	23.4	12.5*	35.2
	FCK = 18 MPa	5.9*	21.8*	9.9*	23.1#	13.5*	35.2
	FCK = 20 MPa	6.1*	22.4*	10.1*	23.7#	13.7*	35.3
h = 9.0 cm	FCK = 15 MPa	6.0*	21.2*	10.1*	26.4#	13.4*	35.6
	FCK = 18 MPa	6.3*	23.3*	10.6*	31.7#	14.3*	35.6
	FCK = 20 MPa	6.5*	23.9*	10.7*	33.5#	14.5*	35.7
h = 9.5 cm	FCK = 15 MPa	6.4*	22.5*	10.7*	29.6#	14.2*	35.9
	FCK = 18 MPa	6.7*	24.7*	11.2*	35.0*	15.2*	36.0
	FCK = 20 MPa	6.9*	25.4*	11.4*	36.0*	15.4*	37.5#
h = 10.0 cm	FCK = 15 MPa	6.7*	23.8*	11.3*	32.9#	15.0*	36.3
	FCK = 18 MPa	7.1*	26.2*	11.9*	37.0*	16.1*	39.4#
	FCK = 20 MPa	7.3*	26.9*	12.0*	38.1*	16.3*	41.8#
h = 10.5 cm	FCK = 15 MPa	7.1*	25.2*	11.9*	35.6*	15.8*	36.6
	FCK = 18 MPa	7.4*	27.6*	12.5*	39.1*	16.9*	43.9#
	FCK = 20 MPa	7.7*	28.4*	12.7*	40.2*	17.2*	46.4#
h = 11.0 cm	FCK = 15 MPa	7.5*	26.5*	12.5*	37.5*	16.6*	40.2#
	FCK = 18 MPa	7.8*	29.1*	13.1*	41.1*	17.8*	48.4#
	FCK = 20 MPa	8.0*	29.9*	13.3*	42.3*	18.1*	51.1#
h = 11.5 cm	FCK = 15 MPa	7.8*	27.8*	13.2*	39.3*	17.4*	44.2#
	FCK = 18 MPa	8.2*	30.5*	13.8*	43.2*	18.7*	52.9*
	FCK = 20 MPa	8.4*	31.4*	14.0*	44.4*	18.9*	54.4*
h = 12.0 cm	FCK = 15 MPa	8.2*	29.1*	13.8*	41.2*	18.2*	48.3#
	FCK = 18 MPa	8.6*	32.0*	14.4*	45.2*	19.6*	55.4*
	FCK = 20 MPa	8.8*	32.9*	14.6*	46.5*	19.8*	56.9*
h = 12.5 cm	FCK = 15 MPa	8.6*	30.5*	14.4*	43.1*	19.0*	52.6#
	FCK = 18 MPa	9.0*	33.4*	15.1*	47.3*	20.4*	57.9*
	FCK = 20 MPa	9.2*	34.4*	15.3*	48.6*	20.7*	59.5*
h = 13.0 cm	FCK = 15 MPa	8.9*	31.8*	15.0*	45.0*	19.8*	55.1*
	FCK = 18 MPa	9.4*	34.9*	15.7*	49.3*	21.3*	60.4*
	FCK = 20 MPa	9.6*	35.9*	15.9*	50.7*	21.6*	62.1*
h = 13.5 cm	FCK = 15 MPa	9.3*	33.1*	15.6*	46.8*	20.6*	57.4*
	FCK = 18 MPa	9.7*	36.3*	16.4*	51.4*	22.2*	62.9*
	FCK = 20 MPa	10.0*	37.4*	16.6*	52.8*	22.5*	64.7*
h = 14.0 cm	FCK = 15 MPa	9.6*	34.4*	16.2*	48.7*	21.5*	59.7*
	FCK = 18 MPa	10.1*	37.8*	17.0*	53.4*	23.0*	65.5*
	FCK = 20 MPa	10.4*	38.9*	17.2*	55.0*	23.4*	67.3*
h = 14.5 cm	FCK = 15 MPa	10.0*	35.8*	16.8*	50.6*	22.3*	62.0*
	FCK = 18 MPa	10.5*	39.2*	17.6*	55.5*	23.9*	68.0*
	FCK = 20 MPa	10.8*	40.4*	17.9*	57.1*	24.2*	69.9*
h = 15.0 cm	FCK = 15 MPa	10.4*	37.1*	17.5*	52.5*	23.1*	64.3*
	FCK = 18 MPa	10.9*	40.7*	18.3*	57.6*	24.8*	70.5*
	FCK = 20 MPa	11.2*	41.9*	18.5*	59.2*	25.1*	72.5*

T E L A T 196 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	5.3*	15.1#	8.9*	29.4	11.5*	44.1
	FCK = 18 MPa	5.5*	18.2#	9.3*	29.5	12.6*	44.2
	FCK = 20 MPa	5.5*	19.2#	9.5*	29.5	12.8*	44.3
h = 7.5 cm	FCK = 15 MPa	5.7*	17.5#	9.5*	30.0	12.4*	45.0
	FCK = 18 MPa	6.0*	21.1#	10.1*	30.1	13.6*	45.1
	FCK = 20 MPa	6.1*	22.3#	10.2*	30.1	13.9*	45.1
h = 8.0 cm	FCK = 15 MPa	6.2*	20.1#	10.3*	30.5	13.3*	45.7
	FCK = 18 MPa	6.4*	23.4*	10.8*	30.6	14.6*	45.9
	FCK = 20 MPa	6.5*	24.1*	11.0*	30.6	14.9*	45.9
h = 8.5 cm	FCK = 15 MPa	6.6*	22.9*	11.1*	31.0	14.3*	46.4
	FCK = 18 MPa	6.9*	25.1*	11.6*	31.0	15.7*	46.5
	FCK = 20 MPa	7.0*	25.0*	11.8*	31.1	15.9*	46.6
h = 9.0 cm	FCK = 15 MPa	7.0*	24.4*	11.8*	31.4	15.2*	47.0
	FCK = 18 MPa	7.3*	26.8*	12.4*	31.4	16.7*	47.1
	FCK = 20 MPa	7.4*	27.3*	12.5*	33.0#	17.0*	47.2
h = 9.5 cm	FCK = 15 MPa	7.4*	25.9*	12.5*	31.7	16.1*	47.6
	FCK = 18 MPa	7.8*	28.5*	13.1*	35.0#	17.7*	47.7
	FCK = 20 MPa	7.9*	29.5*	13.3*	37.0#	18.0*	47.8
h = 10.0 cm	FCK = 15 MPa	7.9*	27.5*	13.2*	32.4#	17.1*	48.1
	FCK = 18 MPa	8.2*	30.2*	13.9*	39.0#	18.7*	48.2
	FCK = 20 MPa	8.4*	31.0*	14.1*	41.2#	19.1*	48.3
h = 10.5 cm	FCK = 15 MPa	8.3*	29.0*	14.0*	36.0#	18.0*	48.6
	FCK = 18 MPa	8.7*	31.9*	14.6*	43.3#	19.7*	48.7
	FCK = 20 MPa	8.8*	32.8*	14.8*	45.7#	20.1*	48.7
h = 11.0 cm	FCK = 15 MPa	8.7*	30.6*	14.7*	39.7*	18.9*	49.0
	FCK = 18 MPa	9.1*	33.5*	15.4*	47.4*	20.8*	49.1
	FCK = 20 MPa	9.3*	34.5*	15.6*	48.8*	21.1*	50.4#
h = 11.5 cm	FCK = 15 MPa	9.2*	32.1*	15.4*	43.6#	19.9*	49.4
	FCK = 18 MPa	9.6*	35.2*	16.1*	49.8*	21.8*	52.4#
	FCK = 20 MPa	9.7*	36.2*	16.4*	51.3*	22.2*	55.4#
h = 12.0 cm	FCK = 15 MPa	9.6*	33.7*	16.1*	47.6*	20.8*	49.8
	FCK = 18 MPa	10.0*	36.9*	16.9*	52.2*	22.8*	57.9#
	FCK = 20 MPa	10.2*	38.0*	17.1*	53.7*	23.2*	60.6#
h = 12.5 cm	FCK = 15 MPa	10.0*	35.2*	16.8*	49.8*	21.7*	52.0#
	FCK = 18 MPa	10.5*	38.6*	17.6*	54.6*	23.8*	62.5#
	FCK = 20 MPa	10.6*	39.7*	17.9*	56.2*	24.3*	66.0#
h = 13.0 cm	FCK = 15 MPa	10.4*	36.7*	17.6*	52.0*	22.7*	56.4#
	FCK = 18 MPa	10.9*	40.3*	18.4*	57.0*	24.8*	67.8#
	FCK = 20 MPa	11.1*	41.5*	18.7*	58.6*	25.3*	71.6#
h = 13.5 cm	FCK = 15 MPa	10.9*	38.3*	18.3*	54.2*	23.6*	61.0#
	FCK = 18 MPa	11.4*	42.0*	19.2*	59.4*	25.9*	72.8*
	FCK = 20 MPa	11.6*	43.2*	19.4*	61.1*	26.3*	74.8*
h = 14.0 cm	FCK = 15 MPa	11.3*	39.8*	19.0*	56.3*	24.5*	65.9#
	FCK = 18 MPa	11.8*	43.7*	19.9*	61.6*	26.9*	75.7*
	FCK = 20 MPa	12.0*	45.0*	20.2*	63.6*	27.4*	77.9*
h = 14.5 cm	FCK = 15 MPa	11.7*	41.4*	19.7*	58.5*	25.5*	70.9#
	FCK = 18 MPa	12.3*	45.4*	20.7*	64.2*	27.9*	78.7*
	FCK = 20 MPa	12.5*	46.7*	21.0*	66.0*	28.4*	80.9*
h = 15.0 cm	FCK = 15 MPa	12.2*	42.9*	20.5*	60.7*	26.4*	74.4*
	FCK = 18 MPa	12.7*	47.1*	21.4*	66.6*	28.9*	81.6*
	FCK = 20 MPa	12.9*	48.4*	21.7*	68.5*	29.5*	83.9*



T E L A T 246 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	5.3*	19.6	8.9*	39.3	11.5*	58.9
	FCK = 18 MPa	5.5*	19.7	9.3*	39.4	12.6*	59.0
	FCK = 20 MPa	5.6*	19.7	9.5*	39.4	12.8*	59.1
h = 7.5 cm	FCK = 15 MPa	5.7*	20.1	9.6*	40.1	12.4*	60.2
	FCK = 18 MPa	6.0*	20.6#	10.1*	40.2	13.6*	60.4
	FCK = 20 MPa	6.1*	21.8#	10.2*	40.3	13.9*	60.5
h = 8.0 cm	FCK = 15 MPa	6.2*	20.5	10.3*	40.9	13.3*	61.4
	FCK = 18 MPa	6.4*	23.7#	10.8*	41.0	14.6*	61.6
	FCK = 20 MPa	6.5*	25.1#	11.0*	41.1	14.9*	61.6
h = 8.5 cm	FCK = 15 MPa	6.6*	22.5#	11.1*	41.7	14.3*	62.5
	FCK = 18 MPa	6.9*	27.0#	11.6*	41.7	15.7*	62.6
	FCK = 20 MPa	7.0*	28.6#	11.8*	41.8	15.9*	62.7
h = 9.0 cm	FCK = 15 MPa	7.0*	25.4#	11.8*	42.3	15.2*	63.4
	FCK = 18 MPa	7.3*	30.6#	12.4*	42.4	16.7*	63.6
	FCK = 20 MPa	7.4*	32.1*	12.5*	42.4	17.0*	63.7
h = 9.5 cm	FCK = 15 MPa	7.4*	28.6#	12.5*	42.9	16.1*	64.3
	FCK = 18 MPa	7.8*	33.2*	13.1*	43.0	17.7*	64.5
	FCK = 20 MPa	7.9*	34.1*	13.3*	43.0	18.0*	64.5
h = 10.0 cm	FCK = 15 MPa	7.9*	31.9#	13.2*	43.4	17.1*	65.1
	FCK = 18 MPa	8.2*	35.1*	13.9*	43.5	18.7*	65.3
	FCK = 20 MPa	8.4*	36.2*	14.1*	43.6	19.1*	65.4
h = 10.5 cm	FCK = 15 MPa	8.3*	33.8*	14.0*	43.9	18.0*	65.9
	FCK = 18 MPa	8.7*	37.1*	14.6*	44.0	19.7*	66.0
	FCK = 20 MPa	8.8*	38.2*	14.8*	45.0#	20.1*	66.1
h = 11.0 cm	FCK = 15 MPa	8.7*	35.7*	14.7*	44.4	18.9*	66.6
	FCK = 18 MPa	9.1*	39.1*	15.4*	47.0#	20.8*	66.7
	FCK = 20 MPa	9.3*	40.3*	15.6*	49.6#	21.1*	66.8
h = 11.5 cm	FCK = 15 MPa	9.2*	37.5*	15.4*	44.8	19.9*	67.2
	FCK = 18 MPa	9.6*	41.1*	16.1*	51.6#	21.8*	67.3
	FCK = 20 MPa	9.7*	42.3*	16.4*	54.5#	22.2*	67.4
h = 12.0 cm	FCK = 15 MPa	9.6*	39.3*	16.1*	47.0#	20.8*	67.0
	FCK = 18 MPa	10.0*	43.1*	16.9*	56.5#	22.8*	67.9
	FCK = 20 MPa	10.2*	44.4*	17.1*	59.7#	23.2*	68.0
h = 12.5 cm	FCK = 15 MPa	10.0*	41.1*	16.8*	51.2#	21.7*	68.3
	FCK = 18 MPa	10.5*	45.2*	17.6*	61.6#	23.8*	68.4
	FCK = 20 MPa	10.6*	46.4*	17.9*	65.1#	24.3*	68.5
h = 13.0 cm	FCK = 15 MPa	10.4*	43.0*	17.6*	55.6#	22.7*	68.8
	FCK = 18 MPa	10.9*	47.2*	18.4*	66.7*	24.8*	68.9
	FCK = 20 MPa	11.1*	48.5*	18.7*	68.6*	25.3*	70.7#
h = 13.5 cm	FCK = 15 MPa	10.9*	44.8*	18.3*	60.2#	23.6*	69.3
	FCK = 18 MPa	11.4*	49.2*	19.2*	69.5*	25.9*	72.4#
	FCK = 20 MPa	11.6*	50.3*	19.4*	71.5*	26.3*	76.5#
h = 14.0 cm	FCK = 15 MPa	11.3*	46.6*	19.0*	65.0#	24.5*	69.7
	FCK = 18 MPa	11.8*	51.2*	19.9*	72.4*	26.9*	78.1#
	FCK = 20 MPa	12.0*	52.6*	20.2*	74.4*	27.4*	82.6#
h = 14.5 cm	FCK = 15 MPa	11.7*	48.5*	19.7*	68.5*	25.5*	70.2
	FCK = 18 MPa	12.3*	53.2*	20.7*	75.2*	27.9*	84.1#
	FCK = 20 MPa	12.5*	54.7*	21.0*	77.3*	28.4*	88.9#
h = 15.0 cm	FCK = 15 MPa	12.2*	50.3*	20.5*	71.1*	26.4*	75.1#
	FCK = 18 MPa	12.7*	55.2*	21.4*	78.0*	28.9*	90.3#
	FCK = 20 MPa	12.9*	56.8*	21.7*	80.3*	29.5*	95.4#

T E L A T 283 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	5.3*	23.4	8.9*	46.7	11.5*	70.1
	FCK = 18 MPa	5.5*	23.4	9.3*	46.9	12.6*	70.3
	FCK = 20 MPa	5.6*	23.5	9.5*	46.9	12.8*	70.4
h = 7.5 cm	FCK = 15 MPa	5.7*	23.9	9.6*	47.9	12.4*	71.8
	FCK = 18 MPa	6.0*	24.0	10.1*	48.0	13.6*	72.0
	FCK = 20 MPa	6.1*	24.0	10.2*	48.1	13.9*	72.1
h = 8.0 cm	FCK = 15 MPa	6.2*	24.5	10.3*	48.9	13.3*	73.4
	FCK = 18 MPa	6.4*	24.5	10.8*	49.1	14.6*	73.6
	FCK = 20 MPa	6.5*	24.7#	11.0*	49.1	14.9*	73.7
h = 8.5 cm	FCK = 15 MPa	6.6*	24.9	11.1*	49.9	14.3*	74.8
	FCK = 18 MPa	6.9*	26.7#	11.6*	50.0	15.7*	75.0
	FCK = 20 MPa	7.0*	28.2#	11.8*	50.1	15.9*	75.1
h = 9.0 cm	FCK = 15 MPa	7.0*	25.4	11.8*	50.7	15.2*	76.1
	FCK = 18 MPa	7.3*	30.2#	12.4*	50.8	16.7*	76.3
	FCK = 20 MPa	7.4*	31.9#	12.5*	50.9	17.0*	76.4
h = 9.5 cm	FCK = 15 MPa	7.4*	28.2#	12.5*	51.5	16.1*	77.3
	FCK = 18 MPa	7.8*	33.9#	13.1*	51.6	17.7*	77.4
	FCK = 20 MPa	7.9*	35.9#	13.3*	51.7	18.0*	77.5
h = 10.0 cm	FCK = 15 MPa	7.9*	31.5#	13.2*	52.2	17.1*	78.3
	FCK = 18 MPa	8.2*	37.9#	13.9*	52.3	18.7*	78.5
	FCK = 20 MPa	8.4*	39.7*	14.1*	52.4	19.1*	78.6
h = 10.5 cm	FCK = 15 MPa	8.3*	35.0#	14.0*	52.9	18.0*	79.3
	FCK = 18 MPa	8.7*	40.8*	14.6*	53.0	19.7*	79.5
	FCK = 20 MPa	8.8*	42.0*	14.8*	53.1	20.1*	79.6
h = 11.0 cm	FCK = 15 MPa	8.7*	38.6#	14.7*	53.5	18.9*	80.2
	FCK = 18 MPa	9.1*	43.0*	15.4*	53.6	20.8*	80.4
	FCK = 20 MPa	9.3*	44.3*	15.6*	53.7	21.1*	80.5
h = 11.5 cm	FCK = 15 MPa	9.2*	41.2*	15.4*	54.0	19.9*	81.0
	FCK = 18 MPa	9.6*	45.3*	16.1*	54.1	21.8*	81.2
	FCK = 20 MPa	9.7*	46.5*	16.4*	54.2	22.2*	81.3
h = 12.0 cm	FCK = 15 MPa	9.6*	43.2*	16.1*	54.5	20.8*	81.8
	FCK = 18 MPa	10.0*	47.5*	16.9*	55.9#	22.8*	82.0
	FCK = 20 MPa	10.2*	48.8*	17.1*	59.1#	23.2*	82.1
h = 12.5 cm	FCK = 15 MPa	10.0*	45.3*	16.8*	55.0	21.7*	82.5
	FCK = 18 MPa	10.5*	49.7*	17.6*	61.0#	23.8*	82.7
	FCK = 20 MPa	10.6*	51.1*	17.9*	64.4#	24.3*	82.8
h = 13.0 cm	FCK = 15 MPa	10.4*	47.3*	17.6*	55.5	22.7*	83.2
	FCK = 18 MPa	10.9*	51.9*	18.4*	66.2#	24.8*	83.4
	FCK = 20 MPa	11.1*	53.4*	18.7*	70.0#	25.3*	83.5
h = 13.5 cm	FCK = 15 MPa	10.9*	49.3*	18.3*	59.7#	23.6*	83.9
	FCK = 18 MPa	11.4*	54.1*	19.2*	71.7#	25.9*	84.0
	FCK = 20 MPa	11.6*	55.7*	19.4*	75.0#	26.3*	84.1
h = 14.0 cm	FCK = 15 MPa	11.3*	51.4*	19.0*	64.4#	24.5*	84.4
	FCK = 18 MPa	11.8*	56.4*	19.9*	77.4#	26.9*	84.6
	FCK = 20 MPa	12.0*	58.0*	20.2*	81.8#	27.4*	84.7
h = 14.5 cm	FCK = 15 MPa	11.7*	53.4*	19.7*	69.4#	25.5*	85.0
	FCK = 18 MPa	12.3*	58.6*	20.7*	82.9*	27.9*	85.2
	FCK = 20 MPa	12.5*	60.3*	21.0*	85.2*	28.4*	88.1#
h = 15.0 cm	FCK = 15 MPa	12.2*	55.4*	20.5*	74.5#	26.4*	85.5
	FCK = 18 MPa	12.7*	60.8*	21.4*	86.0*	28.9*	89.5#
	FCK = 20 MPa	12.9*	62.6*	21.7*	88.5*	29.5*	94.6#



T E L A T 335 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	5.4*	22.3	8.1*	44.7	11.0*	67.0
	FCK = 18 MPa	6.0*	22.4	8.5*	44.8	11.6*	67.2
	FCK = 20 MPa	6.1*	22.4	8.7*	44.9	11.7*	67.3
h = 7.5 cm	FCK = 15 MPa	5.9*	23.0	8.8*	46.1	11.9*	69.1
	FCK = 18 MPa	6.5*	23.1	9.2*	46.2	12.5*	69.3
	FCK = 20 MPa	6.6*	23.1	9.4*	46.3	12.7*	69.4
h = 8.0 cm	FCK = 15 MPa	6.3*	23.7	9.5*	47.3	12.8*	71.0
	FCK = 18 MPa	6.9*	23.7	9.9*	47.5	13.5*	71.2
	FCK = 20 MPa	7.1*	23.8	10.1*	47.6	13.7*	71.3
h = 8.5 cm	FCK = 15 MPa	6.8*	24.2	10.1*	48.5	13.7*	72.7
	FCK = 18 MPa	7.4*	25.3#	10.6*	48.6	14.4*	72.9
	FCK = 20 MPa	7.6*	26.7#	10.8*	48.7	14.6*	73.1
h = 9.0 cm	FCK = 15 MPa	7.2*	24.8	10.8*	49.5	14.7*	74.3
	FCK = 18 MPa	7.9*	28.7#	11.3*	49.7	15.4*	74.5
	FCK = 20 MPa	8.1*	30.3#	11.5*	49.7	15.6*	74.6
h = 9.5 cm	FCK = 15 MPa	7.7*	26.9#	11.5*	50.5	15.6*	75.8
	FCK = 18 MPa	8.4*	32.3#	12.0*	50.6	16.3*	75.9
	FCK = 20 MPa	8.6*	34.2#	12.2*	50.7	16.5*	76.1
h = 10.0 cm	FCK = 15 MPa	8.1*	30.1#	12.1*	51.4	16.5*	77.1
	FCK = 18 MPa	8.9*	36.2#	12.7*	51.5	17.2*	77.3
	FCK = 20 MPa	9.1*	38.3#	12.9*	51.6	17.5*	77.4
h = 10.5 cm	FCK = 15 MPa	8.6*	33.5#	12.8*	52.2	17.4*	78.3
	FCK = 18 MPa	9.4*	40.1*	13.4*	52.3	18.2*	78.5
	FCK = 20 MPa	9.6*	41.2*	13.6*	52.4	18.4*	78.6
h = 11.0 cm	FCK = 15 MPa	9.0*	37.1#	13.5*	52.9	18.3*	79.4
	FCK = 18 MPa	9.9*	42.4*	14.1*	53.1	19.1*	79.6
	FCK = 20 MPa	10.2*	43.6*	14.4*	53.1	19.4*	79.7
h = 11.5 cm	FCK = 15 MPa	9.5*	40.6*	14.1*	53.6	19.2*	80.4
	FCK = 18 MPa	10.4*	44.6*	14.8*	53.7	20.1*	80.6
	FCK = 20 MPa	10.7*	45.9*	15.1*	53.8	20.4*	80.7
h = 12.0 cm	FCK = 15 MPa	9.9*	42.7*	14.8*	54.3	20.1*	81.4
	FCK = 18 MPa	10.9*	46.9*	15.5*	54.4	21.0*	81.6
	FCK = 20 MPa	11.2*	48.2*	15.8*	56.9#	21.3*	81.7
h = 12.5 cm	FCK = 15 MPa	10.3*	44.8*	15.5*	54.9	21.0*	82.3
	FCK = 18 MPa	11.3*	49.2*	16.2*	58.8#	22.0*	82.5
	FCK = 20 MPa	11.7*	50.6*	16.5*	62.2#	22.3*	82.6
h = 13.0 cm	FCK = 15 MPa	10.8*	46.8*	16.1*	55.4	21.9*	83.1
	FCK = 18 MPa	11.8*	51.4*	16.9*	64.0#	22.9*	83.3
	FCK = 20 MPa	12.2*	52.9*	17.2*	67.7#	23.3*	83.4
h = 13.5 cm	FCK = 15 MPa	11.2*	48.9*	16.8*	57.7#	22.8*	83.9
	FCK = 18 MPa	12.3*	53.7*	17.6*	69.4#	23.9*	84.1
	FCK = 20 MPa	12.7*	55.2*	17.9*	73.4#	24.2*	84.2
h = 14.0 cm	FCK = 15 MPa	11.7*	51.0*	17.5*	62.4#	23.7*	84.7
	FCK = 18 MPa	12.8*	56.0*	18.3*	75.0#	24.8*	84.8
	FCK = 20 MPa	13.2*	57.6*	18.6*	79.3#	25.2*	84.9
h = 14.5 cm	FCK = 15 MPa	12.1*	53.1*	18.2*	67.3#	24.6*	85.4
	FCK = 18 MPa	13.3*	58.3*	19.0*	80.9#	25.8*	85.5
	FCK = 20 MPa	13.7*	59.9*	19.3*	84.7*	26.1*	85.6
h = 15.0 cm	FCK = 15 MPa	12.6*	55.1*	18.8*	72.3#	25.5*	86.0
	FCK = 18 MPa	13.8*	60.5*	19.7*	85.6*	26.7*	86.9#
	FCK = 20 MPa	14.2*	62.3*	20.0*	88.1*	27.1*	91.9#

T E L A T 396 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	5.3*	34.8	8.9*	69.6	11.5*	104.4
	FCK = 18 MPa	5.5*	34.9	9.3*	69.8	12.6*	104.7
	FCK = 20 MPa	5.6*	35.0	9.5*	69.9	12.8*	104.9
h = 7.5 cm	FCK = 15 MPa	5.7*	35.9	9.6*	71.7	12.4*	107.6
	FCK = 18 MPa	6.0*	36.0	10.1*	72.0	13.6*	107.9
	FCK = 20 MPa	6.1*	36.0	10.2*	72.1	13.9*	108.1
h = 8.0 cm	FCK = 15 MPa	6.2*	36.9	10.3*	73.7	13.3*	110.6
	FCK = 18 MPa	6.4*	37.0	10.8*	73.9	14.6*	110.9
	FCK = 20 MPa	6.5*	37.0	11.0*	74.1	14.9*	111.1
h = 8.5 cm	FCK = 15 MPa	6.6*	37.8	11.1*	75.5	14.3*	113.2
	FCK = 18 MPa	6.9*	37.9	11.6*	75.7	15.7*	113.6
	FCK = 20 MPa	7.0*	37.9	11.8*	75.8	15.9*	113.8
h = 9.0 cm	FCK = 15 MPa	7.0*	38.6	11.8*	77.1	15.2*	115.7
	FCK = 18 MPa	7.3*	38.7	12.4*	77.3	16.7*	116.0
	FCK = 20 MPa	7.4*	38.7	12.5*	77.5	17.0*	116.2
h = 9.5 cm	FCK = 15 MPa	7.4*	39.3	12.5*	78.6	16.1*	117.9
	FCK = 18 MPa	7.8*	39.4	13.1*	78.8	17.7*	118.2
	FCK = 20 MPa	7.9*	39.5	13.3*	79.0	18.0*	118.4
h = 10.0 cm	FCK = 15 MPa	7.9*	40.0	13.2*	80.0	17.1*	120.0
	FCK = 18 MPa	8.2*	40.1	13.9*	80.2	18.7*	120.3
	FCK = 20 MPa	8.4*	40.2	14.1*	80.3	19.1*	120.5
h = 10.5 cm	FCK = 15 MPa	8.3*	40.6	14.0*	81.3	18.0*	121.9
	FCK = 18 MPa	8.7*	40.8#	14.6*	81.5	19.7*	122.2
	FCK = 20 MPa	8.8*	43.1#	14.8*	81.6	20.1*	123.4
h = 11.0 cm	FCK = 15 MPa	8.7*	41.2	14.7*	82.4	18.9*	123.6
	FCK = 18 MPa	9.1*	45.1#	15.4*	82.6	20.8*	124.0
	FCK = 20 MPa	9.3*	47.7#	15.6*	82.8	21.1*	124.1
h = 11.5 cm	FCK = 15 MPa	9.2*	41.8	15.4*	83.5	19.9*	125.3
	FCK = 18 MPa	9.6*	49.6#	16.1*	83.7	21.8*	125.6
	FCK = 20 MPa	9.7*	52.5#	16.4*	83.8	22.2*	125.8
h = 12.0 cm	FCK = 15 MPa	9.6*	45.2#	16.1*	84.5	20.6*	126.8
	FCK = 18 MPa	10.0*	54.4#	16.9*	84.7	22.8*	127.1
	FCK = 20 MPa	10.2*	57.5#	17.1*	84.9	23.2*	127.3
h = 12.5 cm	FCK = 15 MPa	10.0*	49.3#	16.8*	85.5	21.7*	128.2
	FCK = 18 MPa	10.5*	59.4#	17.6*	85.7	23.8*	128.5
	FCK = 20 MPa	10.6*	62.7#	17.9*	85.8	24.3*	128.7
h = 13.0 cm	FCK = 15 MPa	10.4*	53.7#	17.6*	86.4	22.7*	129.5
	FCK = 18 MPa	10.9*	64.6#	18.4*	86.6	24.8*	129.8
	FCK = 20 MPa	11.1*	67.0*	18.7*	86.7	25.3*	130.0
h = 13.5 cm	FCK = 15 MPa	10.9*	58.2#	18.3*	87.2	23.6*	130.8
	FCK = 18 MPa	11.4*	67.9*	19.2*	87.4	25.9*	131.1
	FCK = 20 MPa	11.6*	69.9*	19.4*	87.5	26.3*	131.3
h = 14.0 cm	FCK = 15 MPa	11.3*	62.9#	19.0*	88.0	24.5*	132.0
	FCK = 18 MPa	11.8*	70.8*	19.9*	88.2	26.9*	132.3
	FCK = 20 MPa	12.0*	72.8*	20.2*	88.3	27.4*	132.4
h = 14.5 cm	FCK = 15 MPa	11.7*	67.1*	19.7*	88.7	25.5*	133.1
	FCK = 18 MPa	12.3*	73.6*	20.7*	88.9	27.9*	133.4
	FCK = 20 MPa	12.5*	75.7*	21.0*	89.0	28.4*	133.5
h = 15.0 cm	FCK = 15 MPa	12.2*	69.7*	20.5*	89.4	26.4*	134.1
	FCK = 18 MPa	12.7*	76.5*	21.4*	89.6	28.9*	134.4
	FCK = 20 MPa	12.9*	78.7*	21.7*	92.5#	29.5*	134.6



T E L A T 503 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	7.0*	45.4	11.7*	90.9	14.5*	136.3
	FCK = 18 MPa	7.3*	45.6	12.3*	91.2	15.9*	136.8
	FCK = 20 MPa	7.4*	45.7	12.5*	91.4	16.3*	137.0
h = 7.5 cm	FCK = 15 MPa	7.5*	47.1	12.7*	94.2	15.7*	141.3
	FCK = 18 MPa	7.9*	47.3	13.3*	94.5	17.2*	141.8
	FCK = 20 MPa	8.0*	47.4	13.5*	94.7	17.7*	142.1
h = 8.0 cm	FCK = 15 MPa	8.1*	48.6	13.7*	97.3	16.9*	145.9
	FCK = 18 MPa	8.5*	48.8	14.3*	97.6	18.5*	146.4
	FCK = 20 MPa	8.6*	48.9	14.5*	97.8	19.0*	146.7
h = 8.5 cm	FCK = 15 MPa	8.7*	50.0	14.6*	100.0	18.1*	150.1
	FCK = 18 MPa	9.1*	50.2	15.3*	100.4	19.8*	150.5
	FCK = 20 MPa	9.2*	50.3	15.5*	100.5	20.4*	150.8
h = 9.0 cm	FCK = 15 MPa	9.3*	51.3	15.6*	102.6	19.3*	153.9
	FCK = 18 MPa	9.7*	51.5	16.3*	102.9	21.1*	154.4
	FCK = 20 MPa	9.9*	51.5	16.6*	103.1	21.7*	154.6
h = 9.5 cm	FCK = 15 MPa	9.9*	52.5	16.6*	104.9	20.5*	157.4
	FCK = 18 MPa	10.3*	52.6	17.4*	105.2	22.4*	157.9
	FCK = 20 MPa	10.5*	52.7	17.6*	105.4	23.1*	158.1
h = 10.0 cm	FCK = 15 MPa	10.4*	53.5	17.5*	107.1	21.7*	160.6
	FCK = 18 MPa	10.9*	53.7	18.4*	107.4	23.8*	161.1
	FCK = 20 MPa	11.1*	53.8	18.6*	107.6	24.4*	161.4
h = 10.5 cm	FCK = 15 MPa	11.0*	54.5	18.5*	109.1	22.9*	163.6
	FCK = 18 MPa	11.5*	54.7	19.4*	109.4	25.1*	164.1
	FCK = 20 MPa	11.7*	54.8	19.7*	109.6	25.8*	164.4
h = 11.0 cm	FCK = 15 MPa	11.6*	55.5	19.5*	110.9	24.1*	166.4
	FCK = 18 MPa	12.1*	55.6	20.4*	111.3	26.4*	166.9
	FCK = 20 MPa	12.3*	55.7	20.7*	111.4	27.1*	167.2
h = 11.5 cm	FCK = 15 MPa	12.2*	56.3	20.5*	112.7	25.3*	169.0
	FCK = 18 MPa	12.8*	56.5	21.4*	113.0	27.7*	169.5
	FCK = 20 MPa	12.9*	56.6	21.6*	113.2	28.5*	169.7
h = 12.0 cm	FCK = 15 MPa	12.8*	57.1	21.4*	114.3	26.5*	171.4
	FCK = 18 MPa	13.4*	57.3	22.5*	114.6	29.0*	171.9
	FCK = 20 MPa	13.5*	57.4	22.8*	114.8	29.9*	172.2
h = 12.5 cm	FCK = 15 MPa	13.3*	57.9	22.4*	115.8	27.7*	173.7
	FCK = 18 MPa	14.0*	58.1#	23.5*	116.1	30.4*	174.2
	FCK = 20 MPa	14.2*	58.1#	23.8*	116.3	31.2*	174.4
h = 13.0 cm	FCK = 15 MPa	13.9*	58.6	23.4*	117.2	28.9*	175.8
	FCK = 18 MPa	14.6*	63.2#	24.5*	117.5	31.7*	176.3
	FCK = 20 MPa	14.8*	66.8#	24.9*	117.7	32.6*	176.5
h = 13.5 cm	FCK = 15 MPa	14.5*	59.3	24.4*	118.5	30.1*	177.8
	FCK = 18 MPa	15.2*	68.5#	25.5*	118.8	33.0*	178.3
	FCK = 20 MPa	15.4*	72.5#	25.9*	119.0	33.9*	178.5
h = 14.0 cm	FCK = 15 MPa	15.1*	61.6#	25.3*	119.8	31.3*	179.7
	FCK = 18 MPa	15.8*	74.1#	26.6*	120.1	34.3*	180.1
	FCK = 20 MPa	16.0*	78.3#	26.9*	120.3	35.3*	180.4
h = 14.5 cm	FCK = 15 MPa	15.7*	66.4#	26.3*	121.0	32.5*	181.5
	FCK = 18 MPa	16.4*	79.9#	27.6*	121.3	35.6*	181.9
	FCK = 20 MPa	16.6*	84.5#	28.0*	121.5	36.6*	182.2
h = 15.0 cm	FCK = 15 MPa	16.2*	71.4#	27.3*	122.1	33.7*	183.1
	FCK = 18 MPa	17.0*	85.9#	28.6*	122.4	37.0*	183.6
	FCK = 20 MPa	17.2*	90.8#	29.0*	122.6	38.0*	183.8

T E L A T 636 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	7.0*	58.1	11.7*	116.1	14.5*	174.2
	FCK = 18 MPa	7.3*	58.3	12.3*	116.6	15.9*	174.9
	FCK = 20 MPa	7.4*	58.4	12.5*	116.8	16.3*	175.3
h = 7.5 cm	FCK = 15 MPa	7.5*	60.6	12.7*	121.2	15.7*	181.8
	FCK = 18 MPa	7.9*	60.8	13.3*	121.6	17.2*	182.4
	FCK = 20 MPa	8.0*	60.9	13.5*	121.9	17.7*	182.8
h = 8.0 cm	FCK = 15 MPa	8.1*	62.9	13.7*	125.8	16.9*	188.6
	FCK = 18 MPa	8.5*	63.1	14.3*	126.2	18.5*	189.3
	FCK = 20 MPa	8.6*	63.2	14.5*	126.5	19.0*	189.7
h = 8.5 cm	FCK = 15 MPa	8.7*	65.0	14.6*	130.0	18.1*	195.0
	FCK = 18 MPa	9.1*	65.2	15.3*	130.4	19.8*	195.6
	FCK = 20 MPa	9.2*	65.3	15.5*	130.7	20.4*	196.0
h = 9.0 cm	FCK = 15 MPa	9.3*	66.9	15.6*	133.9	19.3*	200.8
	FCK = 18 MPa	9.7*	67.2	16.3*	134.3	21.1*	201.5
	FCK = 20 MPa	9.9*	67.3	16.6*	134.6	21.7*	201.9
h = 9.5 cm	FCK = 15 MPa	9.9*	68.7	16.6*	137.4	20.5*	206.2
	FCK = 18 MPa	10.3*	68.9	17.4*	137.9	22.4*	206.8
	FCK = 20 MPa	10.5*	69.1	17.6*	138.2	23.1*	207.2
h = 10.0 cm	FCK = 15 MPa	10.4*	70.4	17.5*	140.8	21.7*	211.1
	FCK = 18 MPa	10.9*	70.6	18.4*	141.2	23.8*	211.8
	FCK = 20 MPa	11.1*	70.7	18.6*	141.5	24.4*	212.2
h = 10.5 cm	FCK = 15 MPa	11.0*	71.9	18.5*	143.8	22.9*	215.8
	FCK = 18 MPa	11.5*	72.1	19.4*	144.3	25.1*	216.4
	FCK = 20 MPa	11.7*	72.3	19.7*	144.6	25.8*	216.8
h = 11.0 cm	FCK = 15 MPa	11.6*	73.4	19.5*	146.7	24.1*	220.1
	FCK = 18 MPa	12.1*	73.6	20.4*	147.2	26.4*	220.8
	FCK = 20 MPa	12.3*	73.7	20.7*	147.4	27.1*	221.2
h = 11.5 cm	FCK = 15 MPa	12.2*	74.7	20.5*	149.4	25.3*	224.1
	FCK = 18 MPa	12.8*	74.9	21.4*	149.9	27.7*	224.8
	FCK = 20 MPa	12.9*	75.1	21.8*	150.1	28.5*	225.2
h = 12.0 cm	FCK = 15 MPa	12.8*	76.0	21.4*	151.9	26.5*	227.9
	FCK = 18 MPa	13.4*	76.2	22.5*	152.4	29.0*	228.6
	FCK = 20 MPa	13.5*	76.3	22.8*	152.6	29.9*	229.0
h = 12.5 cm	FCK = 15 MPa	13.3*	77.1	22.4*	154.3	27.7*	231.4
	FCK = 18 MPa	14.0*	77.4	23.5*	154.7	30.4*	232.1
	FCK = 20 MPa	14.2*	77.5	23.8*	155.0	31.2*	232.5
h = 13.0 cm	FCK = 15 MPa	13.9*	78.2	23.4*	156.5	28.9*	234.7
	FCK = 18 MPa	14.6*	78.5	24.5*	156.9	31.7*	235.4
	FCK = 20 MPa	14.8*	78.6	24.9*	157.2	32.6*	235.8
h = 13.5 cm	FCK = 15 MPa	14.5*	79.3	24.4*	158.6	30.1*	237.9
	FCK = 18 MPa	15.2*	79.5	25.5*	159.0	33.0*	238.6
	FCK = 20 MPa	15.4*	79.6	25.9*	159.3	33.9*	238.9
h = 14.0 cm	FCK = 15 MPa	15.1*	80.3	25.3*	160.6	31.3*	240.8
	FCK = 18 MPa	15.8*	80.5	26.6*	161.0	34.3*	241.5
	FCK = 20 MPa	16.0*	80.6	26.9*	161.3	35.3*	241.9
h = 14.5 cm	FCK = 15 MPa	15.7*	81.2	26.3*	162.4	32.5*	243.6
	FCK = 18 MPa	16.4*	81.4	27.6*	162.9	35.6*	244.3
	FCK = 20 MPa	16.6*	82.7#	28.0*	163.1	36.6*	244.7
h = 15.0 cm	FCK = 15 MPa	16.2*	82.1	27.3*	164.2	33.7*	246.3
	FCK = 18 MPa	17.0*	84.1#	28.6*	164.6	37.0*	247.0
	FCK = 20 MPa	17.2*	88.9#	29.0*	164.9	38.0*	247.3



T E L A TA 335 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	5.4*	22.3	8.1*	44.7	11.0*	67.0
	FCK = 18 MPa	6.0*	22.4	8.5*	44.8	11.6*	67.2
	FCK = 20 MPa	6.1*	22.4	8.7*	44.9	11.7*	67.3
h = 7.5 cm	FCK = 15 MPa	5.9*	23.0	8.8*	46.1	11.9*	69.1
	FCK = 18 MPa	6.5*	23.1	9.2*	46.2	12.5*	69.3
	FCK = 20 MPa	6.6*	23.1	9.4*	46.3	12.7*	69.4
h = 8.0 cm	FCK = 15 MPa	6.3*	23.7	9.5*	47.3	12.8*	71.0
	FCK = 18 MPa	6.9*	23.7	9.9*	47.5	13.5*	71.2
	FCK = 20 MPa	7.1*	23.8	10.1*	47.6	13.7*	71.3
h = 8.5 cm	FCK = 15 MPa	6.8*	24.2	10.1*	48.5	13.7*	72.7
	FCK = 18 MPa	7.4*	25.3#	10.6*	48.6	14.4*	72.9
	FCK = 20 MPa	7.6*	26.7#	10.8*	48.7	14.6*	73.1
h = 9.0 cm	FCK = 15 MPa	7.2*	24.8	10.8*	49.5	14.7*	74.3
	FCK = 18 MPa	7.9*	28.7#	11.3*	49.7	15.4*	74.5
	FCK = 20 MPa	8.1*	30.3#	11.5*	49.7	15.6*	74.6
h = 9.5 cm	FCK = 15 MPa	7.7*	26.9#	11.5*	50.5	15.6*	75.8
	FCK = 18 MPa	8.4*	32.3#	12.0*	50.6	16.3*	75.9
	FCK = 20 MPa	8.6*	34.2#	12.2*	50.7	16.5*	76.1
h = 10.0 cm	FCK = 15 MPa	8.1*	30.1#	12.1*	51.4	16.5*	77.1
	FCK = 18 MPa	8.9*	36.2#	12.7*	51.5	17.2*	77.3
	FCK = 20 MPa	9.1*	38.3#	12.9*	51.6	17.5*	77.4
h = 10.5 cm	FCK = 15 MPa	8.6*	33.5#	12.8*	52.2	17.4*	78.3
	FCK = 18 MPa	9.4*	40.1*	13.4*	52.3	18.2*	78.5
	FCK = 20 MPa	9.6*	41.2*	13.6*	52.4	18.4*	78.6
h = 11.0 cm	FCK = 15 MPa	9.0*	37.1#	13.5*	52.9	18.3*	79.4
	FCK = 18 MPa	9.9*	42.4*	14.1*	53.1	19.1*	79.6
	FCK = 20 MPa	10.2*	43.6*	14.4*	53.1	19.4*	79.7
h = 11.5 cm	FCK = 15 MPa	9.5*	40.6*	14.1*	53.6	19.2*	80.4
	FCK = 18 MPa	10.4*	44.6*	14.8*	53.7	20.1*	80.6
	FCK = 20 MPa	10.7*	45.9*	15.1*	53.8	20.4*	80.7
h = 12.0 cm	FCK = 15 MPa	9.9*	42.7*	14.8*	54.3	20.1*	81.4
	FCK = 18 MPa	10.9*	46.9*	15.5*	54.4	21.0*	81.6
	FCK = 20 MPa	11.2*	48.2*	15.8*	56.9#	21.3*	81.7
h = 12.5 cm	FCK = 15 MPa	10.3*	44.8*	15.5*	54.9	21.0*	82.3
	FCK = 18 MPa	11.3*	49.2*	16.2*	58.8#	22.0*	82.5
	FCK = 20 MPa	11.7*	50.6*	16.5*	62.2#	22.3*	82.6
h = 13.0 cm	FCK = 15 MPa	10.8*	46.8*	16.1*	55.4	21.9*	83.1
	FCK = 18 MPa	11.8*	51.4*	16.9*	64.0#	22.9*	83.3
	FCK = 20 MPa	12.2*	52.9*	17.2*	67.7#	23.3*	83.4
h = 13.5 cm	FCK = 15 MPa	11.2*	48.9*	16.8*	57.7#	22.8*	83.9
	FCK = 18 MPa	12.3*	53.7*	17.6*	69.4#	23.9*	84.1
	FCK = 20 MPa	12.7*	55.2*	17.9*	73.4#	24.2*	84.2
h = 14.0 cm	FCK = 15 MPa	11.7*	51.0*	17.5*	62.4#	23.7*	84.7
	FCK = 18 MPa	12.8*	56.0*	18.3*	75.0#	24.8*	84.8
	FCK = 20 MPa	13.2*	57.6*	18.6*	79.3#	25.2*	84.9
h = 14.5 cm	FCK = 15 MPa	12.1*	53.1*	18.2*	67.3#	24.6*	85.4
	FCK = 18 MPa	13.3*	58.3*	19.0*	80.9#	25.8*	85.5
	FCK = 20 MPa	13.7*	59.9*	19.3*	84.7*	26.1*	85.6
h = 15.0 cm	FCK = 15 MPa	12.6*	55.1*	18.8*	72.3#	25.5*	86.0
	FCK = 18 MPa	13.8*	60.5*	19.7*	85.6*	26.7*	86.9#
	FCK = 20 MPa	14.2*	62.3*	20.0*	88.1*	27.1*	91.9#

T E L A TA 396 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	5.3*	34.8	8.9*	69.6	11.5*	104.4
	FCK = 18 MPa	5.5*	34.9	9.3*	69.8	12.3*	104.7
	FCK = 20 MPa	5.6*	35.0	9.5*	69.9	12.8*	104.9
h = 7.5 cm	FCK = 15 MPa	5.7*	35.9	9.6*	71.7	12.4*	107.6
	FCK = 18 MPa	6.0*	36.0	10.1*	72.0	13.6*	107.9
	FCK = 20 MPa	6.1*	36.0	10.2*	72.1	13.9*	108.1
h = 8.0 cm	FCK = 15 MPa	6.2*	36.9	10.3*	73.7	13.3*	110.6
	FCK = 18 MPa	6.4*	37.0	10.8*	73.9	14.6*	110.9
	FCK = 20 MPa	6.5*	37.0	11.0*	74.1	14.9*	111.1
h = 8.5 cm	FCK = 15 MPa	6.6*	37.8	11.1*	75.5	14.3*	113.2
	FCK = 18 MPa	6.9*	37.9	11.6*	75.7	15.7*	113.6
	FCK = 20 MPa	7.0*	37.9	11.8*	75.8	15.9*	113.8
h = 9.0 cm	FCK = 15 MPa	7.0*	38.6	11.8*	77.1	15.2*	115.7
	FCK = 18 MPa	7.3*	38.7	12.4*	77.3	15.7*	116.0
	FCK = 20 MPa	7.4*	38.7	12.5*	77.5	17.0*	116.2
h = 9.5 cm	FCK = 15 MPa	7.4*	39.3	12.5*	78.6	16.1*	117.9
	FCK = 18 MPa	7.8*	39.4	13.1*	78.8	17.7*	118.2
	FCK = 20 MPa	7.9*	39.5	13.3*	79.0	18.0*	118.4
h = 10.0 cm	FCK = 15 MPa	7.9*	40.0	13.2*	80.0	17.1*	120.0
	FCK = 18 MPa	8.2*	40.1	13.9*	80.2	18.7*	120.3
	FCK = 20 MPa	8.4*	40.2	14.1*	80.3	19.1*	120.5
h = 10.5 cm	FCK = 15 MPa	8.3*	40.6	14.0*	81.3	18.0*	121.9
	FCK = 18 MPa	8.7*	40.8#	14.6*	81.5	19.7*	122.2
	FCK = 20 MPa	8.8*	43.1#	14.8*	81.6	20.1*	122.4
h = 11.0 cm	FCK = 15 MPa	8.7*	41.2	14.7*	82.4	18.9*	123.6
	FCK = 18 MPa	9.1*	45.1#	15.4*	82.6	20.8*	124.0
	FCK = 20 MPa	9.3*	47.7*	15.6*	82.8	21.1*	124.1
h = 11.5 cm	FCK = 15 MPa	9.2*	41.8	15.4*	83.5	19.9*	125.3
	FCK = 18 MPa	9.6*	49.6#	16.1*	83.7	21.8*	125.6
	FCK = 20 MPa	9.7*	52.5#	16.4*	83.8	22.2*	125.8
h = 12.0 cm	FCK = 15 MPa	9.6*	45.2#	16.1*	84.5	20.8*	126.8
	FCK = 18 MPa	10.0*	54.4#	16.9*	84.7	22.8*	127.1
	FCK = 20 MPa	10.2*	57.5#	17.1*	84.9	23.2*	127.3
h = 12.5 cm	FCK = 15 MPa	10.0*	49.3#	16.8*	85.5	21.7*	128.2
	FCK = 18 MPa	10.5*	59.4#	17.6*	85.7	23.8*	128.5
	FCK = 20 MPa	10.6*	62.7#	17.9*	85.8	24.3*	128.7
h = 13.0 cm	FCK = 15 MPa	10.4*	53.7#	17.6*	86.4	22.7*	129.5
	FCK = 18 MPa	10.9*	64.6#	18.4*	86.6	24.8*	129.8
	FCK = 20 MPa	11.1*	67.0*	18.7*	86.7	25.3*	130.0
h = 13.5 cm	FCK = 15 MPa	10.9*	58.2#	18.3*	87.2	23.6*	130.8
	FCK = 18 MPa	11.4*	67.9*	19.2*	87.4	25.9*	131.1
	FCK = 20 MPa	11.6*	69.9*	19.4*	87.5	26.3*	131.3
h = 14.0 cm	FCK = 15 MPa	11.3*	62.9#	19.0*	88.0	24.5*	132.0
	FCK = 18 MPa	11.8*	70.8*	19.9*	88.2	26.9*	132.3
	FCK = 20 MPa	12.0*	72.8*	20.2*	88.3	27.4*	132.4
h = 14.5 cm	FCK = 15 MPa	11.7*	67.1*	19.7*	88.7	25.5*	133.1
	FCK = 18 MPa	12.3*	73.6*	20.7*	88.9	27.9*	133.4
	FCK = 20 MPa	12.5*	75.7*	21.0*	89.0	28.4*	133.5
h = 15.0 cm	FCK = 15 MPa	12.2*	69.7*	20.5*	89.4	26.4*	134.1
	FCK = 18 MPa	12.7*	76.5*	21.4*	89.6	28.9*	134.4
	FCK = 20 MPa	12.9*	78.7*	21.7*	92.5#	29.5*	134.6



T E L A TA 503 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	7.0*	45.4	11.7*	90.9	14.5*	136.3
	FCK = 18 MPa	7.3*	45.6	12.3*	91.2	15.9*	136.8
	FCK = 20 MPa	7.4*	45.7	12.5*	91.4	16.3*	137.0
h = 7.5 cm	FCK = 15 MPa	7.5*	47.1	12.7*	94.2	15.7*	141.3
	FCK = 18 MPa	7.9*	47.3	13.3*	94.5	17.2*	141.8
	FCK = 20 MPa	8.0*	47.4	13.5*	94.7	17.7*	142.1
h = 8.0 cm	FCK = 15 MPa	8.1*	48.6	13.7*	97.3	16.9*	145.9
	FCK = 18 MPa	8.5*	48.8	14.3*	97.6	18.5*	146.4
	FCK = 20 MPa	8.6*	48.9	14.5*	97.8	19.0*	146.7
h = 8.5 cm	FCK = 15 MPa	8.7*	50.0	14.6*	100.0	18.1*	150.1
	FCK = 18 MPa	9.1*	50.2	15.3*	100.4	19.8*	150.5
	FCK = 20 MPa	9.2*	50.3	15.5*	100.5	20.4*	150.8
h = 9.0 cm	FCK = 15 MPa	9.3*	51.3	15.6*	102.6	19.3*	153.9
	FCK = 18 MPa	9.7*	51.5	16.3*	102.9	21.1*	154.4
	FCK = 20 MPa	9.9*	51.5	16.6*	103.1	21.7*	154.6
h = 9.5 cm	FCK = 15 MPa	9.9*	52.5	16.6*	104.9	20.5*	157.4
	FCK = 18 MPa	10.3*	52.6	17.4*	105.2	22.4*	157.9
	FCK = 20 MPa	10.5*	52.7	17.6*	105.4	23.1*	158.1
h = 10.0 cm	FCK = 15 MPa	10.4*	53.5	17.5*	107.1	21.7*	160.6
	FCK = 18 MPa	10.9*	53.7	18.4*	107.4	23.8*	161.1
	FCK = 20 MPa	11.1*	53.8	18.6*	107.6	24.4*	161.4
h = 10.5 cm	FCK = 15 MPa	11.0*	54.5	18.5*	109.1	22.9*	163.6
	FCK = 18 MPa	11.5*	54.7	19.4*	109.4	25.1*	164.1
	FCK = 20 MPa	11.7*	54.8	19.7*	109.6	25.8*	164.4
h = 11.0 cm	FCK = 15 MPa	11.6*	55.5	19.5*	110.9	24.1*	166.4
	FCK = 18 MPa	12.1*	55.6	20.4*	111.3	26.4*	166.9
	FCK = 20 MPa	12.3*	55.7	20.7*	111.4	27.1*	167.2
h = 11.5 cm	FCK = 15 MPa	12.2*	56.3	20.5*	112.7	25.3*	169.0
	FCK = 18 MPa	12.8*	56.5	21.4*	113.0	27.7*	169.5
	FCK = 20 MPa	12.9*	56.6	21.8*	113.2	28.5*	169.7
h = 12.0 cm	FCK = 15 MPa	12.8*	57.1	21.4*	114.3	26.5*	171.4
	FCK = 18 MPa	13.4*	57.3	22.5*	114.6	29.0*	171.9
	FCK = 20 MPa	13.5*	57.4	22.8*	114.8	29.9*	172.2
h = 12.5 cm	FCK = 15 MPa	13.3*	57.9	22.4*	115.8	27.7*	173.7
	FCK = 18 MPa	14.0*	58.1#	23.5*	116.1	30.4*	174.2
	FCK = 20 MPa	14.2*	61.4#	23.8*	116.3	31.2*	174.4
h = 13.0 cm	FCK = 15 MPa	13.9*	58.6	23.4*	117.2	28.9*	175.8
	FCK = 18 MPa	14.6*	63.2#	24.5*	117.5	31.7*	176.3
	FCK = 20 MPa	14.8*	66.8#	24.9*	117.7	32.6*	176.5
h = 13.5 cm	FCK = 15 MPa	14.5*	59.3	24.4*	118.5	30.1*	177.8
	FCK = 18 MPa	15.2*	68.5#	25.5*	118.8	33.0*	178.3
	FCK = 20 MPa	15.4*	72.5#	25.9*	119.0	33.9*	178.5
h = 14.0 cm	FCK = 15 MPa	15.1*	61.6#	25.3*	119.8	31.3*	179.7
	FCK = 18 MPa	15.8*	74.1#	26.6*	120.1	34.3*	180.1
	FCK = 20 MPa	16.0*	78.3#	26.9*	120.3	35.3*	180.4
h = 14.5 cm	FCK = 15 MPa	15.7*	66.4#	26.3*	121.0	32.5*	181.5
	FCK = 18 MPa	16.4*	79.9#	27.6*	121.3	35.6*	181.9
	FCK = 20 MPa	16.6*	84.5#	28.0*	121.5	36.6*	182.2
h = 15.0 cm	FCK = 15 MPa	16.2*	71.4#	27.3*	122.1	33.7*	183.1
	FCK = 18 MPa	17.0*	85.9#	28.6*	122.4	37.0*	183.6
	FCK = 20 MPa	17.2*	90.8#	29.0*	122.6	38.0*	183.8

T E L A TA 636 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	7.0*	58.1	11.7*	116.1	14.5*	174.2
	FCK = 18 MPa	7.3*	58.3	12.3*	116.6	15.9*	174.9
	FCK = 20 MPa	7.4*	58.4	12.5*	116.8	16.3*	175.3
h = 7.5 cm	FCK = 15 MPa	7.5*	60.6	12.7*	121.2	15.7*	181.8
	FCK = 18 MPa	7.9*	60.8	13.3*	121.6	17.2*	182.4
	FCK = 20 MPa	8.0*	60.9	13.5*	121.9	17.7*	182.8
h = 8.0 cm	FCK = 15 MPa	8.1*	62.9	13.7*	125.8	16.9*	188.6
	FCK = 18 MPa	8.5*	63.1	14.3*	126.2	18.5*	189.3
	FCK = 20 MPa	8.6*	63.2	14.5*	126.5	19.0*	189.7
h = 8.5 cm	FCK = 15 MPa	8.7*	65.0	14.6*	130.0	18.1*	195.0
	FCK = 18 MPa	9.1*	65.2	15.3*	130.4	19.8*	195.6
	FCK = 20 MPa	9.2*	65.3	15.5*	130.7	20.4*	196.0
h = 9.0 cm	FCK = 15 MPa	9.3*	66.9	15.6*	133.9	19.3*	200.8
	FCK = 18 MPa	9.7*	67.2	16.3*	134.3	21.1*	201.5
	FCK = 20 MPa	9.9*	67.3	16.6*	134.6	21.7*	201.9
h = 9.5 cm	FCK = 15 MPa	9.9*	68.7	16.6*	137.4	20.5*	206.2
	FCK = 18 MPa	10.3*	68.9	17.4*	137.9	22.4*	206.8
	FCK = 20 MPa	10.5*	69.1	17.6*	138.2	23.1*	207.2
h = 10.0 cm	FCK = 15 MPa	10.4*	70.4	17.5*	140.8	21.7*	211.1
	FCK = 18 MPa	10.9*	70.6	18.4*	141.2	23.8*	211.8
	FCK = 20 MPa	11.1*	70.7	18.6*	141.5	24.4*	212.2
h = 10.5 cm	FCK = 15 MPa	11.0*	71.9	18.5*	143.8	22.9*	215.8
	FCK = 18 MPa	11.5*	72.1	19.4*	144.3	25.1*	216.4
	FCK = 20 MPa	11.7*	72.3	19.7*	144.6	25.8*	216.8
h = 11.0 cm	FCK = 15 MPa	11.6*	73.4	19.5*	146.7	24.1*	220.1
	FCK = 18 MPa	12.1*	73.6	20.4*	147.2	26.4*	220.8
	FCK = 20 MPa	12.3*	73.7	20.7*	147.4	27.1*	221.2
h = 11.5 cm	FCK = 15 MPa	12.2*	74.7	20.5*	149.4	25.3*	224.1
	FCK = 18 MPa	12.8*	74.9	21.4*	149.9	27.7*	224.8
	FCK = 20 MPa	12.9*	75.1	21.8*	150.1	28.5*	225.2
h = 12.0 cm	FCK = 15 MPa	12.8*	76.0	21.4*	151.9	26.5*	227.9
	FCK = 18 MPa	13.4*	76.2	22.5*	152.4	29.0*	228.6
	FCK = 20 MPa	13.5*	76.3	22.8*	152.6	29.9*	229.0
h = 12.5 cm	FCK = 15 MPa	13.3*	77.1	22.4*	154.3	27.7*	231.4
	FCK = 18 MPa	14.0*	77.4	23.5*	154.7	30.4*	232.1
	FCK = 20 MPa	14.2*	77.5	23.8*	155.0	31.2*	232.5
h = 13.0 cm	FCK = 15 MPa	13.9*	78.2	23.4*	156.5	28.9*	234.7
	FCK = 18 MPa	14.6*	78.5	24.5*	156.9	31.7*	235.4
	FCK = 20 MPa	14.8*	78.6	24.9*	157.2	32.6*	235.8
h = 13.5 cm	FCK = 15 MPa	14.5*	79.3	24.4*	158.6	30.1*	237.9
	FCK = 18 MPa	15.2*	79.5	25.5*	159.0	33.0*	238.6
	FCK = 20 MPa	15.4*	79.6	25.9*	159.3	33.9*	238.9
h = 14.0 cm	FCK = 15 MPa	15.1*	80.3	25.3*	160.6	31.3*	240.8
	FCK = 18 MPa	15.8*	80.5	26.6*	161.0	34.3*	241.5
	FCK = 20 MPa	16.0*	80.6	26.9*	161.3	35.3*	241.9
h = 14.5 cm	FCK = 15 MPa	15.7*	81.2	26.3*	162.4	32.5*	243.6
	FCK = 18 MPa	16.4*	81.4	27.6*	162.9	35.6*	244.3
	FCK = 20 MPa	16.6*	82.7#	28.0*	163.1	36.6*	244.7
h = 15.0 cm	FCK = 15 MPa	16.2*	82.1	27.3*	164.2	33.7*	246.3
	FCK = 18 MPa	17.0*	84.1#	28.6*	164.6	37.0*	247.0
	FCK = 20 MPa	17.2*	88.9#	29.0*	164.9	38.0*	247.3



T E L A TA 785 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	8.4*	71.3	13.8*	142.7	15.2#	214.0
	FCK = 18 MPa	8.8*	71.6	14.7*	143.2	18.2#	214.8
	FCK = 20 MPa	8.9*	71.8	14.9*	143.6	19.0*	215.4
h = 7.5 cm	FCK = 15 MPa	9.1*	74.9	14.9*	149.8	17.6#	224.6
	FCK = 18 MPa	9.5*	75.2	16.0*	150.4	20.1*	225.5
	FCK = 20 MPa	9.6*	75.3	16.2*	150.7	20.6*	226.0
h = 8.0 cm	FCK = 15 MPa	9.8*	78.1	16.1*	156.3	19.7*	234.4
	FCK = 18 MPa	10.2*	78.4	17.2*	156.9	21.6*	235.3
	FCK = 20 MPa	10.4*	78.6	17.5*	157.2	22.2*	235.9
h = 8.5 cm	FCK = 15 MPa	10.5*	81.2	17.3*	162.3	21.1*	243.5
	FCK = 18 MPa	11.0*	81.5	18.5*	162.9	23.2*	244.4
	FCK = 20 MPa	11.1*	81.6	18.7*	163.3	23.9*	244.9
h = 9.0 cm	FCK = 15 MPa	11.2*	83.9	18.4*	167.9	22.6*	251.8
	FCK = 18 MPa	11.7*	84.3	19.7*	168.5	24.8*	252.8
	FCK = 20 MPa	11.9*	84.4	20.0*	168.9	25.5*	253.3
h = 9.5 cm	FCK = 15 MPa	11.9*	86.5	19.6*	173.1	24.0*	259.6
	FCK = 18 MPa	12.5*	86.8	21.0*	173.7	26.3*	260.5
	FCK = 20 MPa	12.6*	87.0	21.3*	174.0	27.1*	261.1
h = 10.0 cm	FCK = 15 MPa	12.6*	88.9	20.8*	177.9	25.4*	266.8
	FCK = 18 MPa	13.2*	89.3	22.2*	178.5	27.9*	267.8
	FCK = 20 MPa	13.4*	89.4	22.5*	178.9	28.7*	268.3
h = 10.5 cm	FCK = 15 MPa	13.3*	91.2	21.9*	182.4	26.9*	273.6
	FCK = 18 MPa	13.9*	91.5	23.5*	183.0	29.5*	274.5
	FCK = 20 MPa	14.1*	91.7	23.8*	183.4	30.3*	275.0
h = 11.0 cm	FCK = 15 MPa	14.0*	93.3	23.1*	186.6	28.3*	279.9
	FCK = 18 MPa	14.7*	93.6	24.7*	187.2	31.0*	280.8
	FCK = 20 MPa	14.9*	93.8	25.1*	187.6	31.9*	281.4
h = 11.5 cm	FCK = 15 MPa	14.7*	95.3	24.3*	190.5	29.7*	285.8
	FCK = 18 MPa	15.4*	95.6	26.0*	191.1	32.6*	286.7
	FCK = 20 MPa	15.7*	95.8	26.3*	191.5	33.5*	287.3
h = 12.0 cm	FCK = 15 MPa	15.4*	97.1	25.4*	194.2	31.2*	291.3
	FCK = 18 MPa	16.2*	97.4	27.2*	194.8	34.2*	292.3
	FCK = 20 MPa	16.4*	97.6	27.6*	195.2	35.1*	292.8
h = 12.5 cm	FCK = 15 MPa	16.1*	98.8	26.6*	197.7	32.6*	296.5
	FCK = 18 MPa	16.9*	99.2	28.5*	198.3	35.7*	297.5
	FCK = 20 MPa	17.2*	99.3	28.9*	198.7	36.8*	298.0
h = 13.0 cm	FCK = 15 MPa	16.9*	100.5	27.8*	201.0	34.0*	301.5
	FCK = 18 MPa	17.7*	100.8	29.7*	201.6	37.3*	302.4
	FCK = 20 MPa	17.9*	101.0	30.1*	202.0	38.4*	303.0
h = 13.5 cm	FCK = 15 MPa	17.6*	102.0	29.0*	204.1	35.5*	306.1
	FCK = 18 MPa	18.4*	102.4	31.0*	204.7	38.9*	307.1
	FCK = 20 MPa	18.7*	102.5	31.4*	205.1	40.0*	307.6
h = 14.0 cm	FCK = 15 MPa	18.3*	103.5	30.1*	207.0	36.9*	310.5
	FCK = 18 MPa	19.2*	103.8	32.2*	207.6	40.5*	311.5
	FCK = 20 MPa	19.4*	104.0	32.7*	208.0	41.6*	312.0
h = 14.5 cm	FCK = 15 MPa	19.0*	104.9	31.3*	209.8	38.3*	314.7
	FCK = 18 MPa	19.9*	105.2	33.5*	210.4	42.0*	315.6
	FCK = 20 MPa	20.2*	105.4	33.9*	210.8	43.2*	316.2
h = 15.0 cm	FCK = 15 MPa	19.7*	106.2	32.5*	212.4	39.8*	318.7
	FCK = 18 MPa	20.6*	106.5	34.7*	213.1	43.6*	319.6
	FCK = 20 MPa	20.9*	106.7	35.2*	213.4	44.8*	320.1

T E L A TA 985 (momentos em tf x cm)		W = 1		W = 2		W = 3	
		M1	M2	M1	M2	M1	M2
h = 7.0 cm	FCK = 15 MPa	9.3*	87.5	15.0#	175.0	16.0	262.5
	FCK = 18 MPa	9.7*	87.9	16.4*	175.7	18.0#	263.6
	FCK = 20 MPa	9.9*	88.1	16.6*	176.2	19.0#	264.3
h = 7.5 cm	FCK = 15 MPa	10.1*	92.5	16.3*	185.1	17.4#	277.4
	FCK = 18 MPa	10.6*	92.9	17.8*	185.9	20.9#	278.8
	FCK = 20 MPa	10.7*	93.2	18.0*	186.4	22.1#	279.5
h = 8.0 cm	FCK = 15 MPa	10.9*	97.2	17.6*	194.5	20.0#	291.7
	FCK = 18 MPa	11.4*	97.6	19.2*	195.3	23.7*	292.9
	FCK = 20 MPa	11.6*	97.9	19.4*	195.8	24.3*	293.6
h = 8.5 cm	FCK = 15 MPa	11.7*	101.6	18.9*	203.2	22.8#	304.8
	FCK = 18 MPa	12.2*	102.0	20.6*	204.0	25.4*	306.0
	FCK = 20 MPa	12.4*	102.2	20.9*	204.5	26.1*	306.7
h = 9.0 cm	FCK = 15 MPa	12.5*	105.6	20.2*	211.3	24.7*	316.9
	FCK = 18 MPa	13.1*	106.1	22.0*	212.1	27.1*	318.2
	FCK = 20 MPa	13.2*	106.3	22.3*	212.6	27.9*	318.9
h = 9.5 cm	FCK = 15 MPa	13.3*	109.4	21.5*	218.8	26.3*	328.2
	FCK = 18 MPa	13.9*	109.8	23.4*	219.7	28.9*	329.5
	FCK = 20 MPa	14.1*	110.1	23.7*	220.2	29.7*	330.3
h = 10.0 cm	FCK = 15 MPa	14.1*	112.9	22.8*	225.9	27.9*	338.8
	FCK = 18 MPa	14.7*	113.4	24.8*	226.8	30.6*	340.1
	FCK = 20 MPa	14.9*	113.6	25.1*	227.3	31.4*	340.9
h = 10.5 cm	FCK = 15 MPa	14.8*	116.3	24.1*	232.5	29.5*	348.8
	FCK = 18 MPa	15.6*	116.7	26.2*	233.4	32.3*	350.1
	FCK = 20 MPa	15.8*	116.9	26.6*	233.9	33.2*	350.8
h = 11.0 cm	FCK = 15 MPa	15.6*	119.4	25.3*	238.7	31.0*	358.1
	FCK = 18 MPa	16.4*	119.8	27.6*	239.6	34.1*	359.4
	FCK = 20 MPa	16.6*	120.1	28.0*	240.1	35.0*	360.2
h = 11.5 cm	FCK = 15 MPa	16.4*	122.3	26.6*	244.6	32.6*	366.9
	FCK = 18 MPa	17.2*	122.7	29.0*	245.5	35.8*	368.2
	FCK = 20 MPa	17.5*	123.0	29.4*	246.0	36.8*	369.0
h = 12.0 cm	FCK = 15 MPa	17.2*	125.1	27.9*	250.1	34.2*	375.2
	FCK = 18 MPa	18.1*	125.5	30.4*	251.0	37.5*	376.5
	FCK = 20 MPa	18.3*	125.8	30.8*	251.5	38.6*	377.3
h = 12.5 cm	FCK = 15 MPa	18.0*	127.7	29.2*	255.3	35.8*	383.0
	FCK = 18 MPa	18.9*	128.1	31.8*	256.2	39.3*	384.3
	FCK = 20 MPa	19.2*	128.4	32.3*	256.7	40.4*	385.1
h = 13.0 cm	FCK = 15 MPa	18.0*	130.1	30.5*	260.3	37.4*	390.4
	FCK = 18 MPa	19.7*	130.6	33.2*	261.2	41.0*	391.8
	FCK = 20 MPa	20.0*	130.8	33.7*	261.7	42.2*	392.5
h = 13.5 cm	FCK = 15 MPa	19.6*	132.5	31.8*	265.0	39.0*	397.4
	FCK = 18 MPa	20.6*	132.9	34.6*	265.8	42.7*	398.8
	FCK = 20 MPa	20.9*	133.2	35.1*	266.4	43.9*	399.6
h = 14.0 cm	FCK = 15 MPa	20.4*	134.7	33.1*	269.4	40.6*	404.1
	FCK = 18 MPa	21.4*	135.1	36.0*	270.3	44.5*	405.4
	FCK = 20 MPa	21.7*	135.4	36.5*	270.8	45.7*	406.2
h = 14.5 cm	FCK = 15 MPa	21.2*	136.8	34.4*	273.6	42.1*	410.4
	FCK = 18 MPa	22.3*	137.3	37.4*	274.5	46.2*	411.8
	FCK = 20 MPa	22.6*	137.5	38.0*	275.0	47.5*	412.5
h = 15.0 cm	FCK = 15 MPa	22.0*	138.8	35.7*	277.6	43.7*	416.4
	FCK = 18 MPa	23.1*	139.3	38.8*	278.5	48.0*	417.8
	FCK = 20 MPa	23.4*	139.5	39.4*	279.0	49.3*	418.6