



FICHA DE CARACTERISTICAS TECNICAS  
DEL FORJADO DE VIGUETAS ARMADAS

NUEVA DAYA, S.L.

LA HOYA, P.3, Nº 4, Vereda de Sendres, 4  
03280 ELCHE (Alicante)

TECNICO AUTOR DE LA MEMORIA : Jordi Amat

Hoja nº 2 de 26

Ministerio de Vivienda  
Dirección General de Arquitectura  
y Política de Vivienda  
Autorización de Uso adaptado a R.D. 642/2002 nº

8918-08 14 MAR. 2008

Visado El Jefe de la Sección

Fdo.: Angel Paz Martín

1.- VIGUETA, CELOSIA, MOMENTO FLECTOR ULTIMO Y ARMADURA BASE (véase dibujo 1)

VIGUETA			CELOSIA					MOM. FLECTOR ULTIMO		ARMADURA BASE	
Nombre	e mm	Peso KN/m	Tipo	Øsup. mm	h1 mm	nº celosia	Paso stc mm	Sobre sop. mKN	En vano mKN	nº inferior mm	
VA17	195	0.14	1	6	170	2Ø4	200	2.09	1.41	2Ø 6	
VA20	225	0.15	2	6	200	2Ø4	200	2.46	1.67		
VA22	245	0.15	3	6	220	2Ø4	200	2.71	1.82		
VA25	275	0.15	4	6	250	2Ø4	200	3.07	2.07		

2.- BLOQUES ALIGERANTES (Véase dibujo 2)

Código	Cotas y coordenadas en mm				PESO (N/ud)		
	hb	b	bs	P.1	Cerámico	Hornigón	Poliest.
B17* 72	170	590	480	25; 84	78	153	2
B20* 72	200	590	480	25; 84	84	164	2
B22* 72	220	590	480	25; 84	88	171	2
B25* 72	250	590	480	0;174	95	183	3
B27* 72	270	590	480	0;194	98	189	3
B30* 72	300	590	480	0;224	104	200	3

3.- FORJADOS (Véase dibujo 3)

TIPO DE FORJADO ( h + c ) * s [ /D ]	VIGUETAS	ARMADURA BASE	BLOQUE	PESO (KN/m2)		
				Cerámico	Hornigón	Poliest.
(17+ 4)* 72.5	VA.17	2Ø 6	B17* 72	2.24	2.75	
(17+ 4)* 85.5D	2xVA.17	2Ø 6	B17* 72	2.65	3.09	
(20+ 4)* 72.5	VA.17	2Ø 6	B20* 72	2.47	3.02	
(20+ 4)* 85.5D	2xVA.17	2Ø 6	B20* 72	2.95	3.41	
(20+ 5)* 72.5	VA.17 ; VA.20	2Ø 6	B20* 72	2.71	3.25	2.14
(20+ 5)* 85.5D	2xVA.17 ; VA.20	2Ø 6	B20* 72	3.19	3.65	2.71
(22+ 4)* 72.5	VA.17 ; VA.20	2Ø 6	B22* 72	2.62	3.19	
(22+ 4)* 85.5D	2xVA.17 ; VA.20	2Ø 6	B22* 72	3.15	3.64	
(22+ 5)* 72.5	VA.20 ; VA.22	2Ø 6	B22* 72	2.85	3.42	2.26
(22+ 5)* 85.5D	2xVA.20 ; VA.22	2Ø 6	B22* 72	3.38	3.87	2.88
(25+ 4)* 72.5	VA.22 ; VA.25	2Ø 6	B25* 72	2.46	3.07	
(25+ 4)* 85.5D	2xVA.22 ; VA.25	2Ø 6	B25* 72	3.13	3.64	
(25+ 5)* 72.5	VA.22 ; VA.25	2Ø 6	B25* 72	2.70	3.30	2.06
(25+ 5)* 85.5D	2xVA.22 ; VA.25	2Ø 6	B25* 72	3.36	3.87	2.82
(27+ 4)* 72.5	VA.22 ; VA.25	2Ø 6	B27* 72	2.54	3.17	
(27+ 4)* 85.5D	2xVA.22 ; VA.25	2Ø 6	B27* 72	3.26	3.79	
(27+ 5)* 72.5	VA.22 ; VA.25	2Ø 6	B27* 72	2.77	3.40	2.12
(27+ 5)* 85.5D	2xVA.22 ; VA.25	2Ø 6	B27* 72	3.50	4.03	2.94
(30+ 4)* 72.5	VA.25	2Ø 6	B30* 72	2.67	3.33	
(30+ 4)* 85.5D	2xVA.25	2Ø 6	B30* 72	3.48	4.04	
(30+ 5)* 72.5	VA.25	2Ø 6	B30* 72	2.90	3.57	2.21
(30+ 5)* 85.5D	2xVA.25	2Ø 6	B30* 72	3.72	4.27	3.13

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Hoja nº 3 de 26

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4.- MATERIALES

HORMIGON DE LA VIGUETA	: HA-25.0/P/12/IIa	, fck = 25.0 N/mm2	Gamma.c = 1.50
HORMIGON IN SITU	: HA-25.0/B/16/IIa	, fck = 25.0 N/mm2	Gamma.c = 1.50 Normal
ACERO BASE	: B-500	, fyk = 500 N/mm2	Gamma.s = 1.15
ACERO REFUERZO INFERIOR	: B-500S	, fyk = 500 N/mm2	Gamma.s = 1.15
ACERO REFUERZO SUPERIOR	: B-400S	, fyk = 400 N/mm2	Gamma.s = 1.15 Normal
ACERO REFUERZO SUPERIOR	: B-500S	, fyk = 500 N/mm2	Gamma.s = 1.15 Normal
ACERO CELOSIAS	: B-500	, fyk = 500 N/mm2	Gamma.s = 1.15

(2) CONTROL

5.- ARMADO DE LA VIGUETA (Véase dibujo 4)

REFUERZO INFERIOR (3)

Y + X	0ø 0	1ø 6	1ø 8	1ø10	1ø 8+1ø 8	1ø12	1ø10+1ø 8
X - %L					1ø 8 - 57		1ø 8 - 52
Y + X	1ø10+1ø10	1ø12+1ø10	1ø16	1ø12+1ø12	1ø16+1ø10	1ø16+1ø12	1ø16+1ø16
X - %L	1ø10 - 61	1ø10 - 56		1ø12 - 63	1ø10 - 48	1ø12 - 55	1ø16 - 66

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03280 ELCHE (Alicante)

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Hoja nº 4 de 26

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6.- NOTAS

- (1) Se reduce el recubrimiento superior, temporal, a  $\geq 5$  mm, según 4.1.3.3 EC-2 Parte 1-3, UNE ENV 1992-1-3, respecto al indicado en 10.1 EFHE-02, acogiéndose al 5.º párrafo del artículo 1.º de la EFHE-02.
- (2) Los materiales colocados en obra se ensayarán según el Capítulo Control de Materiales de la Instrucción vigente, con el nivel indicado y bajo la dirección del responsable del control de calidad o del Director de Obra.  
En los forjados con losa superior de 5 cm, tipo  $(h + 5) * s$ , el árido del hormigón de la obra podrá ser de tamaño máximo,  $D \leq 20$  mm.
- (3)  $L$  = luz de cálculo. A la longitud (en % de  $L$ ) de la armadura  $X$  se le sumará 2 veces  $0,6 * H$  más el anclaje correspondiente al diámetro.  $H$  es el canto total del forjado. El corte está calculado para vanos aislados y cargas repartidas.
- (4) La vigueta primera, sin refuerzo de armado positivo, no se colocará en vanos, sólo en voladizos, cuando el momento último,  $M_u$ , sea menor que 1,3 veces el de fisuración. Para voladizos en ambiente IIIa esta vigueta se fabricará con recubrimientos de 35 mm, nominal+margen, relación  $a/c \leq 0,5$  y 300 kg/m<sup>3</sup> de cemento
- (5) Los momentos flectores y los esfuerzos cortantes producidos por las cargas mayoradas con el coeficiente  $\Gamma_{mf}$  deben ser menores que los valores últimos  $M_u$  y  $V_u$ .
- (6) Momento de fisuración por compresión según 49.2.1 EHE-98. Sin embargo, EC-2 Parte 1-1 sólo prescribe este ELS para Clases de exposición ambiental equivalentes a III y IV.
- (7)  $W_k$  es la abertura característica de la fisura según 49.2.5 EHE-98, debida a un momento solicitante  $M_u/1,5$ . La abertura que provocan las cargas cuasipermanentes es proporcional a los momentos (a favor de la durabilidad) hasta un mínimo de 0,4  $W_k$ . Según 49.2.4 los límites de  $W_k$  son:  $\leq 0,4$  mm en Clase de exposición ambiental I,  $\leq 0,3$  en Clase IIb,  $\leq 0,2$  en Clase IIIa y 0,1 en Clase IIIc o Q. Con control de ejecución normal se modificará: recubrimiento armadura superior 30 mm, reducción de  $M_u = 5,5/d$  y reducción  $E_{I,fis} = 10/d$  ( $d$ = canto útil en mm)
- (8) Los valores indicados se han calculado según 50.2.2.2 EHE-98, pero homogeneizados. Para estimar las deformaciones se aplicará este mismo artículo y el siguiente de la EHE-98, limitándose las flechas según 15.2.1 EFHE-02.  
A 28 días. Para otra edad se multiplicarán por los factores:  

Edad	7 días	14 días	21 días	3 meses	6 meses	1 año	>5 años
Rigidez total	0,83	0,89	0,97	1,08	1,13	1,16	1,20
Momento fisuración	0,78	0,86	0,96	1,10	1,17	1,22	1,27
- (9) Refuerzo inferior mínimo por vigueta para alcanzar el momento último negativo en sección tipo.
- (10) La relación  $x/d$  es la profundidad de la fibra neutra respecto al canto útil. A considerar cuando los momentos flectores se redistribuyan según 21.4 EHE-98.
- (11) Los valores del esfuerzo cortante último  $V_u$ , corresponden a la colaboración del hormigón y a la armadura transversal de cortante según 14.2.1 EFHE.
- (12) En el dibujo  $l$  y  $l'$  corresponden a las longitudes  $l_1$ ,  $l'_1$ ,  $l_2$  y  $l'_2$  que se deducen de 21.2.a) EFHE-02 y pueden organizarse en prolongación recta o inclinada, con un ángulo igual o menor a 30°. La distancia  $l'$  de solapo óptima no es menor que la necesaria para cubrir dos soldaduras.

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Hoja nº 5 de 26

Oficina de Ingeniería de Edificación  
 Calle de la Universidad de Valencia, 4  
 46100, Burjassot, Valencia  
 Teléfono: 96 351 11 11  
 Fax: 96 351 11 12  
 E-mail: info@ingenieria.com  
 96 351 11 11 - 96 351 11 12  
 2008  
 Visado en el plano de la Dirección  
 Félix Ángel Par...

FLEXION POSITIVA (por m)

TIPO DE FORJADO (h+c) * s	TIPO DE VIGUETA (4)	REFUERZO INFERIOR VIGUETA Y + X	MOMENTO ULTIMO		MOMENTO SERVICIO FISURACION POR COMPRESION	Wk	CLASE POR RECUBRIM.	MOMENTO DE FISURACION MF	RIGIDEZ TOTAL FISURADA	
			Mu	Rel. x/d					E-Ib	E-If
n-KN/m (5)	n-KN/m (6)	mm (7)	mm (8)	n2-MN/m (8)	n2-MN/m					
(17+ 4) * 72.5	VA.17 1	0ø 0	6.2	.01	17.8	.08	IIa	5.8	7.3	0.5
	2	1ø 6	9.3	.02	22.0	.11	IIa	5.9	7.4	0.7
	3	1ø 8	11.7	.03	24.6	.14	IIa	6.0	7.5	0.9
	4	1ø10	14.6	.03	27.4	.17	IIa	6.1	7.6	1.1
	5	1ø 8+1ø 8	17.0	.04	29.5	.15	IIa	6.2	7.7	1.2
	6	1ø12	18.2	.04	30.3	.19	IIa	6.2	7.7	1.3
	7	1ø10+1ø 8	20.0	.05	31.8	.17	IIa	6.3	7.8	1.4
	8	1ø10+1ø10	22.9	.05	33.8	.17	IIa	6.4	7.9	1.6
	9	1ø12+1ø10	26.4	.06	36.0	.18	IIa	6.5	8.0	1.8
	10	1ø16	27.1	.07	36.0	.22	IIa	6.5	8.0	1.9
	11	1ø12+1ø12	29.9	.07	38.0	.18	IIa	6.6	8.1	2.0
	12	1ø16+1ø10	35.1	.09	40.6	.21	IIa	6.8	8.3	2.4
	13	1ø16+1ø12	38.5	.09	42.3	.21	IIa	6.9	8.4	2.5
	14	1ø16+1ø16	46.9	.12	46.0	.21	IIa	7.2	8.7	3.0

FLEXION NEGATIVA (por m)

REFUERZO SUPERIOR POR NERVIO	B400 MOMENTO ULTIMO - ABERTURA FISURA				B500 MOMENTO ULTIMO - ABERTURA FISURA				MOMENTO DE SERVICIO FISURACION POR COMPRESION	MOMENTO FISURACION MF	RIGIDEZ TOTAL FIS.							
	Sección tipo		Sección maciza		Sección tipo		Sección maciza				E-Ib	E-If						
Mu	Ref. inf.	Rel. x/d	Wk	Mu	Ref. inf.	Rel. x/d	Wk	Mu	Ref. inf.	Rel. x/d	Wk	n-KN/m	n-KN/m	n2-MN/m				
(5)	(9)	(10)	(7)	(5)	(9)	(10)	(7)	(5)	(9)	(10)	(7)	(6)	(8)	(8)				
1ø10	5.0	.10	.08	0.0	.00	.00	0.0	6.1	.13	.10	0.0	0.0	0.0	0.0	7.1	0.9		
2ø 8	6.3	.13	.08	0.0	.00	.00	0.0	7.8	.17	.10	0.0	0.0	0.0	0.0	7.1	1.0		
1ø12	7.0	.15	.08	0.0	.00	.00	0.0	11.4	.19	.10	0.0	0.0	0.0	0.0	7.1	1.0		
1ø 8+1ø10	7.9	.17	.08	0.0	.00	.00	0.0	13.0	.21	.10	0.0	0.0	0.0	0.0	7.1	1.1		
2ø10	12.6	.21	.07	0.0	.00	.00	0.0	15.4	.26	.09	0.0	0.0	0.0	0.0	7.1	1.3		
1ø10+1ø12	15.0	.26	.08	0.0	.00	.00	0.0	18.2	.32	.12	0.0	0.0	0.0	0.0	7.1	1.4		
2ø12	17.3	.30	.08	0.0	.00	.00	0.0	20.8	.40	.14	0.0	0.0	0.0	0.0	7.1	1.5		
1ø10+1ø16	20.5	.40	.12	0.0	.00	.00	0.0	24.2	.51	.18	29.3	.08	.22	19.5	13.4	7.1	1.7	
1ø12+1ø16	22.4	.46	.13	26.4	.08	.15	26.2	26.2	.58	.19	32.7	.10	.23	20.1	13.4	7.1	1.9	
2ø16	26.6	.60	.14	33.3	.10	.17	34.4	34.4	1ø12	.53	.20	41.3	.12	.24	21.1	13.5	7.1	2.1
4ø12	32.4	1ø12	.45	.13	37.7	.11	.17	40.2	1ø16	.46	.18	46.7	.14	.23	22.0	13.6	7.2	2.4
2ø16+1ø12	35.2	1ø12	.56	.15	42.3	.12	.20	43.6	1ø16	.58	.20	52.2	.16	.27	22.4	13.7	7.2	2.5
3ø16	41.7	1ø16	.52	.16	49.0	.15	.20	53.7	2ø16	.36	.21	60.3	.18	.26	23.1	13.8	7.2	2.7
4ø16	56.6	2ø16	.45	.16	63.9	.20	.19	62.0	2ø16	.74	.20	78.3	.24	.25	24.6	14.0	7.2	3.2

ESFUERZO CORTANTE POS. Vu (11) (KN/m) VA.17 (simple celosía) : 30.4  
(KN/m) VA.17 (doble celosía) : 46.4

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Hoja nº 6 de 26

Ministerio de Vivienda,  
Urbanismo, Obras Públicas, Energía,  
Transporte y Turismo

Autorización de Ejecución de R.D. 442/1982

8918-08 14 MAR. 2009

Visado El Jefe de la Sección

Fco. Angel Paz Martín

FLEXION POSITIVA (por m)

TIPO DE FORJADO (h+c) * s	TIPO DE VIGUETA (4)	REFUERZO INFERIOR VIGUETA Y + X	MOMENTO Ultimo Rel. x/d		MOMENTO SERVICIO FISURACION POR COMPRESION		Wk CLASE POR RECUBRIM. mm (7)	MOMENTO DE FISURACION Mf n·KN/m (8)	RIGIDEZ TOTAL FISURADA E·Ib E·If		
			n·KN/m (5)	mm (5)	n·KN/m (6)	mm (6)			(8) m <sup>2</sup> ·MN/m	(8) m <sup>2</sup> ·MN/m	
(17+ 4) * 85.5D	VA.17	1	0ø 0	10.5	.02	23.1	.09	IIa	9.2	10.5	0.8
		2	1ø 6	15.7	.04	28.4	.14	IIa	9.4	10.6	1.1
		3	1ø 8	19.6	.05	31.6	.18	IIa	9.5	10.7	1.4
		4	1ø10	24.6	.06	35.1	.21	IIa	9.7	10.9	1.7
		5	1ø 8+1ø 8	28.5	.07	37.7	.18	IIa	9.8	11.0	2.0
		6	1ø12	30.5	.07	38.6	.23	IIa	9.9	11.0	2.1
		7	1ø10+1ø 8	33.4	.08	40.5	.20	IIa	10.0	11.1	2.3
		8	1ø10+1ø10	38.1	.09	42.9	.20	IIa	10.1	11.2	2.6
		9	1ø12+1ø10	43.9	.11	45.6	.22	IIa	10.3	11.4	2.9
		10	1ø16	44.9	.11	45.5	.25	IIa	10.3	11.4	2.9
		11	1ø12+1ø12	49.5	.12	48.0	.21	IIa	10.5	11.5	3.2
		12	1ø16+1ø10	57.8	.15	51.1	.24	IIa	10.8	11.7	3.7
		13	1ø16+1ø12	63.2	.16	53.1	.24	IIa	11.0	11.9	4.0
		14	1ø16+1ø16	76.3	.20	57.2	.23	IIa	11.4	12.2	4.7

FLEXION NEGATIVA (por m)

REFUERZO SUPERIOR POR NERVIOS	B400 MOMENTO ULTIMO - ABERTURA FISURA						B500 MOMENTO ULTIMO - ABERTURA FISURA						MOMENTO DE SERVICIO FISUR. POR COMPRESION n·KN/m (6)	MOMENTO FISURAC. Mf n·KN/m (8)	RIGIDEZ TOTAL FIS. E·Ib E·If			
	Sección tipo			Sección maciza			Sección tipo			Sección maciza					n·KN/m (8)	m <sup>2</sup> ·MN/m (8)	E·Ib	E·If
	Mu n·KN/m (5)	Ref. inf. vig. (9)	Rel. x/d (10)	Wk (7)	Mu n·KN/m (5)	Ref. x/d (10)	Wk (7)	Mu n·KN/m (5)	Ref. inf. x/d (9)	Wk (7)	Mu n·KN/m (5)	Ref. x/d (10)						
1ø10	0.0	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	15.4	10.2	1.0		
2ø 8	0.0	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	15.5	10.2	1.1		
1ø12	0.0	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	15.5	10.2	1.2		
1ø 8+1ø10	0.0	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	15.5	10.3	1.3		
2ø10	0.0	.00	.00	0.0	.00	.00	10.4	.13	.10	0.0	.00	.00	24.8	15.5	10.3	1.4		
1ø10+1ø12	10.1	.13	.09	0.0	.00	.00	16.6	.16	.11	0.0	.00	.00	25.9	15.6	10.3	1.5		
2ø12	15.7	.15	.08	0.0	.00	.00	19.3	.19	.10	0.0	.00	.00	26.8	15.6	10.3	1.7		
1ø10+1ø16	19.0	.19	.10	0.0	.00	.00	23.3	.24	.16	25.0	.07	.13	27.9	15.7	10.3	1.9		
1ø12+1ø16	21.1	.21	.10	0.0	.00	.00	25.8	.27	.18	27.9	.08	.16	28.7	15.8	10.3	2.0		
2ø16	26.2	.27	.14	28.4	.08	.12	31.7	.34	.20	35.3	.10	.20	30.3	15.9	10.4	2.3		
4ø12	29.4	.30	.12	32.2	.09	.13	35.3	.39	.17	39.9	.12	.20	31.6	16.0	10.4	2.5		
2ø16+1ø12	32.4	.35	.15	36.2	.11	.17	38.7	.45	.20	44.7	.13	.24	32.2	16.1	10.4	2.7		
3ø16	36.7	.42	.15	41.9	.12	.18	43.3	.53	.21	51.7	.16	.24	33.3	16.2	10.5	3.0		
4ø16	45.4	.57	.16	54.9	.17	.19	58.6	1ø12 .51	.21	67.5	.21	.25	35.6	16.5	10.5	3.6		

ESFUERZO CORTANTE POS. Vu (11) (KN/m) VA.17 (simple celosía) : 57.0  
(KN/m) VA.17 (doble celosía) : 84.2

FICHA DE CARACTERISTICAS TECNICAS  
DEL FORJADO DE VIGUETAS ARMADAS

NUEVA DAYA, S.L.

LA HOYA, P.3, Nº 4, Vereda de Sendres, 4  
03280 ELCHE (Alicante)

TECNICO AUTOR DE LA MEMORIA : Jordi Amat

Hoja nº 7 de 26

Ministerio de Fomento  
Dirección General de Arquitectura  
y Puentes de Vías  
Aprobación de Proyecto nº 2002 nº  
8918-00 14 MAR. 2008  
Visado por el Director

FLEXION POSITIVA (por m)

TIPO DE FORJADO (h+c) * s	TIPO DE VIGUETA (4)	REFUERZO INFERIOR VIGUETA Y + X	MOMENTO Ultimo Rel. x/d		MOMENTO SERVICIO FISURACION POR COMPRESION m·KN/m (6)	Wk CLASE POR RECUBRIM. mm (7)	MOMENTO DE FISURACION MF m·KN/m (8)	RIGIDEZ TOTAL FISURADA			
			Mu m·KN/m (5)	x/d				E-Id	E-If		
(20+ 4) * 72.5	VA.17	1	0ø 0	7.3	.01	22.3	.08	IIa	7.5	10.7	0.7
		2	1ø 6	10.9	.02	27.5	.09	IIa	7.7	10.9	1.0
		3	1ø 8	13.6	.02	30.9	.13	IIa	7.8	11.0	1.2
		4	1ø10	17.1	.03	34.5	.17	IIa	7.9	11.1	1.5
		5	1ø 8+1ø 8	19.9	.04	37.2	.15	IIa	8.0	11.2	1.7
		6	1ø12	21.3	.04	38.2	.19	IIa	8.0	11.3	1.8
		7	1ø10+1ø 8	23.4	.04	40.1	.17	IIa	8.1	11.4	2.0
		8	1ø10+1ø10	26.8	.05	42.7	.17	IIa	8.2	11.5	2.2
		9	1ø12+1ø10	31.0	.06	45.6	.19	IIa	8.4	11.7	2.5
		10	1ø16	31.8	.06	45.7	.22	IIa	8.4	11.7	2.6
		11	1ø12+1ø12	35.1	.06	48.2	.19	IIa	8.5	11.9	2.8
		12	1ø16+1ø10	41.2	.08	51.6	.21	IIa	8.7	12.1	3.3
		13	1ø16+1ø12	45.3	.08	53.8	.21	IIa	8.9	12.2	3.6
		14	1ø16+1ø16	55.3	.10	58.7	.21	IIa	9.2	12.6	4.2

FLEXION NEGATIVA (por m)

REFUERZO SUPERIOR POR NERVIO	B400 MOMENTO ULTIMO - ABERTURA FISURA Sección tipo						B500 MOMENTO ULTIMO - ABERTURA FISURA Sección maciza						MOMENTO DE SERVICIO FISUR. POR COMPRESION m·KN/m (6)	MOMENTO FISURAC. MF m·KN/m (8)	RIGIDEZ TOTAL FIS.		
	Mu m·KN/m (5)	Ref. vig. (9)	Rel. inf. (10)	Wk x/d (7)	Mu m·KN/m (5)	Ref. (10)	Rel. x/d (7)	Mu m·KN/m (5)	Ref. vig. (9)	Rel. inf. (10)	Wk x/d (7)	Mu m·KN/m (5)			Ref. (10)	Rel. x/d (7)	E-Id
1ø10	0.0	.00	.00	.00	0.0	.00	.00	7.2	.11	.11	.00	.00	.00	18.4	16.6	10.5	1.1
2ø 8	7.4	.11	.08	.08	0.0	.00	.00	9.2	.14	.10	0.0	.00	.00	19.6	16.6	10.5	1.3
1ø12	8.2	.13	.09	.09	0.0	.00	.00	10.1	.16	.11	0.0	.00	.00	19.9	16.6	10.5	1.4
1ø 8+1ø10	9.3	.15	.08	.08	0.0	.00	.00	15.3	.18	.10	0.0	.00	.00	20.7	16.7	10.5	1.5
2ø10	11.2	.18	.08	.08	0.0	.00	.00	18.3	.22	.10	0.0	.00	.00	21.7	16.7	10.5	1.7
1ø10+1ø12	17.8	.22	.08	.08	0.0	.00	.00	21.8	.27	.11	0.0	.00	.00	22.8	16.8	10.5	1.9
2ø12	20.6	.26	.08	.08	0.0	.00	.00	25.0	.34	.13	0.0	.00	.00	23.7	16.9	10.5	2.1
1ø10+1ø16	24.6	.34	.12	.12	0.0	.00	.00	29.3	.44	.18	34.4	.07	.21	24.8	16.9	10.5	2.4
1ø12+1ø16	27.0	.39	.13	.13	0.0	.00	.00	31.9	.50	.19	38.5	.08	.22	25.5	17.0	10.6	2.6
2ø16	32.4	.51	.14	.14	39.2	.08	.17	41.8	1ø12 .46	.20	48.6	.10	.24	27.1	17.2	10.6	3.0
4ø12	35.7	.57	.13	.13	44.4	.09	.17	46.0	1ø12 .54	.17	54.9	.12	.23	28.3	17.3	10.6	3.3
2ø16+1ø12	38.5	.65	.15	.15	49.9	.11	.21	53.0	1ø16 .50	.21	61.7	.13	.28	28.9	17.4	10.6	3.5
3ø16	47.6	1ø12 .59	.16	.16	57.8	.13	.21	59.7	2ø12 .60	.21	71.3	.16	.27	30.0	17.5	10.7	3.9
4ø16	62.3	2ø12 .66	.16	.16	75.7	.17	.20	79.1	2ø16 .63	.20	93.0	.21	.26	32.2	17.9	10.8	4.6

ESFUERZO CORTANTE POS. Vu (11) (KN/m) VA.17 (simple celosía) : 35.4  
(KN/m) VA.17 (doble celosía) : 54.1

FICHA DE CARACTERISTICAS TECNICAS  
DEL FORJADO DE VIGUETAS ARMADAS

NUEVA DAYA, S.L.

LA HOYA, P.3, Nº 4, Vereda de Sendres, 4  
03280 ELCHE (Alicante)

TECNICO AUTOR DE LA MEMORIA : Jordi Amat

Hoja nº 7 de 26

Ministerio de Fomento  
Dirección General de Infraestructura  
y Transporte Viario  
Aprobación de Urbanización S.D. 11/2002 n.º  
2918-00-14 MSR. 2008  
Visado en la Sección  
[Signature]

FLEXION POSITIVA (por m)

TIPO DE FORJADO (h+c) * s	TIPO DE VIGUETA (4)	REFUERZO INFERIOR VIGUETA Y + X	MOMENTO Ultimo Rel. x/d		MOMENTO SERVICIO FISURACION POR COMPRESION n·KN/m (6)	Wk CLASE POR RECUBRIM. mm (7)	MOMENTO DE FISURACION MF n·KN/m (8)	RIGIDEZ TOTAL FISURADA			
			Mu n·KN/m (5)	mm				E-Ib (8)	E-If n2·MN/m		
(20+ 4) * 72.5	VA.17	1	0ø 0	7.3	.01	22.3	.08	IIa	7.5	10.7	0.7
		2	1ø 6	10.9	.02	27.5	.09	IIa	7.7	10.9	1.0
		3	1ø 8	13.6	.02	30.9	.13	IIa	7.8	11.0	1.2
		4	1ø10	17.1	.03	34.5	.17	IIa	7.9	11.1	1.5
		5	1ø 8+1ø 8	19.9	.04	37.2	.15	IIa	8.0	11.2	1.7
		6	1ø12	21.3	.04	38.2	.19	IIa	8.0	11.3	1.8
		7	1ø10+1ø 8	23.4	.04	40.1	.17	IIa	8.1	11.4	2.0
		8	1ø10+1ø10	26.8	.05	42.7	.17	IIa	8.2	11.5	2.2
		9	1ø12+1ø10	31.0	.06	45.6	.19	IIa	8.4	11.7	2.5
		10	1ø16	31.8	.06	45.7	.22	IIa	8.4	11.7	2.6
		11	1ø12+1ø12	35.1	.06	48.2	.19	IIa	8.5	11.9	2.8
		12	1ø16+1ø10	41.2	.08	51.6	.21	IIa	8.7	12.1	3.3
		13	1ø16+1ø12	45.3	.08	53.8	.21	IIa	8.9	12.2	3.6
		14	1ø16+1ø16	55.3	.10	58.7	.21	IIa	9.2	12.6	4.2

FLEXION NEGATIVA (por m)

REFUERZO SUPERIOR POR NERVIO	B400 MOMENTO ULTIMO - ABERTURA FISURA Sección tipo						B500 MOMENTO ULTIMO - ABERTURA FISURA Sección maciza						MOMENTO DE SERVICIO FISUR. POR COMPRESION n·KN/m (6)	MOMENTO FISURAC. MF n·KN/m (8)	RIGIDEZ TOTAL FIS. E-Ib E-If		
	Mu n·KN/m (5)	Ref. vig. (9)	Rel. inf. (10)	Wk x/d (7)	Mu n·KN/m (5)	Ref. (10)	Rel. x/d (7)	Mu n·KN/m (5)	Ref. vig. (9)	Rel. inf. (10)	Wk x/d (7)	Mu n·KN/m (5)			Ref. (10)	Rel. x/d (7)	n·KN/m (8)
1ø10	0.0	.00	.00	.00	0.0	.00	.00	7.2	.11	.11	.00	.00	.00	18.4	16.6	10.5	1.1
2ø 8	7.4	.11	.08	.08	0.0	.00	.00	9.2	.14	.10	.00	.00	.00	19.6	16.6	10.5	1.3
1ø12	8.2	.13	.09	.09	0.0	.00	.00	10.1	.16	.11	.00	.00	.00	19.9	16.6	10.5	1.4
1ø 8+1ø10	9.3	.15	.08	.08	0.0	.00	.00	15.3	.18	.10	.00	.00	.00	20.7	16.7	10.5	1.5
2ø10	11.2	.18	.08	.08	0.0	.00	.00	18.3	.22	.10	.00	.00	.00	21.7	16.7	10.5	1.7
1ø10+1ø12	17.8	.22	.08	.08	0.0	.00	.00	21.8	.27	.11	.00	.00	.00	22.8	16.8	10.5	1.9
2ø12	20.6	.26	.08	.08	0.0	.00	.00	25.0	.34	.13	.00	.00	.00	23.7	16.9	10.5	2.1
1ø10+1ø16	24.6	.34	.12	.12	0.0	.00	.00	29.3	.44	.18	34.4	.07	.21	24.8	16.9	10.5	2.4
1ø12+1ø16	27.0	.39	.13	.13	0.0	.00	.00	31.9	.50	.19	38.5	.08	.22	25.5	17.0	10.6	2.6
2ø16	32.4	.51	.14	.14	39.2	.08	.17	41.8	1ø12 .46	.20	48.6	.10	.24	27.1	17.2	10.6	3.0
4ø12	35.7	.57	.13	.13	44.4	.09	.17	46.0	1ø12 .54	.17	54.9	.12	.23	28.3	17.3	10.6	3.3
2ø16+1ø12	38.5	.65	.15	.15	49.9	.11	.21	53.0	1ø16 .50	.21	61.7	.13	.28	28.9	17.4	10.6	3.5
3ø16	47.6	1ø12 .59	.16	.16	57.8	.13	.21	59.7	2ø12 .60	.21	71.3	.16	.27	30.0	17.5	10.7	3.9
4ø16	62.3	2ø12 .66	.16	.16	75.7	.17	.20	79.1	2ø16 .63	.20	93.0	.21	.26	32.2	17.9	10.8	4.6

ESFUERZO CORTANTE POS. Vu (11) (KN/m) VA.17 (simple celosía) : 35.4  
(KN/m) VA.17 (doble celosía) : 54.1

FICHA DE CARACTERISTICAS TECNICAS  
DEL FORJADO DE VIGUETAS ARMADAS

NUEVA DAYA, S.L.

LA HOYA, P.3, Nº 4, Vereda de Sendres, 4  
03280 ELCHE (Alicante)

TECNICO AUTOR DE LA MEMORIA : Jordi Amat

Hoja nº 8 de 26

Ministerio de Vivienda,  
Dirección General de Arquitectura,  
Urbanismo y Política de Vivienda  
Autoridad de Ordenación de B.O. 27/02/07  
8910-08 14 MAR. 2009  
Visado El Jefe de la Sección  
Fdo: Angel Paz Moran

FLEXION POSITIVA (por m)

TIPO DE FORJADO (h+c) * s	TIPO DE VIGUETA (4)	REFUERZO INFERIOR VIGUETA Y + X	MOMENTO Ultimo Rel. x/d		MOMENTO SERVICIO FISURACION POR COMPRESION	Wk CLASE POR RECUBRIM. mm (7)	MOMENTO DE FISURACION Mf m·KN/m (8)	RIGIDEZ TOTAL FISURADA			
			m·KN/m (5)	mm (6)				E·Ib	E·If		
(20+ 4) * 85.5D	VA.17	1	0ø 0	12.3	.02	28.8	.10	IIa	12.0	15.4	1.1
		2	1ø 6	18.3	.03	35.5	.13	IIa	12.2	15.6	1.6
		3	1ø 8	22.9	.04	39.7	.18	IIa	12.3	15.7	1.9
		4	1ø10	28.8	.05	44.1	.21	IIa	12.5	15.9	2.4
		5	1ø 8+1ø 8	33.4	.06	47.6	.19	IIa	12.7	16.1	2.7
		6	1ø12	35.7	.06	48.8	.24	IIa	12.8	16.1	2.9
		7	1ø10+1ø 8	39.1	.07	51.1	.21	IIa	12.9	16.3	3.2
		8	1ø10+1ø10	44.8	.08	54.3	.20	IIa	13.1	16.4	3.6
		9	1ø12+1ø10	51.5	.09	57.8	.22	IIa	13.3	16.6	4.0
		10	1ø16	52.9	.10	57.9	.26	IIa	13.3	16.7	4.1
		11	1ø12+1ø12	58.2	.11	61.0	.22	IIa	13.5	16.9	4.5
		12	1ø16+1ø10	68.2	.13	65.0	.25	IIa	13.8	17.2	5.2
		13	1ø16+1ø12	74.7	.14	67.4	.24	IIa	14.1	17.4	5.6
		14	1ø16+1ø16	90.5	.17	72.6	.23	IIa	14.6	17.8	6.6

FLEXION NEGATIVA (por m)

REFUERZO SUPERIOR POR NERVIOS	B400 MOMENTO ULTIMO - ABERTURA FISURA				B500 MOMENTO ULTIMO - ABERTURA FISURA				MOMENTO DE SERVICIO FISUR. POR COMPRESION	MOMENTO FISURAC. Mf	RIGIDEZ TOTAL FIS.					
	Sección tipo		Sección maciza		Sección tipo		Sección maciza				m·KN/m (6)	m·KN/m (8)	m2·MN/m (8)			
	Mu	Ref. Rel. inf. x/d	Mu	Rel. x/d	Mu	Ref. Rel. inf. x/d	Mu	Rel. x/d								
	m·KN/m (5)	vig. (9)	mm (10)	mm (7)	m·KN/m (5)	vig. (9)	mm (10)	mm (7)	m·KN/m (5)	mm (10)	mm (7)					
1ø10	0.0	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	19.5	15.1	1.3
2ø 8	0.0	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	19.6	15.1	1.4
1ø12	0.0	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	19.6	15.1	1.5
1ø 8+1ø10	0.0	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	19.6	15.1	1.6
2ø10	0.0	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	19.7	15.1	1.8
1ø10+1ø12	0.0	.00	.00	0.0	.00	.00	19.6	.14	.12	0.0	.00	.00	31.7	19.8	15.2	2.0
2ø12	13.9	.13	.09	0.0	.00	.00	22.8	.16	.11	0.0	.00	.00	33.0	19.8	15.2	2.2
1ø10+1ø16	22.5	.16	.10	0.0	.00	.00	27.6	.20	.15	0.0	.00	.00	34.7	19.9	15.2	2.5
1ø12+1ø16	25.0	.18	.10	0.0	.00	.00	30.7	.23	.17	0.0	.00	.00	35.8	20.0	15.2	2.7
2ø16	31.2	.23	.13	33.4	.07	.10	38.0	.29	.20	41.5	.09	.18	38.0	20.2	15.3	3.2
4ø12	35.0	.26	.12	37.8	.08	.12	42.4	.33	.17	46.9	.10	.19	39.8	20.3	15.4	3.5
2ø16+1ø12	38.9	.30	.15	42.6	.09	.16	46.7	.38	.21	52.7	.11	.24	40.8	20.4	15.4	3.7
3ø16	44.2	.36	.16	49.4	.11	.17	52.7	.45	.21	61.1	.13	.24	42.4	20.6	15.4	4.1
4ø16	55.4	.49	.16	64.9	.14	.19	64.6	.60	.21	79.9	.18	.26	45.7	21.0	15.6	5.0

ESFUERZO CORTANTE POS. Vu (11) (KN/m) VA.17 (simple celosía) : 66.4  
(KN/m) VA.17 (doble celosía) : 98.0

FICHA DE CARACTERISTICAS TECNICAS  
DEL FORJADO DE VIGUETAS ARMADAS

NUEVA DAYA, S.L.

LA HOYA, P.3, Nº 4, Vereda de Sendres, 4  
03280 ELCHE (Alicante)

TECNICO AUTOR DE LA MEMORIA : Jordi Amat

Hoja nº 9 de 26

Ministerio de Fomento  
Dirección General de Infraestructuras,  
y Polos de Desarrollo  
Aprobación de los planos de P.E. nº 1000/03  
0918-03 MAR. 2008  
Visado por el Sr. de la Sección



Fdo: Angel Paz Martín

FLEXION POSITIVA (por m)

TIPO DE FORJADO (h+c) * s	TIPO DE VIGUETA (4)	REFUERZO INFERIOR VIGUETA Y + X	MOMENTO ULTIMO Rel. x/d		MOMENTO SERVICIO FISURACION POR COMPRESION	Wk	CLASE POR RECUBRIM.	MOMENTO DE FISURACION Mf	RIGIDEZ TOTAL FISURADA	
			Mu	n-KN/m (5)					E-Ib	E-If
(20+ 5) * 72.5	VA.17 1	0ø 0	7.6	.01	23.9	.09	IIa	8.2	12.3	0.7
	VA.20 2	1ø 6	11.4	.02	29.6	.09	IIa	8.3	12.4	1.1
	3	1ø 8	14.3	.02	33.1	.13	IIa	8.4	12.6	1.3
	4	1ø10	17.9	.03	37.0	.16	IIa	8.5	12.7	1.6
	5	1ø 8+1ø 8	20.9	.03	40.0	.15	IIa	8.7	12.9	1.9
	6	1ø12	22.4	.04	41.0	.19	IIa	8.7	12.9	2.0
	7	1ø10+1ø 8	24.5	.04	43.1	.17	IIa	8.8	13.0	2.2
	8	1ø10+1ø10	28.1	.05	45.9	.17	IIa	8.9	13.2	2.5
	9	1ø12+1ø10	32.5	.05	49.0	.19	IIa	9.1	13.4	2.8
	10	1ø16	33.4	.06	49.2	.22	IIa	9.1	13.4	2.8
	11	1ø12+1ø12	36.8	.06	51.8	.19	IIa	9.2	13.5	3.1
	12	1ø16+1ø10	43.3	.07	55.6	.21	IIa	9.5	13.8	3.6
	13	1ø16+1ø12	47.5	.08	57.9	.21	IIa	9.6	14.0	3.9
	14	1ø16+1ø16	58.1	.10	63.2	.21	IIa	10.0	14.4	4.7

FLEXION NEGATIVA (por m)

REFUERZO SUPERIOR POR NERVIOS	B400 MOMENTO ULTIMO - ABERTURA FISURA						B500 MOMENTO ULTIMO - ABERTURA FISURA						MOMENTO DE SERVICIO FISURACION POR COMPRESION	MOMENTO FISURAC. Mf	RIGIDEZ TOTAL FIS.		
	Sección tipo			Sección maciza			Sección tipo			Sección maciza					E-Ib	E-If	
	Mu	Ref. inf.	Rel. x/d	Wk	Mu	Ref. x/d	Wk	Mu	Ref. inf.	Rel. x/d	Wk	Mu					Ref. x/d
1ø10	0.0	.00	.00	0.0	.00	.00	7.6	.11	.11	0.0	.00	.00	19.6	18.6	12.0	1.3	
2ø 8	7.8	.11	.08	0.0	.00	.00	9.6	.14	.10	0.0	.00	.00	20.9	18.7	12.0	1.4	
1ø12	8.6	.12	.09	0.0	.00	.00	10.6	.15	.11	0.0	.00	.00	21.3	18.7	12.0	1.5	
1ø 8+1ø10	9.8	.14	.09	0.0	.00	.00	12.1	.18	.11	0.0	.00	.00	22.1	18.7	12.0	1.7	
2ø10	11.8	.17	.08	0.0	.00	.00	19.3	.21	.10	0.0	.00	.00	23.2	18.8	12.0	1.9	
1ø10+1ø12	18.8	.21	.08	0.0	.00	.00	22.9	.26	.10	0.0	.00	.00	24.4	18.9	12.0	2.1	
2ø12	21.7	.25	.08	0.0	.00	.00	26.3	.33	.12	0.0	.00	.00	25.4	18.9	12.0	2.3	
1ø10+1ø16	26.0	.32	.10	0.0	.00	.00	31.0	.42	.17	36.1	.07	.20	26.7	19.0	12.1	2.6	
1ø12+1ø16	28.5	.37	.12	0.0	.00	.00	33.9	.48	.18	40.4	.08	.22	27.5	19.1	12.1	2.9	
2ø16	34.4	.49	.14	41.2	.08	.16	40.1	.61	.19	51.1	.10	.24	29.2	19.2	12.1	3.3	
4ø12	37.9	.55	.12	46.6	.09	.17	48.7	1ø12	.51	.17	57.7	.11	.23	30.6	19.4	12.2	3.7
2ø16+1ø12	41.0	.62	.15	52.4	.10	.21	52.7	1ø12	.60	.20	64.8	.13	.28	31.3	19.5	12.2	3.9
3ø16	50.5	1ø12	.56	60.7	.12	.21	62.2	1ø16	.61	.20	75.0	.15	.27	32.5	19.6	12.2	4.3
4ø16	65.0	1ø16	.67	79.6	.16	.20	84.4	2ø16	.61	.20	97.9	.20	.26	35.0	20.0	12.3	5.2

ESFUERZO CORTANTE POS. Vu (11) (KN/m) VA.17 (simple celosía) : 37.1 VA.20 (simple celosía) : 36.7  
(KN/m) VA.17 (doble celosía) : 56.6 VA.20 (doble celosía) : 55.8

FICHA DE CARACTERISTICAS TECNICAS DEL FORJADO DE VIGUETAS ARMADAS

NUEVA DAYA, S.L.

LA HOYA, P.3, Nº 4, Vereda de Sendres, 4 03280 ELCHE (Alicante)

TECNICO AUTOR DE LA MEMORIA : Jordi Amat

Hoja nº 10 de 26

Dirección General de Arquitectura, Urbanismo y Bellas Artes  
 Autorización de Urbanismo - R.D. 67/2007  
 0918-08 15 MAR. 2008  
 Visado el jefe de la Sección  
 Edo. Angel Paz Martín

FLEXION POSITIVA (por m)

TIPO DE FORJADO (h+c) * s	TIPO DE VIGUETA (4)	REFUERZO INFERIOR VIGUETA Y + X	MOMENTO Ultimo Rel. x/d		MOMENTO SERVICIO FISURACION POR COMPRESION n-KN/m (6)	Wk CLASE POR RECUBRIM. mm (7)	MOMENTO DE FISURACION Mf n-KN/m (8)	RIGIDEZ TOTAL FISURADA	
			Mu n-KN/m (5)	x/d				E-Ib E-If (8) m <sup>2</sup> -MN/m	
(20+ 5) * 85.5D	VA.17 1	0ø 0	12.9	.02	30.9	.10	13.1	17.7	1.2
	VA.20 2	1ø 6	19.2	.03	38.1	.13	13.3	17.9	1.7
	3	1ø 8	24.0	.04	42.6	.18	13.4	18.1	2.1
	4	1ø10	30.1	.05	47.4	.21	13.6	18.3	2.6
	5	1ø 8+1ø 8	35.0	.06	51.1	.19	13.8	18.5	3.0
	6	1ø12	37.5	.06	52.4	.24	13.9	18.5	3.2
	7	1ø10+1ø 8	41.0	.07	54.9	.21	14.0	18.7	3.5
	8	1ø10+1ø10	47.0	.08	58.4	.21	14.2	18.9	3.9
	9	1ø12+1ø10	54.1	.09	62.2	.22	14.5	19.1	4.5
	10	1ø16	55.6	.09	62.3	.27	14.5	19.1	4.5
	11	1ø12+1ø12	61.2	.10	65.6	.22	14.7	19.4	5.0
	12	1ø16+1ø10	71.7	.12	70.1	.25	15.0	19.7	5.7
	13	1ø16+1ø12	78.5	.14	72.9	.25	15.3	20.0	6.2
	14	1ø16+1ø16	95.2	.17	79.1	.24	15.9	20.5	7.4

FLEXION NEGATIVA (por m)

REFUERZO SUPERIOR POR NERVIO	B400 MOMENTO ULTIMO - Sección tipo			ABERTURA FISURA Sección maciza			B500 MOMENTO ULTIMO - Sección tipo			ABERTURA FISURA Sección maciza			MOMENTO DE SERVICIO FISUR. POR COMPRESION n-KN/m (6)	MOMENTO FISURAC. Mf n-KN/m (8)	RIGIDEZ TOTAL FIS. E-Ib E-If (8) m <sup>2</sup> -MN/m			
	Mu	Ref. inf.	Rel. x/d	Wk	Mu	Ref. x/d	Rel. x/d	Wk	Mu	Ref. inf.	Rel. x/d	Wk			Mu	Ref. x/d	Rel. x/d	Wk
	n-KN/m (5)	vig. (9)	mm (10)	mm (7)	n-KN/m (5)	vig. (9)	mm (10)	mm (7)	n-KN/m (5)	vig. (9)	mm (10)	mm (7)			n-KN/m (5)	vig. (9)	mm (10)	mm (7)
1ø10	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	.00	.00	0.0	22.0	17.3	1.4	
2ø 8	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	.00	.00	0.0	22.1	17.3	1.5	
1ø12	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	.00	.00	0.0	22.1	17.3	1.6	
1ø 8+1ø10	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	.00	.00	0.0	22.1	17.4	1.8	
2ø10	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	.00	.00	0.0	22.2	17.4	2.0	
1ø10+1ø12	0.0	.00	.00	.00	0.0	.00	.00	.00	15.5	.13	.12	.00	.00	33.8	22.3	17.4	2.2	
2ø12	14.6	.12	.09	.00	0.0	.00	.00	.00	24.0	.15	.11	.00	.00	35.3	22.3	17.4	2.4	
1ø10+1ø16	23.6	.15	.10	.00	0.0	.00	.00	.00	29.1	.19	.13	.00	.00	37.1	22.4	17.5	2.8	
1ø12+1ø16	26.3	.17	.10	.00	0.0	.00	.00	.00	32.3	.22	.16	.00	.00	38.3	22.5	17.5	3.0	
2ø16	32.8	.22	.12	.00	0.0	.00	.00	.00	40.0	.28	.19	43.6	.08	40.8	22.7	17.6	3.5	
4ø12	36.9	.25	.11	.39	39.7	.08	.11	.11	44.7	.32	.17	49.3	.09	42.7	22.8	17.6	3.8	
2ø16+1ø12	41.0	.29	.14	.44	44.7	.09	.16	.16	49.4	.37	.20	55.4	.11	43.9	22.9	17.7	4.1	
3ø16	46.7	.34	.15	.51	51.9	.10	.17	.17	55.8	.43	.21	64.2	.13	45.6	23.1	17.7	4.6	
4ø16	58.7	.46	.16	.68	68.2	.14	.19	.19	68.8	.58	.21	84.1	.17	49.3	23.5	17.9	5.5	

ESPUERZO CORTANTE POS. Vu (11) (KN/m) VA.17 (simple celosía) : 69.6 VA.20 (simple celosía) : 68.9  
 (KN/m) VA.17 (doble celosía) : 102.7 VA.20 (doble celosía) : 101.4

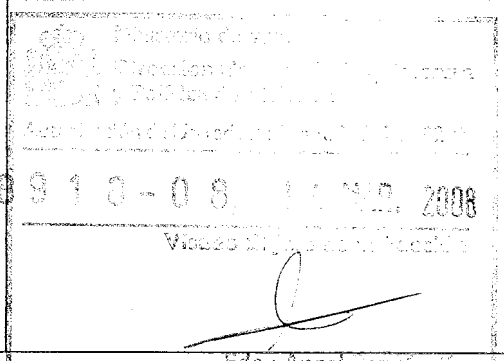
FICHA DE CARACTERISTICAS TECNICAS  
DEL FORJADO DE VIGUETAS ARMADAS

NUEVA DAYA, S.L.

LA HOYA, P.3, Nº 4, Vereda de Sendres, 4  
03280 ELCHE (Alicante)

TECNICO AUTOR DE LA MEMORIA : Jordi Amat

Hoja nº 11 de 26



FLEXION POSITIVA (por m)

TIPO DE FORJADO (h+c) * s	TIPO DE VIGUETA (4)	REFUERZO INFERIOR VIGUETA Y + X	MOMENTO Ultimo Rel. x/d		MOMENTO SERVICIO FISURACION POR COMPRESION n-KN/m (6)	Wk CLASE POR RECUBRIM. mm (7)	MOMENTO DE FISURACION Mf n-KN/m (8)	RIGIDEZ TOTAL FISURADA			
			Mu n-KN/m (5)	Rel. x/d				E-Ib	E-If		
(22+ 4) * 72.5	VA.17	1	0ø 0	0.0	.00	0.0	.00	IIa	8.8	13.5	0.8
	VA.20	2	1ø 6	11.9	.02	31.7	.08	IIa	9.0	13.7	1.2
		3	1ø 8	14.9	.02	35.5	.13	IIa	9.1	13.8	1.5
		4	1ø10	18.8	.03	39.6	.16	IIa	9.2	14.0	1.8
		5	1ø 8+1ø 8	21.8	.03	42.8	.15	IIa	9.3	14.2	2.1
		6	1ø12	23.4	.04	44.0	.19	IIa	9.4	14.2	2.2
		7	1ø10+1ø 8	25.6	.04	46.1	.17	IIa	9.5	14.3	2.4
		8	1ø10+1ø10	29.4	.04	49.2	.17	IIa	9.6	14.5	2.7
		9	1ø12+1ø10	34.0	.05	52.5	.19	IIa	9.8	14.7	3.1
		10	1ø16	34.9	.05	52.7	.22	IIa	9.8	14.7	3.1
		11	1ø12+1ø12	38.5	.06	55.6	.19	IIa	9.9	14.9	3.4
		12	1ø16+1ø10	45.3	.07	59.6	.22	IIa	10.2	15.2	4.0
		13	1ø16+1ø12	49.8	.08	62.2	.21	IIa	10.3	15.3	4.3
		14	1ø16+1ø16	60.9	.09	67.8	.21	IIa	10.7	15.8	5.2

FLEXION NEGATIVA (por m)

REFUERZO SUPERIOR POR NERVIO	B400 MOMENTO ULTIMO - ABERTURA FISURA						B500 MOMENTO ULTIMO - ABERTURA FISURA						MOMENTO DE SERVICIO FISUR. POR COMPRESION n-KN/m (6)	MOMENTO FISURAC. Mf n-KN/m (8)	RIGIDEZ TOTAL FIS.	
	Sección tipo			Sección maciza			Sección tipo			Sección maciza					E-Ib	E-If
	Mu n-KN/m (5)	Ref. vig. (9)	Rel. inf. x/d (10)	Wk (7)	Mu n-KN/m (5)	Rel. (10)	Wk (7)	Mu n-KN/m (5)	Ref. vig. (9)	Rel. inf. x/d (10)	Wk (7)	Mu n-KN/m (5)				
1ø10	0.0	.00	.00	0.0	.00	.00	7.9	.10	.11	0.0	.00	.00	20.8	19.0	13.2	1.4
2ø 8	8.2	.10	.08	0.0	.00	.00	10.1	.13	.10	0.0	.00	.00	22.2	19.1	13.2	1.6
1ø12	9.0	.12	.09	0.0	.00	.00	11.2	.15	.11	0.0	.00	.00	22.7	19.1	13.2	1.7
1ø 8+1ø10	10.3	.13	.09	0.0	.00	.00	12.7	.17	.11	0.0	.00	.00	23.6	19.1	13.3	1.8
2ø10	12.4	.16	.08	0.0	.00	.00	20.2	.20	.10	0.0	.00	.00	24.8	19.2	13.3	2.0
1ø10+1ø12	19.7	.20	.08	0.0	.00	.00	24.1	.25	.10	0.0	.00	.00	26.1	19.3	13.3	2.3
2ø12	22.8	.24	.08	0.0	.00	.00	27.7	.31	.13	0.0	.00	.00	27.2	19.4	13.3	2.6
1ø10+1ø16	27.3	.31	.11	0.0	.00	.00	32.7	.40	.18	0.0	.00	.00	28.7	19.5	13.4	2.9
1ø12+1ø16	30.1	.36	.13	0.0	.00	.00	35.8	.46	.19	42.3	.07	.22	29.6	19.5	13.4	3.1
2ø16	36.4	.47	.14	43.1	.08	.16	42.5	.58	.20	53.5	.10	.24	31.5	19.7	13.4	3.7
4ø12	40.1	.52	.13	48.8	.08	.17	51.5	1ø12 .49	.18	60.5	.11	.23	32.9	19.9	13.5	4.0
2ø16+1ø12	43.5	.59	.15	54.9	.10	.21	55.8	1ø12 .58	.21	67.9	.12	.28	33.8	20.0	13.5	4.4
3ø16	53.5	1ø12 .54	.16	63.7	.11	.21	65.9	1ø16 .58	.21	78.7	.14	.27	35.1	20.2	13.5	4.8
4ø16	68.9	1ø16 .64	.16	83.5	.15	.20	89.3	2ø16 .58	.21	102.8	.19	.26	34.5	20.6	13.6	5.8

ESFUERZO CORTANTE POS. Vu (11) (KN/m) VA.17 (simple celosía) : 38.8 VA.20 (simple celosía) : 38.4  
(KN/m) VA.17 (doble celosía) : 59.2 VA.20 (doble celosía) : 58.3

FICHA DE CARACTERISTICAS TECNICAS  
DEL FORJADO DE VIGUETAS ARMADAS

NUEVA DAYA, S.L.

LA HOYA, P.3, Nº 4, Vereda de Sendres, 4  
03280 ELCHE (Alicante)

TECNICO AUTOR DE LA MEMORIA : Jordi Amat

Hoja nº 12 de 26

Autorización de Uso en el Proyecto

8918-08 14 MAR. 2008

Visado El Jefe de la Sección

Fdo.: Angel Paz Martín

FLEXION POSITIVA (por m)

TIPO DE FORJADO (h+c) * s	TIPO DE VIGUETA (4)	REFUERZO INFERIOR VIGUETA Y + X	MOMENTO ULTIMO		Rel. x/d	MOMENTO SERVICIO FISURACION POR COMPRESION m-KN/m (6)	Wk mm (7)	CLASE POR RECUBRIM.	MOMENTO DE FISURACION MF m-KN/m (8)	RIGIDEZ TOTAL FISURADA	
			Mu m-KN/m (5)	Rel. x/d						E-Ib	E-If
(22+4) * 85.5D	VA.17 1	0ø 0	13.4	.02		33.1	.10	IIa	14.0	19.4	1.3
	VA.20 2	1ø 6	20.1	.03		40.8	.12	IIa	14.2	19.6	1.9
	3	1ø 8	25.1	.04		45.6	.18	IIa	14.4	19.8	2.4
	4	1ø10	31.5	.05		50.8	.22	IIa	14.6	20.0	2.9
	5	1ø 8+1ø 8	36.6	.06		54.7	.19	IIa	14.8	20.2	3.3
	6	1ø12	39.2	.06		56.2	.24	IIa	14.9	20.3	3.5
	7	1ø10+1ø 8	42.9	.07		58.9	.21	IIa	15.0	20.4	3.8
	8	1ø10+1ø10	49.2	.07		62.6	.21	IIa	15.2	20.6	4.3
	9	1ø12+1ø10	56.7	.09		66.7	.23	IIa	15.5	20.9	4.9
	10	1ø16	58.2	.09		66.9	.27	IIa	15.5	20.9	5.0
	11	1ø12+1ø12	64.1	.10		70.3	.22	IIa	15.7	21.1	5.5
	12	1ø16+1ø10	75.1	.12		74.9	.25	IIa	16.1	21.5	6.3
	13	1ø16+1ø12	82.3	.13		77.7	.25	IIa	16.3	21.7	6.8
	14	1ø16+1ø16	100.0	.16		83.6	.24	IIa	17.0	22.3	8.1

FLEXION NEGATIVA (por m)

REFUERZO SUPERIOR POR NERVIOS	B400 MOMENTO ULTIMO - ABERTURA FISURA Sección tipo							B500 MOMENTO ULTIMO - ABERTURA FISURA Sección tipo							MOMENTO DE SERVICIO FISUR. POR COMPRESION m-KN/m (6)	MOMENTO FISURAC. MF m-KN/m (8)	RIGIDEZ TOTAL FIS.			
	Mu m-KN/m (5)	Ref. inf. vig. (9)	Rel. x/d (10)	Wk mm (7)	Sección maciza			Mu m-KN/m (5)	Ref. inf. vig. (9)	Rel. x/d (10)	Wk mm (7)	Sección maciza					m-KN/m (8)	m2-MN/m (8)	E-Ib	E-If
					Mu m-KN/m (5)	Ref. inf. vig. (9)	Rel. x/d (10)					Wk mm (7)	Mu m-KN/m (5)	Ref. inf. vig. (9)						
1ø10	0.0	.00	.00	.00	0.0	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	0.0	22.5	19.0	1.5		
2ø 8	0.0	.00	.00	.00	0.0	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	0.0	22.5	19.0	1.7		
1ø12	0.0	.00	.00	.00	0.0	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	0.0	22.6	19.0	1.7		
1ø 8+1ø10	0.0	.00	.00	.00	0.0	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	0.0	22.6	19.0	1.9		
2ø10	0.0	.00	.00	.00	0.0	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	0.0	22.7	19.1	2.1		
1ø10+1ø12	0.0	.00	.00	.00	0.0	.00	.00	21.6	.13	.12	.12	0.0	.00	.00	35.9	22.8	19.1	2.4		
2ø12	0.0	.00	.00	.00	0.0	.00	.00	25.2	.15	.11	.11	0.0	.00	.00	37.6	22.8	19.1	2.6		
1ø10+1ø16	24.8	.15	.10	.10	0.0	.00	.00	30.5	.18	.14	.14	0.0	.00	.00	39.6	23.0	19.2	3.0		
1ø12+1ø16	27.6	.17	.10	.10	0.0	.00	.00	33.9	.21	.17	.17	0.0	.00	.00	41.0	23.0	19.2	3.2		
2ø16	34.5	.21	.13	.13	0.0	.00	.00	42.1	.27	.20	.20	45.6	.08	.17	43.7	23.2	19.3	3.8		
4ø12	38.7	.24	.12	.12	41.6	.07	.11	47.1	.30	.17	.17	51.6	.09	.19	45.8	23.4	19.4	4.2		
2ø16+1ø12	43.1	.27	.15	.15	46.8	.08	.15	52.1	.35	.21	.21	58.1	.10	.24	47.0	23.5	19.4	4.5		
3ø16	49.2	.33	.16	.16	54.4	.10	.17	58.9	.42	.21	.21	67.3	.12	.25	49.0	23.7	19.5	5.0		
4ø16	62.1	.44	.16	.16	71.5	.13	.19	72.9	.55	.21	.21	88.3	.16	.26	53.0	24.2	19.7	6.1		

ESFUERZO CORTANTE POS. Vu (11) (KN/m) VA.17 (simple celosía) : 72.7 VA.20 (simple celosía) : 72.0  
(KN/m) VA.17 (doble celosía) : 107.3 VA.20 (doble celosía) : 105.9

FICHA DE CARACTERISTICAS TECNICAS  
DEL FORJADO DE VIGUETAS ARMADAS

NUEVA DAYA, S.L.

LA HOYA, P.3, Nº 4, Vereda de Sendres, 4  
03280 ELCHE (Alicante)

TECNICO AUTOR DE LA MEMORIA : Jordi Amat

Hoja nº 13 de 26

8918-08 14 MAR. 2008

Visado

Firma: Angel Paz Martín

FLEXION POSITIVA (por m)

TIPO DE FORJADO (h+c) * s	TIPO DE VIGUETA (4)	REFUERZO INFERIOR VIGUETA Y + X	MOMENTO Ultimo		MOMENTO SERVICIO PISURACION POR COMPRESION m-KN/m (6)	Wk CLASE POR RECUBRIM. mm (7)	MOMENTO DE PISURACION Mf m-KN/m (8)	RIGIDEZ TOTAL PISURADA			
			Mu m-KN/m (5)	Rel. x/d				E-Ib	E-If		
* 72.5	VA.20	1	0ø 0	0.0	.00	0.0	.00	IIa	9.6	15.4	0.9
	VA.22	2	1ø 6	12.4	.02	33.9	.08	IIa	9.7	15.6	1.3
		3	1ø 8	15.6	.02	38.0	.13	IIa	9.8	15.7	1.6
		4	1ø10	19.6	.03	42.5	.16	IIa	10.0	15.9	1.9
		5	1ø 8+1ø 8	22.8	.03	45.9	.15	IIa	10.1	16.1	2.2
		6	1ø12	24.4	.03	47.1	.19	IIa	10.1	16.2	2.4
		7	1ø10+1ø 8	26.8	.04	49.5	.17	IIa	10.2	16.3	2.6
		8	1ø10+1ø10	30.7	.04	52.7	.17	IIa	10.4	16.5	2.9
		9	1ø12+1ø10	35.5	.05	56.3	.19	IIa	10.5	16.7	3.4
		10	1ø16	36.5	.05	56.6	.22	IIa	10.6	16.7	3.4
		11	1ø12+1ø12	40.2	.06	59.6	.19	IIa	10.7	16.9	3.8
		12	1ø16+1ø10	47.4	.07	63.9	.22	IIa	11.0	17.2	4.3
		13	1ø16+1ø12	52.1	.07	66.7	.21	IIa	11.1	17.5	4.7
		14	1ø16+1ø16	63.7	.09	72.8	.21	IIa	11.6	18.0	5.7

FLEXION NEGATIVA (por m)

REFUERZO SUPERIOR POR NERVIO	B400 MOMENTO ULTIMO - ABERTURA FISURA						B500 MOMENTO ULTIMO - ABERTURA FISURA						MOMENTO DE SERVICIO PISUR. POR COMPRESION m-KN/m (6)	MOMENTO PISURAC. Mf m-KN/m (8)	RIGIDEZ TOTAL FIS.	
	Sección tipo			Sección maciza			Sección tipo			Sección maciza					E-Ib	E-If
	Mu m-KN/m (5)	Ref. vig. (9)	Rel. x/d (10)	Wk (7)	Mu m-KN/m (5)	Ref. (10)	Rel. x/d (7)	Wk (7)	Mu m-KN/m (5)	Ref. vig. (9)	Rel. x/d (10)	Wk (7)				
1ø10	0.0	.00	.00	0.0	.00	.00	8.3	.10	.11	0.0	.00	.00	22.9	21.4	15.0	1.5
2ø 8	8.5	.10	.08	0.0	.00	.00	10.5	.13	.10	0.0	.00	.00	24.3	21.4	15.1	1.8
1ø12	9.5	.11	.09	0.0	.00	.00	11.7	.14	.12	0.0	.00	.00	24.8	21.4	15.1	1.9
1ø 8+1ø10	10.8	.13	.09	0.0	.00	.00	13.3	.16	.11	0.0	.00	.00	25.7	21.5	15.1	2.0
2ø10	12.9	.16	.08	0.0	.00	.00	21.2	.20	.10	0.0	.00	.00	27.0	21.6	15.1	2.3
1ø10+1ø12	20.6	.19	.08	0.0	.00	.00	25.3	.24	.11	0.0	.00	.00	28.4	21.6	15.1	2.6
2ø12	24.0	.23	.08	0.0	.00	.00	29.1	.30	.11	0.0	.00	.00	29.6	21.7	15.1	2.9
1ø10+1ø16	28.7	.30	.10	0.0	.00	.00	34.5	.39	.17	0.0	.00	.00	31.1	21.8	15.2	3.3
1ø12+1ø16	31.6	.34	.11	0.0	.00	.00	37.7	.44	.18	44.2	.07	.21	32.0	21.9	15.2	3.5
2ø16	38.3	.45	.14	45.1	.07	.16	45.0	.56	.19	56.0	.09	.24	34.1	22.1	15.2	4.1
4ø12	42.3	.50	.12	51.0	.08	.16	54.3	1ø12 .47	.17	63.2	.10	.23	35.7	22.3	15.3	4.5
2ø16+1ø12	46.0	.57	.15	57.4	.09	.21	59.0	1ø12 .56	.20	71.1	.12	.28	36.6	22.4	15.3	4.8
3ø16	50.9	.66	.15	66.6	.11	.21	69.6	1ø16 .56	.21	82.4	.14	.28	38.1	22.5	15.4	5.4
4ø16	72.8	1ø16 .61	.16	87.5	.15	.20	94.2	2ø16 .56	.21	107.7	.18	.26	36.9	23.0	15.5	6.4

ESFUERZO CORTANTE POS. Vu (11) (KN/m) VA.20 (simple celosía) : 40.0 VA.22 (simple celosía) : 39.7  
(KN/m) VA.20 (doble celosía) : 60.9 VA.22 (doble celosía) : 60.3

FICHA DE CARACTERISTICAS TECNICAS  
DEL FORJADO DE VIGUETAS ARMADAS

NUEVA DAYA, S.L.

LA HOYA, P.3, Nº 4, Vereda de Sendres, 4  
03280 ELCHE (Alicante)

TECNICO AUTOR DE LA MEMORIA : Jordi Amat

Hoja nº 14 de 26

8912-03 MAR. 2008

Visado Director de la Oficina

FLEXION POSITIVA (por m)

TIPO DE FORJADO (h+c) * s	TIPO DE VIGUETA (4)	REFUERZO INFERIOR VIGUETA Y + X	MOMENTO Ultimo Rel. x/d		MOMENTO SERVICIO FISURACION POR COMPRESION n·KN/m (6)	Wk CLASE POR RECUBRIM. mm (7)	MOMENTO DE FISURACION Mf n·KN/m (8)	RIGIDEZ TOTAL FISURADA	
			Mu n·KN/m (5)	x/d				E·Ib E·If (8)	m2·MN/m
(22+ 5) * 85.5D	VA.20 1	0ø 0	14.0	.02	35.5	.10	IIa	15.2	22.1 1.4
	VA.22 2	1ø 6	21.0	.03	43.8	.12	IIa	15.4	22.4 2.1
	3	1ø 8	26.2	.04	49.0	.17	IIa	15.6	22.6 2.5
	4	1ø10	32.9	.05	54.6	.21	IIa	15.8	22.8 3.1
	5	1ø 8+1ø 8	38.3	.05	58.8	.19	IIa	16.0	23.1 3.6
	6	1ø12	41.0	.06	60.4	.24	IIa	16.1	23.1 3.8
	7	1ø10+1ø 8	44.9	.06	63.2	.21	IIa	16.3	23.3 4.2
	8	1ø10+1ø10	51.4	.07	67.3	.21	IIa	16.5	23.5 4.7
	9	1ø12+1ø10	59.2	.08	71.6	.23	IIa	16.7	23.8 5.4
	10	1ø16	60.9	.09	71.9	.27	IIa	16.8	23.9 5.5
	11	1ø12+1ø12	67.0	.10	75.6	.22	IIa	17.0	24.1 6.0
	12	1ø16+1ø10	78.6	.11	80.9	.25	IIa	17.4	24.5 6.9
	13	1ø16+1ø12	86.2	.13	84.2	.25	IIa	17.7	24.8 7.5
	14	1ø16+1ø16	104.7	.15	91.3	.24	IIa	18.3	25.5 8.9

FLEXION NEGATIVA (por m)

REFUERZO SUPERIOR POR NERVIO	B400 MOMENTO ULTIMO - ABERTURA FISURA Sección tipo						B500 MOMENTO ULTIMO - ABERTURA FISURA Sección maciza						MOMENTO DE SERVICIO FISUR. POR COMPRESION n·KN/m (6)	MOMENTO FISURAC. Mf n·KN/m (8)	RIGIDEZ TOTAL FIS. E·Ib E·If (8)					
	Mu	Ref. inf.	Rel. x/d	Wk	Mu	Ref. x/d	Rel. x/d	Wk	Mu	Ref. inf.	Rel. x/d	Wk			Mu	Ref. x/d	Rel. x/d	Wk		
	n·KN/m (5)	vig. (9)	mm (10)	mm (7)	n·KN/m (5)	vig. (9)	mm (10)	mm (7)	n·KN/m (5)	vig. (9)	mm (10)	mm (7)			n·KN/m (5)	vig. (9)	mm (10)	mm (7)		
1ø10	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	25.3	21.7	1.7
2ø 8	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	25.3	21.7	1.9
1ø12	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	25.3	21.7	2.0
1ø 8+1ø10	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	25.4	21.7	2.2
2ø10	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	25.5	21.8	2.4
1ø10+1ø12	0.0	.00	.00	.00	0.0	.00	.00	.00	17.0	.12	.12	.00	0.0	.00	.00	.00	39.4	25.5	21.8	2.7
2ø12	0.0	.00	.00	.00	0.0	.00	.00	.00	26.4	.14	.12	.00	0.0	.00	.00	.00	41.1	25.6	21.8	3.0
1ø10+1ø16	25.9	.14	.10	.00	0.0	.00	.00	.00	31.9	.18	.13	.00	0.0	.00	.00	.00	43.3	25.7	21.9	3.4
1ø12+1ø16	28.9	.16	.10	.00	0.0	.00	.00	.00	35.5	.20	.15	.00	0.0	.00	.00	.00	44.6	25.8	21.9	3.6
2ø16	36.2	.20	.11	.00	0.0	.00	.00	.00	44.2	.26	.19	.08	47.7	.08	.17	.00	47.6	26.0	22.0	4.3
4ø12	40.6	.23	.11	.07	43.4	.07	.10	.00	49.5	.29	.17	.09	54.0	.09	.18	.00	49.7	26.2	22.1	4.7
2ø16+1ø12	45.3	.26	.14	.08	48.9	.08	.15	.00	54.7	.34	.20	.10	60.7	.10	.24	.00	51.0	26.3	22.1	5.1
3ø16	51.7	.31	.15	.09	56.9	.09	.17	.00	62.1	.40	.21	.12	70.5	.12	.24	.00	53.1	26.5	22.2	5.6
4ø16	65.4	.43	.16	.12	74.9	.12	.19	.00	77.1	.53	.21	.15	92.4	.15	.26	.00	57.4	27.0	22.4	6.8

ESFUERZO CORTANTE POS. Vu (11) (KN/m) VA.20 (simple celosía) : 75.1 VA.22 (simple celosía) : 74.7  
(KN/m) VA.20 (doble celosía) : 110.5 VA.22 (doble celosía) : 109.6

FICHA DE CARACTERISTICAS TECNICAS  
DEL FORJADO DE VIGUETAS ARMADAS

NUEVA DAYA, S.L.

LA HOYA, P.3, Nº 4, Vereda de Sendres, 4  
03280 ELCHE (Alicante)

TECNICO AUTOR DE LA MEMORIA : Jordi Amat

Hoja nº 15 de 26

8918-08 14 MAR. 2008  
Visado El Jefe de la Sección

FLEXION POSITIVA (por m)

TIPO DE FORJADO (h+c) * s	TIPO DE VIGUETA (4)	REFUERZO INFERIOR VIGUETA Y + X	MOMENTO Rel. ULTIMO x/d Mu		MOMENTO SERVICIO FISURACION POR COMPRESION n·KN/m (6)	Wk CLASE POR RECUBRIM. mm (7)	MOMENTO DE FISURACION Mf n·KN/m (8)	RIGIDEZ TOTAL FISURADA E·Ib E·If	
			m·KN/m (5)					(8) m <sup>2</sup> ·MN/m	
(25+ 4) * 72.5	VA.22 1	0ø 0	0.0	.00	0.0	.00	10.1	17.5	1.0
	VA.25 2	1ø 6	13.5	.02	38.4	.08	10.3	17.7	1.5
	3	1ø 8	16.9	.02	43.1	.13	10.4	17.9	1.8
	4	1ø10	21.2	.03	48.2	.17	10.6	18.1	2.3
	5	1ø 8+1ø 8	24.7	.03	52.0	.15	10.7	18.3	2.6
	6	1ø12	26.5	.03	53.5	.19	10.8	18.4	2.8
	7	1ø10+1ø 8	29.0	.03	56.1	.17	10.9	18.5	3.1
	8	1ø10+1ø10	33.3	.04	59.8	.17	11.0	18.7	3.5
	9	1ø12+1ø10	38.5	.05	63.9	.19	11.2	19.0	4.0
	10	1ø16	39.7	.05	64.2	.22	11.2	19.0	4.0
	11	1ø12+1ø12	43.7	.05	67.6	.19	11.4	19.2	4.4
	12	1ø16+1ø10	51.5	.06	72.6	.22	11.7	19.6	5.1
	13	1ø16+1ø12	56.6	.07	75.8	.22	11.9	19.9	5.6
	14	1ø16+1ø16	69.3	.09	82.5	.21	12.4	20.5	6.7

FLEXION NEGATIVA (por m)

REFUERZO SUPERIOR POR NERVIOS	B400 MOMENTO ULTIMO - ABERTURA FISURA Sección tipo				B500 MOMENTO ULTIMO - ABERTURA FISURA Sección maciza				MOMENTO DE SERVICIO FISUR. POR COMPRESION n·KN/m (6)	MOMENTO FISURAC. Mf n·KN/m (8)	RIGIDEZ TOTAL FIS. E·Ib E·If					
	Mu	Ref. inf.	Rel. x/d	Wk vig.	Mu	Ref. x/d	Rel. x/d	Wk			n·KN/m (5)	n·KN/m (10)	n·KN/m (7)	n·KN/m (8)	m <sup>2</sup> ·MN/m (8)	
	m·KN/n (5)			mm (7)	m·KN/n (5)			mm (7)								
1ø10	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	0.0	22.6	17.0	1.8	
2ø 8	0.0	.00	.00	.00	0.0	.00	.00	.00	11.5	.12	.10	0.0	27.4	22.7	17.1	2.1
1ø12	10.3	.10	.10	.00	0.0	.00	.00	.00	12.7	.13	.12	0.0	27.9	22.7	17.1	2.2
1ø 8+1ø10	11.7	.12	.09	.00	0.0	.00	.00	.00	14.5	.15	.11	0.0	29.0	22.8	17.1	2.4
2ø10	14.1	.14	.08	.00	0.0	.00	.00	.00	23.1	.18	.10	0.0	30.3	22.9	17.1	2.7
1ø10+1ø12	22.5	.18	.09	.00	0.0	.00	.00	.00	27.6	.22	.11	0.0	31.6	23.0	17.1	3.1
2ø12	26.2	.21	.08	.00	0.0	.00	.00	.00	31.9	.28	.12	0.0	32.8	23.1	17.2	3.4
1ø10+1ø16	31.4	.28	.11	.00	0.0	.00	.00	.00	37.8	.37	.18	0.0	34.2	23.2	17.2	3.9
1ø12+1ø16	34.7	.32	.12	.00	0.0	.00	.00	.00	41.4	.42	.19	0.0	35.1	23.3	17.2	4.2
2ø16	42.1	.44	.14	.15	49.0	.07	.15	.20	49.2	.57	.20	60.9	36.9	23.6	17.3	4.9
4ø12	46.4	.50	.13	.16	55.4	.08	.16	.18	59.5	1ø12 .46	.18	68.7	38.3	23.8	17.4	5.3
2ø16+1ø12	50.4	.59	.15	.20	62.4	.09	.20	.21	64.6	1ø12 .57	.21	77.4	39.0	23.9	17.4	5.7
3ø16	61.9	1ø12 .52	.16	.21	72.5	.10	.21	.21	76.3	1ø16 .57	.21	89.7	40.1	24.1	17.5	6.3
4ø16	79.7	1ø16 .64	.16	.21	95.3	.13	.21	.21	103.3	2ø16 .57	.21	117.5	42.3	24.7	17.6	7.4

ESFUERZO CORTANTE POS. Vu (11) (KN/m) VA.22 (simple celosía) : 43.0 VA.25 (simple celosía) : 42.6  
(KN/m) VA.22 (doble celosía) : 65.3 VA.25 (doble celosía) : 64.5

FICHA DE CARACTERISTICAS TECNICAS  
DEL FORJADO DE VIGUETAS ARMADAS

NUEVA DAYA, S.L.

LA HOYA, P.3, Nº 4, Vereda de Sendres, 4  
03280 ELCHE (Alicante)

TECNICO AUTOR DE LA MEMORIA : Jordi Amat

Hoja nº 16 de 26

Ministerio de Sanidad, Consumo y Bienestar Social  
Dirección General de Arquitectura, Urbanismo y Política de Vivienda  
Asociación de Urbanistas de España (AUE) nº 25.117.001-4  
8918-00 15 MAR. 2008  
Visado en julio de 2008  
Fdo: Angel Pina

FLEXION POSITIVA (por m)

TIPO DE FORJADO (h+c) * s	TIPO DE VIGUETA (4)	REFUERZO INFERIOR VIGUETA Y + X	MOMENTO Ultimo Rel. x/d		MOMENTO SERVICIO FISURACION POR COMPRESION		Wk CLASE POR RECUBRIM. mm (7)	MOMENTO DE FISURACION Mf n-KN/m (8)	RIGIDEZ TOTAL FISURADA	
			Mu n-KN/m (5)	mm (5)	Mu n-KN/m (6)	mm (6)			E-Ib E-If (8) m <sup>2</sup> -MN/m	
(25+ 4) * 85.5D	VA.22 1	0ø 0	0.0	.00	0.0	.00	.00	16.8	25.8	1.7
	VA.25 2	1ø 6	22.7	.03	49.7	.11	.11	17.1	26.1	2.4
	3	1ø 8	28.4	.03	55.6	.18	.18	17.3	26.3	3.0
	4	1ø10	35.7	.04	62.0	.22	.22	17.5	26.6	3.7
	5	1ø 8+1ø 8	41.5	.05	66.8	.19	.19	17.8	26.8	4.3
	6	1ø12	44.5	.05	68.6	.25	.25	17.8	26.9	4.5
	7	1ø10+1ø 8	48.7	.06	71.8	.22	.22	18.0	27.1	4.9
	8	1ø10+1ø10	55.8	.07	76.4	.21	.21	18.3	27.4	5.6
	9	1ø12+1ø10	64.4	.08	81.3	.23	.23	18.5	27.7	6.4
	10	1ø16	66.2	.08	81.7	.28	.28	18.6	27.7	6.5
	11	1ø12+1ø12	72.9	.09	85.7	.23	.23	18.9	28.0	7.1
	12	1ø16+1ø10	85.6	.11	91.1	.26	.26	19.3	28.5	8.2
	13	1ø16+1ø12	93.8	.12	94.5	.25	.25	19.6	28.8	8.9
	14	1ø16+1ø16	114.2	.14	101.4	.24	.24	20.3	29.6	10.6

FLEXION NEGATIVA (por m)

REFUERZO SUPERIOR POR NERVIO	B400 MOMENTO ULTIMO - ABERTURA FISURA				B500 MOMENTO ULTIMO - ABERTURA FISURA				MOMENTO DE SERVICIO FISUR. POR COMPRESION n-KN/m (6)	MOMENTO FISURAC. Mf n-KN/m (8)	RIGIDEZ TOTAL FIS. E-Ib E-If (8) m <sup>2</sup> -MN/m				
	Sección tipo		Sección maciza		Sección tipo		Sección maciza				n-KN/m (5)	n-KN/m (10)	n-KN/m (7)		
	Mu n-KN/m (5)	Ref. Rel. inf. x/d (9)	Wk Rel. x/d (10)	Wk (7)	Mu n-KN/m (5)	Ref. Rel. inf. x/d (9)	Wk Rel. x/d (10)	Wk (7)							
1ø10	0.0	.00	.00	0.0	.00	.00	0.0	.00	0.0	.00	.00	0.0	26.5	25.3	2.0
2ø 8	0.0	.00	.00	0.0	.00	.00	0.0	.00	0.0	.00	.00	0.0	26.6	25.3	2.3
1ø12	0.0	.00	.00	0.0	.00	.00	0.0	.00	0.0	.00	.00	0.0	26.6	25.3	2.4
1ø 8+1ø10	0.0	.00	.00	0.0	.00	.00	0.0	.00	0.0	.00	.00	0.0	26.7	25.3	2.6
2ø10	0.0	.00	.00	0.0	.00	.00	0.0	.00	0.0	.00	.00	0.0	26.8	25.4	2.9
1ø10+1ø12	0.0	.00	.00	0.0	.00	.00	0.0	.00	0.0	.00	.00	0.0	26.9	25.4	3.2
2ø12	0.0	.00	.00	0.0	.00	.00	28.7	.13	.12	0.0	.00	.00	46.7	27.0	3.6
1ø10+1ø16	28.2	.13	.11	0.0	.00	.00	34.8	.16	.14	0.0	.00	.00	49.1	27.1	4.0
1ø12+1ø16	31.5	.15	.10	0.0	.00	.00	38.8	.18	.17	0.0	.00	.00	50.6	27.2	4.4
2ø16	39.5	.19	.12	0.0	.00	.00	48.4	.24	.20	51.9	.07	.15	53.8	27.5	5.1
4ø12	44.4	.21	.12	0.0	.00	.00	54.2	.27	.17	58.6	.08	.18	56.0	27.7	5.6
2ø16+1ø12	49.5	.24	.15	53.2	.07	.14	60.1	.31	.21	66.0	.09	.23	57.5	27.8	6.0
3ø16	56.7	.29	.16	61.9	.09	.16	68.3	.37	.21	76.7	.11	.24	59.7	28.1	6.7
4ø16	72.0	.40	.16	81.5	.11	.19	85.1	.51	.21	100.7	.14	.26	64.1	28.7	8.1

ESFUERZO CORTANTE POS. Vu (11) (KN/m) VA.22 (simple celosía) : 80.8 VA.25 (simple celosía) : 80.1  
(KN/m) VA.22 (doble celosía) : 118.6 VA.25 (doble celosía) : 117.2

FICHA DE CARACTERISTICAS TECNICAS  
DEL FORJADO DE VIGUETAS ARMADAS

NUEVA DAYA, S.L.

LA HOYA, P.3, Nº 4, Vereda de Sendres, 4  
03280 ELCHE (Alicante)

TECNICO AUTOR DE LA MEMORIA : Jordi Amat

Hoja nº 17 de 26

Ministerio de Fomento  
Dirección General de Infraestructura  
y Políticas de Vivienda  
Asesoración de Urbanismo y P.D. 401/2004  
8918-08 14 MAR 2008  
Visado en jefe de la Dirección  
Eduardo Pérez

FLEXION POSITIVA (por m)

TIPO DE FORJADO (h+c) * s	TIPO DE VIGUETA (4)	REFUERZO INFERIOR VIGUETA Y + X	MOMENTO Ultimo Rel. x/d		MOMENTO SERVICIO FISURACION POR COMPRESION m·KN/m (6)	Wk CLASE POR RECUBRIM. mm (7)	MOMENTO DE FISURACION Mf m·KN/m (8)	RIGIDEZ TOTAL FISURADA		
			Mu m·KN/m (5)	mm				E·Ib E·If	m <sup>2</sup> ·MN/m (8)	
(25+ 5) * 72.5	VA.22 1	0ø 0	0.0	.00	0.0	.00	IIa	10.8	19.6	1.1
	VA.25 2	1ø 6	14.0	.02	40.6	.08	IIa	10.9	19.9	1.6
	3	1ø 8	17.5	.02	45.6	.13	IIa	11.1	20.1	2.0
	4	1ø10	22.1	.02	51.0	.17	IIa	11.2	20.3	2.5
	5	1ø 8+1ø 8	25.7	.03	55.0	.15	IIa	11.4	20.5	2.9
	6	1ø12	27.5	.03	56.6	.19	IIa	11.5	20.6	3.0
	7	1ø10+1ø 8	30.1	.03	59.4	.17	IIa	11.6	20.8	3.3
	8	1ø10+1ø10	34.6	.04	63.4	.17	IIa	11.7	21.0	3.8
	9	1ø12+1ø10	40.0	.04	67.7	.19	IIa	11.9	21.3	4.3
	10	1ø16	41.2	.05	68.1	.23	IIa	12.0	21.4	4.4
	11	1ø12+1ø12	45.4	.05	71.7	.19	IIa	12.1	21.6	4.8
	12	1ø16+1ø10	53.5	.06	77.0	.22	IIa	12.5	22.1	5.6
	13	1ø16+1ø12	58.8	.07	80.4	.22	IIa	12.7	22.4	6.1
	14	1ø16+1ø16	72.1	.08	87.8	.21	IIa	13.2	23.1	7.3

FLEXION NEGATIVA (por m)

REFUERZO SUPERIOR POR NERVIOS	B400 MOMENTO ULTIMO - ABERTURA FISURA							B500 MOMENTO ULTIMO - ABERTURA FISURA							MOMENTO DE SERVICIO FISUR. POR COMPRESION m·KN/m (6)	MOMENTO FISURAC. Mf m·KN/m (8)	RIGIDEZ TOTAL FIS.		
	Sección tipo			Sección maciza				Sección tipo			Sección maciza						E·Ib E·If	m <sup>2</sup> ·MN/m (8)	
	Mu m·KN/m (5)	Ref. inf. vig. (9)	Rel. x/d (10)	Wk (7)	Mu m·KN/m (5)	Ref. x/d (10)	Wk (7)	Mu m·KN/m (5)	Ref. inf. x/d (9)	Wk (7)	Mu m·KN/m (5)	Ref. x/d (10)	Wk (7)						
1ø10	0.0	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	25.6	19.1	2.0
2ø 8	0.0	.00	.00	0.0	.00	.00	11.9	.11	.10	0.0	.00	.00	28.9	25.7	19.2	2.3	25.7	19.2	2.3
1ø12	10.7	.10	.10	0.0	.00	.00	13.2	.13	.12	0.0	.00	.00	29.4	25.7	19.2	2.4	25.7	19.2	2.4
1ø 8+1ø10	12.2	.11	.09	0.0	.00	.00	15.0	.14	.12	0.0	.00	.00	30.5	25.8	19.2	2.6	30.5	19.2	2.6
2ø10	14.7	.14	.09	0.0	.00	.00	18.1	.17	.11	0.0	.00	.00	31.9	25.8	19.2	2.9	31.9	19.2	2.9
1ø10+1ø12	17.6	.17	.09	0.0	.00	.00	28.8	.21	.11	0.0	.00	.00	33.4	25.9	19.2	3.3	33.4	19.2	3.3
2ø12	27.3	.20	.08	0.0	.00	.00	33.3	.27	.10	0.0	.00	.00	34.6	26.0	19.3	3.7	34.6	19.3	3.7
1ø10+1ø16	32.8	.27	.09	0.0	.00	.00	39.5	.35	.16	0.0	.00	.00	36.2	26.2	19.3	4.2	36.2	19.3	4.2
1ø12+1ø16	36.2	.31	.11	0.0	.00	.00	43.3	.41	.18	0.0	.00	.00	37.2	26.3	19.3	4.5	37.2	19.3	4.5
2ø16	44.1	.42	.13	0.0	.00	.00	51.7	.55	.19	63.3	.08	.23	39.1	26.5	19.4	5.3	39.1	19.4	5.3
4ø12	48.6	.48	.12	57.6	.07	.16	62.3	1ø12 .45	.17	71.5	.09	.23	40.5	26.7	19.5	5.8	40.5	19.5	5.8
2ø16+1ø12	52.9	.57	.15	64.9	.08	.20	67.7	1ø12 .55	.20	80.5	.10	.29	41.3	26.9	19.5	6.2	41.3	19.5	6.2
3ø16	64.8	1ø12 .50	.16	75.4	.10	.21	80.0	1ø16 .55	.21	93.4	.12	.28	42.5	27.1	19.5	6.8	42.5	19.5	6.8
4ø16	83.6	1ø16 .62	.16	99.2	.13	.21	108.2	2ø16 .55	.21	122.4	.16	.27	44.9	27.7	19.7	8.1	44.9	19.7	8.1

ESFUERZO CORTANTE POS. Vu (11) (KN/m) VA.22 (simple celosía) : 44.7 VA.25 (simple celosía) : 44.2  
(KN/m) VA.22 (doble celosía) : 67.8 VA.25 (doble celosía) : 67

FICHA DE CARACTERISTICAS TECNICAS  
DEL FORJADO DE VIGUETAS ARMADAS

NUEVA DAYA, S.L.

LA HOYA, P.3, Nº 4, Vereda de Sendres, 4  
03280 ELCHE (Alicante)

TECNICO AUTOR DE LA MEMORIA : Jordi Amat

Hoja nº 18 de 26

Ministerio de Vivienda  
Dirección General de Arquitectura  
y Política de Vivienda  
Instituto del Vivienda I.D.V. 40000712  
8918-08 14 MAR. 2008  
Vizado en [ ] de la Sección  
Fdo: Angel Paz Martín

FLEXION POSITIVA (por m)

TIPO DE FORJADO (h+c) * s	TIPO DE VIGUETA (4)	REFUERZO INFERIOR VIGUETA Y + X	MOMENTO Ultimo Rel. x/d		MOMENTO SERVICIO FISURACION POR COMPRESION n·KN/m (6)	Wk RECURBIM. mm (7)	CLASE POR RECURBIM.	MOMENTO DE FISURACION Mf n·KN/m (8)	RIGIDEZ TOTAL FISURADA	
			Mu n·KN/m (5)	x/d					E·Ib E·If	m2·MN/m
(25+5) * 85.5D	VA.22 1	0ø 0	0.0	.00	0.0	.00	IIa	18.1	29.2	1.8
	VA.25 2	1ø 6	23.6	.03	52.6	.10	IIa	18.4	29.5	2.6
	3	1ø 8	29.5	.03	58.9	.17	IIa	18.6	29.8	3.3
	4	1ø10	37.1	.04	65.6	.22	IIa	18.8	30.1	4.0
	5	1ø 8+1ø 8	43.1	.05	70.7	.19	IIa	19.1	30.4	4.6
	6	1ø12	46.3	.05	72.7	.25	IIa	19.2	30.5	4.9
	7	1ø10+1ø 8	50.6	.06	76.1	.22	IIa	19.3	30.7	5.4
	8	1ø10+1ø10	58.0	.06	81.0	.21	IIa	19.6	31.0	6.1
	9	1ø12+1ø10	66.9	.08	86.4	.23	IIa	19.9	31.4	6.9
	10	1ø16	68.9	.08	86.8	.28	IIa	19.9	31.4	7.0
	11	1ø12+1ø12	75.8	.09	91.2	.23	IIa	20.2	31.8	7.7
	12	1ø16+1ø10	89.0	.10	97.7	.26	IIa	20.7	32.3	8.9
	13	1ø16+1ø12	97.7	.11	101.7	.26	IIa	21.0	32.7	9.7
	14	1ø16+1ø16	118.9	.14	110.1	.24	IIa	21.8	33.6	11.5

FLEXION NEGATIVA (por m)

REFUERZO SUPERIOR POR NERVIOS	B400 MOMENTO ULTIMO - ABERTURA FISURA							B500 MOMENTO ULTIMO - ABERTURA FISURA							MOMENTO DE SERVICIO FISUR. POR COMPRESION n·KN/m (6)	MOMENTO FISURAC. Mf n·KN/m (8)	RIGIDEZ TOTAL FIS.			
	Sección tipo			Sección maciza				Sección tipo			Sección maciza						E·Ib E·If	m2·MN/m		
	Mu	Ref. inf.	Rel. x/d	Mu	Ref.	Rel.	Wk	Mu	Ref.	Rel.	Wk	Mu	Ref.	Rel.					Wk	
	n·KN/m (5)	vig. (9)	x/d (10)	mm (7)	n·KN/m (5)	vig. (9)	x/d (10)	mm (7)	n·KN/m (5)	vig. (9)	x/d (10)	mm (7)	n·KN/m (5)	vig. (9)	x/d (10)	mm (7)	n·KN/m (6)	n·KN/m (8)	m2·MN/m (8)	
1ø10	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	30.0	28.6	2.1
2ø 8	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	30.1	28.7	2.4
1ø12	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	30.1	28.7	2.5
1ø 8+1ø10	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	30.1	28.7	2.8
2ø10	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	30.2	28.8	3.1
1ø10+1ø12	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	30.3	28.8	3.5
2ø12	0.0	.00	.00	.00	0.0	.00	.00	.00	29.9	.13	.12	.00	0.0	.00	.00	.00	49.2	30.4	28.9	3.8
1ø10+1ø16	22.1	.13	.11	.00	0.0	.00	.00	.00	36.3	.16	.14	.00	0.0	.00	.00	.00	51.8	30.6	28.9	4.3
1ø12+1ø16	32.8	.14	.10	.00	0.0	.00	.00	.00	40.4	.18	.14	.00	0.0	.00	.00	.00	53.4	30.7	29.0	4.7
2ø16	41.2	.18	.11	.00	0.0	.00	.00	.00	50.5	.23	.19	.15	54.0	.07	.15	.15	56.9	31.0	29.1	5.5
4ø12	46.2	.20	.11	.00	0.0	.00	.00	.00	56.5	.26	.17	.17	61.0	.08	.17	.17	59.3	31.2	29.2	6.0
2ø16+1ø12	51.7	.23	.14	.13	55.3	.07	.13	.13	62.8	.30	.21	.23	68.7	.09	.23	.23	60.9	31.3	29.2	6.5
3ø16	59.2	.28	.15	.16	64.3	.08	.16	.16	71.4	.36	.21	.24	79.8	.10	.24	.24	63.2	31.6	29.4	7.2
4ø16	75.3	.39	.16	.19	84.8	.11	.19	.19	89.2	.49	.21	.26	104.9	.14	.26	.26	68.0	32.2	29.6	8.8

ESFUERZO CORTANTE POS. Vu (11) (KN/m) VA.22 (simple celosía) : 83.9 VA.25 (simple celosía) : 83.2  
(KN/m) VA.22 (doble celosía) : 123.2 VA.25 (doble celosía) : 121.7

FICHA DE CARACTERISTICAS TECNICAS DEL FORJADO DE VIGUETAS ARMADAS

NUEVA DAYA, S.L.

LA HOYA, P.3, Nº 4, Vereda de Sendres, 4  
03280 ELCHE (Alicante)

TECNICO AUTOR DE LA MEMORIA : Jordi Amat

Hoja nº 19 de 26

8918-00 MAR. 2008

Vizado y sellado de la Dirección

FLEXION POSITIVA (por m)

TIPO DE FORJADO (h+c) * s	TIPO DE VIGUETA (4)	REFUERZO INFERIOR VIGUETA Y + X	MOMENTO Ultimo Rel. x/d		MOMENTO SERVICIO FISURACION POR COMPRESION m·KN/m (6)	Wk CLASE POR RECUBRIM. mm (7)	MOMENTO DE FISURACION Mf m·KN/m (8)	RIGIDEZ TOTAL FISURADA	
			Mu m·KN/m (5)	mm				E·Ib E·If (8) m <sup>2</sup> ·MN/m	
* 72.5	VA.22 1	0ø 0	0.0	.00	0.0	.00	IIa	11.4	21.0 1.2
	VA.25 2	1ø 6	14.5	.01	42.9	.08	IIa	11.6	21.3 1.7
	3	1ø 8	18.2	.02	48.2	.13	IIa	11.7	21.5 2.2
	4	1ø10	22.9	.02	53.9	.16	IIa	11.9	21.7 2.7
	5	1ø 8+1ø 8	26.6	.03	58.2	.15	IIa	12.1	21.9 3.1
	6	1ø12	28.6	.03	59.9	.19	IIa	12.1	22.0 3.3
	7	1ø10+1ø 8	31.3	.03	62.8	.17	IIa	12.2	22.2 3.6
	8	1ø10+1ø10	35.9	.04	67.0	.18	IIa	12.4	22.5 4.1
	9	1ø12+1ø10	41.5	.04	71.6	.19	IIa	12.6	22.8 4.6
	10	1ø16	42.8	.04	72.1	.23	IIa	12.7	22.8 4.7
	11	1ø12+1ø12	47.1	.05	75.9	.19	IIa	12.9	23.0 5.2
	12	1ø16+1ø10	55.6	.06	81.5	.22	IIa	13.2	23.5 6.0
	13	1ø16+1ø12	61.1	.06	85.0	.22	IIa	13.4	23.8 6.6
	14	1ø16+1ø16	74.9	.08	92.4	.21	IIa	13.9	24.5 7.9

FLEXION NEGATIVA (por m)

REFUERZO SUPERIOR POR NERVIO	B400 MOMENTO ULTIMO - ABERTURA FISURA Sección tipo				B500 MOMENTO ULTIMO - ABERTURA FISURA Sección maciza				MOMENTO DE SERVICIO FISUR. POR COMPRESION			MOMENTO FISURAC. Mf m·KN/m (8)	RIGIDEZ TOTAL FIS. E·Ib E·If (8) m <sup>2</sup> ·MN/m		
	Mu m·KN/m (5)	Ref. inf. vig. (9)	Rel. x/d (10)	Wk (7)	Mu m·KN/m (5)	Ref. x/d (10)	Wk (7)	Mu m·KN/m (5)	Ref. vig. (9)	Wk (7)	m·KN/m (6)		m·KN/m (8)	m <sup>2</sup> ·MN/m (8)	
1ø10	0.0	.00	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	25.2	20.5	2.1	
2ø 8	0.0	.00	.00	.00	0.0	.00	.00	12.4	.11	.10	0.0	30.3	25.2	2.4	
1ø12	11.1	.10	.10	.10	0.0	.00	.00	13.8	.12	.12	0.0	30.9	25.3	2.6	
1ø 8+1ø10	12.6	.11	.09	.09	0.0	.00	.00	15.6	.14	.12	0.0	32.1	25.3	2.8	
2ø10	15.2	.13	.09	.09	0.0	.00	.00	25.0	.17	.11	0.0	33.6	25.4	3.1	
1ø10+1ø12	18.3	.16	.09	.09	0.0	.00	.00	30.0	.21	.11	0.0	35.2	25.6	3.6	
2ø12	28.4	.19	.08	.08	0.0	.00	.00	34.7	.26	.12	0.0	36.5	25.7	4.0	
1ø10+1ø16	34.2	.26	.10	.10	0.0	.00	.00	41.3	.34	.18	0.0	38.2	25.8	4.5	
1ø12+1ø16	37.7	.30	.12	.12	0.0	.00	.00	45.3	.40	.19	0.0	39.3	26.0	4.9	
2ø16	46.0	.41	.14	.14	0.0	.00	.00	54.2	.53	.20	65.8	41.4	26.2	20.8	5.7
4ø12	50.8	.47	.13	.13	59.8	.07	.16	59.1	.60	.17	74.2	42.9	26.5	20.9	6.2
2ø16+1ø12	55.4	.55	.15	.15	67.4	.08	.20	70.9	1ø12 .53	.21	83.6	43.7	26.6	21.0	6.7
3ø16	61.3	.65	.15	.15	78.4	.09	.21	83.6	1ø16 .53	.21	97.1	45.1	26.9	21.0	7.4
4ø16	87.5	1ø16 .60	.16	.16	103.1	.12	.21	113.1	2ø16 .53	.21	127.3	47.6	27.6	21.2	8.8

ESFUERZO CORTANTE POS. Vu (11) (KN/m)

VA.22 (simple celosía) : 46.3  
VA.22 (doble celosía) : 70.3

VA.25 (simple celosía) : 45.9  
VA.25 (doble celosía) : 69.4

FICHA DE CARACTERISTICAS TECNICAS  
DEL FORJADO DE VIGUETAS ARMADAS

NUEVA DAYA, S.L.

LA HOYA, P.3, Nº 4, Vereda de Sendres, 4  
03280 ELCHE (Alicante)

TECNICO AUTOR DE LA MEMORIA : Jordi Amat

Hoja nº 20 de 26

8918-08 14 MAR. 2008

Vicario de Jefe de Inspección

Fdo: Angel Paz Florido

FLEXION POSITIVA (por m)

TIPO DE FORJADO (h+c) * s	TIPO DE VIGUETA (4)	REFUERZO INFERIOR VIGUETA Y + X	MOMENTO Ultimo Rel. x/d		MOMENTO SERVICIO FISURACION POR COMPRESION m-KN/m (6)	Wk mm (7)	CLASE POR RECUBRIM.	MOMENTO DE FISURACION Mf m-KN/m (8)	RIGIDEZ TOTAL FISURADA	
			Mu m-KN/m (5)	x/d					E-Ib (8) m <sup>2</sup> -MN/m	E-If
(27+ 4) * 85.5D	VA.22 1	0ø 0	0.0	.00	0.0	.00	IIa	19.1	31.0	2.0
	VA.25 2	1ø 6	24.5	.02	55.6	.10	IIa	19.4	31.4	2.9
	3	1ø 8	30.7	.03	62.2	.17	IIa	19.6	31.6	3.5
	4	1ø10	38.5	.04	69.4	.22	IIa	19.8	32.0	4.3
	5	1ø 8+1ø 8	44.8	.05	74.8	.19	IIa	20.1	32.2	5.0
	6	1ø12	48.0	.05	76.9	.25	IIa	20.2	32.3	5.3
	7	1ø10+1ø 8	52.5	.05	80.5	.22	IIa	20.4	32.5	5.8
	8	1ø10+1ø10	60.2	.06	85.7	.22	IIa	20.6	32.9	6.5
	9	1ø12+1ø10	69.5	.07	91.1	.24	IIa	21.0	33.3	7.5
	10	1ø16	71.5	.08	91.5	.28	IIa	21.0	33.3	7.6
	11	1ø12+1ø12	78.7	.08	95.9	.23	IIa	21.3	33.6	8.3
	12	1ø16+1ø10	92.5	.10	102.0	.26	IIa	21.8	34.2	9.6
	13	1ø16+1ø12	101.5	.11	105.6	.26	IIa	22.1	34.5	10.4
	14	1ø16+1ø16	123.7	.13	113.3	.25	IIa	22.9	35.4	12.4

FLEXION NEGATIVA (por m)

REFUERZO SUPERIOR POR NERVIOS	B400 MOMENTO ULTIMO - ABERTURA FISURA						B500 MOMENTO ULTIMO - ABERTURA FISURA						MOMENTO DE SERVICIO FISUR. POR COMPRESION m-KN/m (6)	MOMENTO FISURAC. Mf m-KN/m (8)	RIGIDEZ TOTAL FIS. E-Ib E-If	
	Sección tipo			Sección maciza			Sección tipo			Sección maciza					m-KN/m (8)	m <sup>2</sup> -MN/m (8)
Mu	Ref. inf.	Rel. x/d	Wk	Mu	Rel. x/d	Wk	Mu	Ref. inf.	Rel. x/d	Wk	Mu	Rel. x/d	Wk	m-KN/m (6)		m-KN/m (8)
m-KN/m (5)	vig. (9)	(10)	(7)	m-KN/m (5)	(10)	(7)	m-KN/m (5)	vig. (9)	(10)	(7)	m-KN/m (5)	(10)	(7)			
1ø10	0.0	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	29.6	30.5	2.3
2ø 8	0.0	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	29.7	30.5	2.6
1ø12	0.0	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	29.7	30.5	2.7
1ø 8+1ø10	0.0	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	29.8	30.5	2.9
2ø10	0.0	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	29.9	30.6	3.3
1ø10+1ø12	0.0	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	.00	.00	0.0	30.0	30.7	3.7
2ø12	0.0	.00	.00	0.0	.00	.00	31.0	.12	.12	0.0	.00	.00	51.7	30.1	30.7	4.1
1ø10+1ø16	30.5	.12	.11	0.0	.00	.00	37.7	.15	.14	0.0	.00	.00	54.5	30.3	30.8	4.7
1ø12+1ø16	34.1	.14	.11	0.0	.00	.00	42.0	.17	.16	0.0	.00	.00	56.3	30.4	30.9	5.0
2ø16	42.8	.17	.12	0.0	.00	.00	52.5	.22	.20	0.0	.00	.00	60.0	30.7	31.0	5.9
4ø12	48.1	.19	.11	0.0	.00	.00	58.9	.25	.17	63.3	.07	.17	62.6	30.9	31.1	6.5
2ø16+1ø12	53.8	.23	.15	57.5	.07	.13	65.5	.29	.21	71.4	.08	.23	64.3	31.1	31.2	7.0
3ø16	61.8	.27	.16	66.8	.08	.16	74.6	.35	.22	82.9	.10	.24	66.9	31.3	31.4	7.8
4ø16	78.7	.37	.16	88.1	.11	.19	93.4	.47	.22	109.0	.13	.27	72.0	32.0	31.7	9.5

ESFUERZO CORTANTE POS. Vu (11) (KN/m) VA.22 (simple celosía) : 87.0 VA.25 (simple celosía) : 86.3  
(KN/m) VA.22 (doble celosía) : 127.7 VA.25 (doble celosía) : 126.2

FICHA DE CARACTERISTICAS TECNICAS  
DEL FORJADO DE VIGUETAS ARMADAS

NUEVA DAYA, S.L.

LA HOYA, P.3, Nº 4, Vereda de Sendres, 4  
03280 ELCHE (Alicante)

TECNICO AUTOR DE LA MEMORIA : Jordi Amat

Hoja nº 21 de 26

8918-08 14 MAR. 2008  
Visado El jefe de la Sección

FLEXION POSITIVA (por m)

TIPO DE FORJADO (h+c) * s	TIPO DE VIGUETA (4)	REFUERZO INFERIOR VIGUETA Y + X	MOMENTO Ultimo Rel. x/d		MOMENTO SERVICIO FISURACION POR COMPRESION		Wk CLASE POR RECUBRIM. mm (7)	MOMENTO DE FISURACION Mf n-KN/m (8)	RIGIDEZ TOTAL FISURADA	
			Mu n-KN/m (5)	mm (5)	Mu n-KN/m (6)	mm (6)			E-Ib E-If	n2-MN/m (8)
(27+ 5) * 72.5	VA.22 1	0ø 0	0.0	.00	0.0	.00	IIa	12.1	23.5	1.3
	VA.25 2	1ø 6	15.0	.01	45.3	.08	IIa	12.3	23.8	1.9
	3	1ø 8	18.8	.02	50.8	.12	IIa	12.5	24.0	2.3
	4	1ø10	23.7	.02	56.9	.16	IIa	12.7	24.3	2.9
	5	1ø 8+1ø 8	27.6	.03	61.4	.15	IIa	12.8	24.6	3.3
	6	1ø12	29.6	.03	63.2	.19	IIa	12.9	24.7	3.5
	7	1ø10+1ø 8	32.4	.03	66.3	.17	IIa	13.0	24.9	3.8
	8	1ø10+1ø10	37.2	.04	70.7	.18	IIa	13.2	25.1	4.4
	9	1ø12+1ø10	43.1	.04	75.6	.19	IIa	13.4	25.5	5.0
	10	1ø16	44.4	.04	76.1	.23	IIa	13.5	25.5	5.1
	11	1ø12+1ø12	48.9	.05	80.1	.19	IIa	13.6	25.8	5.6
	12	1ø16+1ø10	57.6	.06	86.1	.22	IIa	14.0	26.3	6.5
	13	1ø16+1ø12	63.4	.06	89.9	.22	IIa	14.2	26.7	7.1
	14	1ø16+1ø16	77.6	.08	98.3	.21	IIa	14.8	27.5	8.5

FLEXION NEGATIVA (por m)

REFUERZO SUPERIOR POR NERVIOS	B400 MOMENTO ULTIMO - ABERTURA FISURA Sección tipo				B500 MOMENTO ULTIMO - ABERTURA FISURA Sección maciza				MOMENTO DE SERVICIO FISUR. POR COMPRESION n-KN/m (6)	MOMENTO FISURAC. Mf n-KN/m (8)	RIGIDEZ TOTAL FIS. E-Ib E-If					
	Mu	Ref. inf.	Rel. x/d	Wk vig.	Mu	Ref. x/d	Rel. x/d	Wk			Mu	Ref.	Rel.	Wk	n2-MN/m (8)	
	n-KN/m (5)	(9)	(10)	(7)	n-KN/m (5)	(9)	(10)	(7)			n-KN/m (5)	(9)	(10)	(7)		
1ø10	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	.00	0.0	28.5	23.0	2.2
2ø 8	0.0	.00	.00	.00	0.0	.00	.00	.00	12.9	.10	.10	.00	31.8	28.6	23.0	2.6
1ø12	0.0	.00	.00	.00	0.0	.00	.00	.00	14.3	.12	.12	.00	32.5	28.6	23.0	2.7
1ø 8+1ø10	13.1	.11	.09	.09	0.0	.00	.00	.00	16.2	.13	.12	.00	33.7	28.7	23.0	3.0
2ø10	15.8	.13	.09	.09	0.0	.00	.00	.00	19.5	.16	.11	.00	35.3	28.8	23.0	3.4
1ø10+1ø12	19.0	.16	.09	.09	0.0	.00	.00	.00	31.1	.20	.11	.00	37.0	28.9	23.1	3.8
2ø12	29.5	.19	.08	.08	0.0	.00	.00	.00	36.1	.25	.11	.00	38.5	29.0	23.1	4.3
1ø10+1ø16	35.5	.25	.09	.09	0.0	.00	.00	.00	43.0	.33	.16	.00	40.3	29.2	23.2	4.9
1ø12+1ø16	39.3	.29	.10	.10	0.0	.00	.00	.00	47.2	.38	.18	.00	41.4	29.3	23.2	5.2
2ø16	48.0	.39	.13	.13	0.0	.00	.00	.00	56.6	.51	.19	.23	43.7	29.6	23.3	6.1
4ø12	53.0	.45	.12	.12	62.0	.07	.15	.15	61.9	.58	.17	.17	45.3	29.8	23.3	6.7
2ø16+1ø12	57.9	.53	.15	.15	69.9	.08	.20	.20	74.0	1ø12 .51	.21	.21	46.2	30.0	23.4	7.2
3ø16	64.2	.63	.15	.15	81.3	.09	.21	.21	87.3	1ø16 .51	.21	.21	47.7	30.2	23.5	8.0
4ø16	91.4	1ø16 .57	.16	.16	107.0	.12	.21	.21	118.0	2ø16 .51	.21	.21	50.4	30.9	23.6	9.5

ESFUERZO CORTANTE POS. Vu (11) (KN/m) VA.22 (simple celosía) : 48 VA.25 (simple celosía) : 47.5  
(KN/m) VA.22 (doble celosía) : 72.8 VA.25 (doble celosía) : 71.9

FICHA DE CARACTERISTICAS TECNICAS  
DEL FORJADO DE VIGUETAS ARMADAS

NUEVA DAYA, S.L.

LA HOYA, P.3, Nº 4, Vereda de Sendres, 4  
03280 ELCHE (Alicante)

TECNICO AUTOR DE LA MEMORIA : Jordi Amat

Hoja nº 22 de 26

Ministerio de Fomento  
Dirección General de Arquitectura  
y Urbanismo  
Servicio de Inspección Técnica de Edificios  
8918-08 14 MAR. 2008  
Firma: Argui Parfura

FLEXION POSITIVA (por m)

TIPO DE FORJADO (h+c) * s	TIPO DE VIGUETA (4)	REFUERZO INFERIOR VIGUETA Y + X	MOMENTO Ultimo Rel. x/d		MOMENTO SERVICIO FISURACION POR COMPRESION m-KN/m (6)	Wk mm (7)	CLASE POR RECUBRIM.	MOMENTO DE FISURACION Mf m-KN/m (8)	RIGIDEZ TOTAL FISURADA	
			Mu m-KN/m (5)	mm					E-Ib E-If (8) m <sup>2</sup> -MN/m	
(27+ 5) * 85.5D	VA.22 1	0ø 0	0.0	.00	0.0	.00	IIa	20.4	35.0	2.1
	VA.25 2	1ø 6	25.3	.02	58.7	.10	IIa	20.7	35.4	3.1
	3	1ø 8	31.8	.03	65.7	.17	IIa	21.0	35.7	3.8
	4	1ø10	39.9	.04	73.3	.22	IIa	21.3	36.1	4.7
	5	1ø 8+1ø 8	46.4	.04	78.9	.19	IIa	21.5	36.4	5.4
	6	1ø12	49.8	.05	81.2	.25	IIa	21.6	36.5	5.7
	7	1ø10+1ø 8	54.4	.05	85.0	.22	IIa	21.8	36.8	6.2
	8	1ø10+1ø10	62.4	.06	90.5	.22	IIa	22.1	37.1	7.1
	9	1ø12+1ø10	72.1	.07	96.5	.24	IIa	22.4	37.6	8.0
	10	1ø16	74.2	.07	97.1	.28	IIa	22.5	37.6	8.2
	11	1ø12+1ø12	81.6	.08	102.0	.23	IIa	22.8	38.0	9.0
	12	1ø16+1ø10	96.0	.10	109.3	.27	IIa	23.3	38.6	10.4
	13	1ø16+1ø12	105.3	.11	113.7	.26	IIa	23.6	39.0	11.3
	14	1ø16+1ø16	128.4	.13	123.1	.25	IIa	24.5	40.0	13.5

FLEXION NEGATIVA (por m)

REFUERZO SUPERIOR POR NERVIOS	B400 MOMENTO ULTIMO - ABERTURA FISURA Sección tipo Sección maciza						B500 MOMENTO ULTIMO - ABERTURA FISURA Sección tipo Sección maciza						MOMENTO DE SERVICIO FISUR. POR COMPRESION Mf m-KN/m (8)	RIGIDEZ TOTAL FIS. E-Ib E-If			
	Mu m-KN/m (5)	Ref. vig. (9)	Rel. inf. (10)	Wk x/d (7)	Mu m-KN/m (5)	Rel. (10)	Wk (7)	Mu m-KN/m (5)	Ref. vig. (9)	Rel. inf. (10)	Wk x/d (7)	Mu m-KN/m (5)		Rel. (10)	Wk (7)	m <sup>2</sup> -MN/m (8)	
1ø10	0.0	.00	.00		0.0	.00	.00	0.0	.00	.00		0.0	.00	.00	33.4	34.4	2.4
2ø 8	0.0	.00	.00		0.0	.00	.00	0.0	.00	.00		0.0	.00	.00	33.5	34.4	2.7
1ø12	0.0	.00	.00		0.0	.00	.00	0.0	.00	.00		0.0	.00	.00	33.5	34.4	2.9
1ø 8+1ø10	0.0	.00	.00		0.0	.00	.00	0.0	.00	.00		0.0	.00	.00	33.6	34.5	3.1
2ø10	0.0	.00	.00		0.0	.00	.00	0.0	.00	.00		0.0	.00	.00	33.7	34.5	3.5
1ø10+1ø12	0.0	.00	.00		0.0	.00	.00	0.0	.00	.00		0.0	.00	.00	33.8	34.6	3.9
2ø12	0.0	.00	.00		0.0	.00	.00	24.2	.12	.12		54.3	.00	.00	33.9	34.6	4.4
1ø10+1ø16	0.0	.00	.00		0.0	.00	.00	39.2	.15	.14		57.3	.00	.00	34.1	34.7	5.0
1ø12+1ø16	35.4	.13	.11		0.0	.00	.00	43.7	.16	.13		59.2	.00	.00	34.2	34.8	5.4
2ø16	44.5	.17	.10		0.0	.00	.00	54.6	.21	.18		63.2	.00	.00	34.5	34.9	6.4
4ø12	50.0	.19	.10		0.0	.00	.00	61.2	.24	.16		66.0	.07	.16	34.7	35.0	7.0
2ø16+1ø12	55.9	.22	.14		0.0	.00	.00	68.2	.28	.21		67.8	.08	.22	34.9	35.1	7.6
3ø16	64.3	.26	.15		69.3	.08	.15	77.7	.33	.21		70.6	.10	.24	35.2	35.3	8.4
4ø16	82.0	.36	.16		91.5	.10	.19	97.6	.46	.21		76.1	.13	.27	35.9	35.6	10.3

ESFUERZO CORTANTE POS. Vu (11) (KN/m) VA.22 (simple celosía) : 90.1 VA.25 (simple celosía) : 89.3  
(KN/m) VA.22 (doble celosía) : 132.2 VA.25 (doble celosía) : 130.7

FICHA DE CARACTERISTICAS TECNICAS  
DEL FORJADO DE VIGUETAS ARMADAS

NUEVA DAYA, S.L.

LA HOYA, P.3, Nº 4, Vereda de Sendres, 4  
03280 ELCHE (Alicante)

TECNICO AUTOR DE LA MEMORIA : Jordi Amat

Hoja nº 23 de 26

Ministerio de Fomento  
Dirección General de Infraestructura  
y Políticas de Transportes  
Asesoramiento de Obras de Infraestructura  
8918-08 14 MAR. 2008  
Vinculo de Responsabilidad

FLEXION POSITIVA (por m)

TIPO DE FORJADO (h+c) * s	TIPO DE VIGUETA (4)	REFUERZO INFERIOR VIGUETA Y + X	MOMENTO Ultimo Rel. x/d		MOMENTO SERVICIO FISURACION POR COMPRESION n·KN/m (6)	Wk CLASE POR RECUBRIM. mm (7)	MOMENTO DE FISURACION Mf n·KN/m (8)	RIGIDEZ TOTAL FISURADA	
			Mu n·KN/m (5)	x/d				E·Ib	E·If
(30+ 4) * 72.5	VA.25	1	0.0	.00	0.0	.00	13.5	27.0	1.5
		2	1.0	.01	16.0	.08	13.7	27.4	2.1
		3	1.0	.02	20.1	.12	13.9	27.6	2.6
		4	1.0	.02	25.4	.16	14.1	27.9	3.3
		5	1.0 8+1.0 8	.02	29.5	.15	14.3	28.2	3.8
		6	1.0	.03	31.7	.19	14.3	28.3	4.0
		7	1.0+1.0 8	.03	34.7	.17	14.5	28.5	4.4
		8	1.0+1.0	.03	39.8	.18	14.7	28.8	5.0
		9	1.0+1.0	.04	46.1	.19	14.9	29.2	5.7
		10	1.0	.04	47.5	.23	14.9	29.2	5.8
		11	1.0+1.0	.04	52.3	.19	15.1	29.6	6.4
		12	1.0+1.0	.05	61.7	.22	15.5	30.1	7.5
		13	1.0+1.0	.06	67.9	.22	15.7	30.5	8.1
		14	1.0+1.0	.07	83.2	.22	16.3	31.3	9.8

FLEXION NEGATIVA (por m)

REFUERZO SUPERIOR POR NERVIOS	B400 MOMENTO ULTIMO - ABERTURA FISURA Sección tipo				B500 MOMENTO ULTIMO - ABERTURA FISURA Sección maciza				MOMENTO DE SERVICIO FISUR. POR COMPRESION n·KN/m (6)	MOMENTO DE FISURACION Mf n·KN/m (8)	RIGIDEZ TOTAL FIS.		
	Mu	Ref. inf.	Rel. x/d	Wk	Mu	Ref. inf.	Rel. x/d	Wk			E·Ib	E·If	
	n·KN/m (5)	vig. (9)	mm (10)	mm (7)	n·KN/m (5)	vig. (9)	mm (10)	mm (7)			n·KN/m (8)	m <sup>2</sup> ·MN/m (8)	
1.0	0.0	.00	.00	0.0	.00	.00	0.0	.00	0.0	29.1	26.5	2.6	
2.0	0.0	.00	.00	0.0	.00	.00	13.8	.10	10	0.0	29.2	26.5	3.0
1.0	0.0	.00	.00	0.0	.00	.00	15.3	.11	13	0.0	29.2	26.5	3.2
1.0 8+1.0	14.1	.10	.09	0.0	.00	.00	17.4	.12	12	0.0	29.3	26.6	3.5
2.0	17.0	.12	.09	0.0	.00	.00	21.0	.15	11	0.0	29.4	26.6	3.9
1.0+1.0	20.4	.15	.09	0.0	.00	.00	33.5	.19	12	0.0	29.5	26.7	4.5
2.0	31.7	.18	.09	0.0	.00	.00	38.8	.23	12	0.0	29.7	26.7	5.0
1.0+1.0	38.3	.23	.10	0.0	.00	.00	46.4	.31	18	0.0	29.9	26.8	5.7
1.0+1.0	42.4	.27	.12	0.0	.00	.00	51.0	.36	19	0.0	30.0	26.8	6.1
2.0	51.9	.37	.14	0.0	.00	.00	61.5	.48	20	73.1	30.4	27.0	7.2
4.0	57.4	.42	.13	0.0	.00	.00	67.4	.54	17	82.5	30.6	27.1	7.9
2.0+1.0	62.9	.49	.15	75.0	.07	.20	80.3	1.0	12	48	30.8	27.1	8.5
3.0	70.1	.59	.16	87.2	.08	.21	89.1	1.0	12	60	31.2	27.2	9.3
4.0	93.1	1.0	.16	114.9	.11	.21	127.9	2.0	16	48	32.0	27.5	11.1

ESFUERZO CORTANTE POS. Vu (11) (KN/m) VA.25 (simple celosia) : 50.8  
(KN/m) VA.25 (doble celosia) : 76.8

FICHA DE CARACTERISTICAS TECNICAS DEL FORJADO DE VIGUETAS ARMADAS

NUEVA DAYA, S.L.

LA HOYA, P.3, Nº 4, Vereda de Sendres, 4 03280 ELCHE (Alicante)

TECNICO AUTOR DE LA MEMORIA : Jordi Amat

Hoja nº 24 de 26

Dirección General de Arquitectura y Política de Vivienda

Autorización de Uso para el día 14 MAR. 2008

8918-00 14 MAR. 2008

Visado El Jefe de la Sección

Fdo: Angel Paz Martín

FLEXION POSITIVA (por m)

TIPO DE FORJADO (h+c) * s	TIPO DE VIGUETA (4)	REFUERZO INFERIOR VIGUETA Y + X	MOMENTO Ultimo Rel. x/d		MOMENTO SERVICIO FISURACION POR COMPRESION n·KN/m (6)	Wk CLASE POR RECUBRIM. mm (7)	MOMENTO DE FISURACION MF n·KN/m (8)	RIGIDEZ TOTAL FISURADA			
			Mu n·KN/m (5)	mm				E-Ib	E-If		
(30+ 4) * 85.5D	VA.25	1	0ø 0	0.0	.00	0.0	.00	IIa	22.7	40.1	2.4
		2	1ø 6	27.1	.02	65.3	.10	IIa	23.0	40.5	3.5
		3	1ø 8	34.0	.03	73.0	.16	IIa	23.2	40.8	4.3
		4	1ø10	42.7	.04	81.6	.22	IIa	23.5	41.2	5.4
		5	1ø 8+1ø 8	49.6	.04	87.8	.19	IIa	23.8	41.5	6.2
		6	1ø12	53.3	.05	90.4	.25	IIa	23.9	41.7	6.6
		7	1ø10+1ø 8	58.3	.05	94.6	.22	IIa	24.1	41.9	7.1
		8	1ø10+1ø10	66.9	.06	100.5	.22	IIa	24.4	42.3	8.1
		9	1ø12+1ø10	77.2	.07	106.8	.24	IIa	24.8	42.8	9.2
		10	1ø16	79.5	.07	107.4	.29	IIa	24.8	42.9	9.4
		11	1ø12+1ø12	87.5	.08	112.3	.23	IIa	25.1	43.3	10.3
		12	1ø16+1ø10	102.9	.09	119.3	.27	IIa	25.7	43.9	11.9
		13	1ø16+1ø12	113.0	.10	123.5	.26	IIa	26.1	44.4	13.0
		14	1ø16+1ø16	137.9	.12	132.3	.25	IIa	27.0	45.5	15.5

FLEXION NEGATIVA (por m)

REFUERZO SUPERIOR POR NERVIO	B400 MOMENTO ULTIMO - ABERTURA FISURA Sección tipo						B500 MOMENTO ULTIMO - ABERTURA FISURA Sección maciza						MOMENTO DE SERVICIO FISUR. POR COMPRESION n·KN/m (6)	MOMENTO FISURAC. MF n·KN/m (8)	RIGIDEZ TOTAL FIS. E-Ib E-If				
	Mu	Ref. inf.	Rel. x/d	Wk	Mu	Ref. x/d	Wk	Mu	Ref. inf.	Rel. x/d	Wk	Mu			Ref.	Wk	n·KN/m	n·KN/m	n2·MN/m
	n·KN/m (5)	vig. (9)	mm (10)	mm (7)	n·KN/m (5)	vig. (10)	mm (7)	n·KN/m (5)	vig. (9)	mm (10)	mm (7)	n·KN/m (5)			vig. (10)	mm (7)	n·KN/m (6)	n·KN/m (8)	n2·MN/m (8)
1ø10	0.0	.00	.00	.00	0.0	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	0.0	34.4	39.4	2.8	
2ø 8	0.0	.00	.00	.00	0.0	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	0.0	34.5	39.5	3.2	
1ø12	0.0	.00	.00	.00	0.0	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	0.0	34.6	39.5	3.4	
1ø 8+1ø10	0.0	.00	.00	.00	0.0	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	0.0	34.6	39.5	3.7	
2ø10	0.0	.00	.00	.00	0.0	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	0.0	34.7	39.6	4.1	
1ø10+1ø12	0.0	.00	.00	.00	0.0	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	0.0	34.9	39.7	4.6	
2ø12	0.0	.00	.00	.00	0.0	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	0.0	35.0	39.8	5.1	
1ø10+1ø16	0.0	.00	.00	.00	0.0	.00	.00	42.1	.14	.14	.00	0.0	.00	.00	64.3	35.2	39.9	5.8	
1ø12+1ø16	38.0	.12	.11	.00	0.0	.00	.00	46.9	.15	.15	.00	0.0	.00	.00	66.3	35.4	40.0	6.3	
2ø16	47.8	.16	.11	.00	0.0	.00	.00	58.8	.20	.20	.00	0.0	.00	.00	70.8	35.7	40.2	7.4	
4ø12	53.7	.18	.11	.00	0.0	.00	.00	65.9	.23	.17	.00	70.3	.07	.15	73.8	35.9	40.3	8.2	
2ø16+1ø12	60.2	.20	.15	.00	0.0	.00	.00	73.5	.26	.22	.00	79.4	.08	.21	75.9	36.1	40.4	8.8	
3ø16	69.2	.24	.16	.00	74.3	.07	.14	84.0	.31	.22	.00	92.3	.09	.24	79.0	36.5	40.6	9.8	
4ø16	88.7	.34	.17	.00	98.1	.10	.19	105.9	.43	.22	.00	121.5	.12	.27	85.1	37.2	41.0	12.0	

ESFUERZO CORTANTE POS. Vu (11) (KN/m) VA.25 (simple celosía) : 95.4  
(KN/m) VA.25 (doble celosía) : 139.6

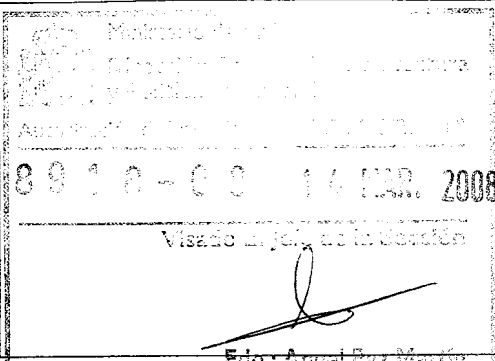
FICHA DE CARACTERISTICAS TECNICAS  
DEL FORJADO DE VIGUETAS ARMADAS

NUEVA DAYA, S.L.

LA HOYA, P.3, Nº 4, Vereda de Sendres, 4  
03280 ELCHE (Alicante)

TECNICO AUTOR DE LA MEMORIA : Jordi Amat

Hoja nº 25 de 26


  
 FID. Angel Paz Martín

FLEXION POSITIVA (por m)

TIPO DE FORJADO (h+c) * s	TIPO DE VIGUETA (4)	REFUERZO INFERIOR VIGUETA Y + X	MOMENTO Ultimo Rel. x/d		MOMENTO SERVICIO FISURACION POR COMPRESION		Wk CLASE POR RECUBRIM. mm (7)	MOMENTO DE FISURACION MF m·KN/m (8)	RIGIDEZ TOTAL FISURADA		
			Mu m·KN/m (5)	Rel. x/d	Mu m·KN/m (6)	COMPRESION			E·Ib E·If	m2·MN/m (8)	
(30+ 5) * 72.5	VA.25	1	0ø 0	0.0	.00	0.0	.00	IIa	14.3	30.1	1.6
		2	1ø 6	16.5	.01	52.8	.08	IIa	14.5	30.5	2.3
		3	1ø 8	20.8	.02	59.2	.11	IIa	14.7	30.8	2.8
		4	1ø10	26.2	.02	66.3	.16	IIa	14.9	31.2	3.5
		5	1ø 8+1ø 8	30.4	.02	71.6	.15	IIa	15.1	31.5	4.0
		6	1ø12	32.7	.03	73.8	.19	IIa	15.2	31.6	4.3
		7	1ø10+1ø 8	35.8	.03	77.3	.17	IIa	15.3	31.8	4.7
		8	1ø10+1ø10	41.1	.03	82.5	.18	IIa	15.5	32.2	5.4
		9	1ø12+1ø10	47.6	.04	88.3	.19	IIa	15.8	32.6	6.1
		10	1ø16	49.1	.04	89.0	.23	IIa	15.8	32.6	6.3
		11	1ø12+1ø12	54.0	.04	93.5	.19	IIa	16.0	33.0	6.9
		12	1ø16+1ø10	63.8	.05	100.7	.22	IIa	16.4	33.6	8.0
		13	1ø16+1ø12	70.1	.06	105.1	.22	IIa	16.7	34.0	8.7
		14	1ø16+1ø16	86.0	.07	115.0	.22	IIa	17.3	35.0	10.5

FLEXION NEGATIVA (por m)

REFUERZO SUPERIOR POR NERVIO	B400 MOMENTO ULTIMO - ABERTURA FISURA						B500 MOMENTO ULTIMO - ABERTURA FISURA						MOMENTO DE SERVICIO FISUR. POR COMPRESION m·KN/m (6)	MOMENTO FISURAC. MF m·KN/m (8)	RIGIDEZ TOTAL FIS.			
	Sección tipo			Sección maciza			Sección tipo			Sección maciza					E·Ib	E·If		
	Mu	Ref. inf.	Rel. x/d	Wk	Mu	Rel. x/d	Wk	Mu	Ref. inf.	Rel. x/d	Wk	Mu					Ref. inf.	Rel. x/d
1ø10	0.0	.00	.00	.00	0.0	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	.00	33.0	29.5	2.8
2ø 8	0.0	.00	.00	.00	0.0	.00	.00	14.2	.09	.10	.10	37.1	.00	.00	.00	33.1	29.5	3.2
1ø12	0.0	.00	.00	.00	0.0	.00	.00	15.8	.11	.13	.13	37.9	.00	.00	.00	33.1	29.6	3.4
1ø 8+1ø10	14.5	.10	.09	.09	0.0	.00	.00	18.0	.12	.12	.12	39.3	.00	.00	.00	33.2	29.6	3.7
2ø10	17.5	.12	.09	.09	0.0	.00	.00	21.7	.15	.11	.11	41.3	.00	.00	.00	33.3	29.6	4.2
1ø10+1ø12	21.1	.14	.09	.09	0.0	.00	.00	34.6	.18	.12	.12	43.2	.00	.00	.00	33.4	29.7	4.8
2ø12	24.6	.17	.09	.09	0.0	.00	.00	40.2	.23	.11	.11	45.0	.00	.00	.00	33.6	29.7	5.3
1ø10+1ø16	39.6	.22	.10	.10	0.0	.00	.00	48.1	.30	.16	.16	47.1	.00	.00	.00	33.8	29.8	6.1
1ø12+1ø16	43.9	.26	.10	.10	0.0	.00	.00	53.0	.35	.17	.17	48.4	.00	.00	.00	33.9	29.8	6.5
2ø16	53.9	.36	.13	.13	0.0	.00	.00	64.0	.46	.19	.19	51.2	.07	.22	.22	34.3	30.0	7.7
4ø12	59.6	.41	.12	.12	0.0	.00	.00	70.2	.53	.17	.17	53.0	.08	.23	.23	34.5	30.0	8.4
2ø16+1ø12	65.4	.48	.15	.15	77.5	.07	.19	76.1	.61	.20	.20	54.2	.09	.29	.29	34.7	30.1	9.1
3ø16	73.0	.57	.15	.15	90.1	.08	.21	92.8	1ø12 .58	.21	.21	55.9	.10	.29	.29	35.0	30.2	10.0
4ø16	97.0	1ø12 .64	.16	.16	118.8	.11	.21	132.8	2ø16 .47	.21	.21	59.3	.14	.28	.28	35.8	30.5	12.0

ESFUERZO CORTANTE POS. Vu (11) (KN/m) VA.25 (simple celosía) : 52.4  
(KN/m) VA.25 (doble celosía) : 79.3

FICHA DE CARACTERISTICAS TECNICAS DEL FORJADO DE VIGUETAS ARMADAS

NUEVA DAYA, S.L.

LA HOYA, P.3, Nº 4, Vereda de Sendres, 4 03280 ELCHE (Alicante)

TECNICO AUTOR DE LA MEMORIA : Jordi Amat

Hoja nº 26 de 26

Dirección de Urbanismo, Obras Públicas y Mantenimiento  
 Ayuntamiento de Elche (Alicante) B.D. 1000000000  
 8918-08 14 MAR. 2008  
 Visado en planta en Sección  
 Fdo: Angel Pascual

FLEXION POSITIVA (por m)

TIPO DE FORJADO (h+c) * s	TIPO DE VIGUETA (4)	REFUERZO INFERIOR VIGUETA Y + X	MOMENTO Ultimo Rel. x/d		MOMENTO SERVICIO FISURACION POR COMPRESION m·KN/m (6)	Wk CLASE POR RECUBRIM. mm (7)	MOMENTO DE FISURACION MF m·KN/m (8)	RIGIDEZ TOTAL FISURADA			
			Mu m·KN/m (5)	x/d				E·Ib	E·If		
(30+ 5) * 85.5D	VA.25	1	0ø 0	0.0	.00	0.0	.00	IIa	24.2	45.0	2.6
		2	1ø 6	28.0	.02	68.5	.10	IIa	24.5	45.5	3.8
		3	1ø 8	35.1	.03	76.7	.15	IIa	24.8	45.8	4.6
		4	1ø10	44.1	.04	85.6	.21	IIa	25.1	46.3	5.7
		5	1ø 8+1ø 8	51.2	.04	92.2	.19	IIa	25.4	46.7	6.6
		6	1ø12	55.0	.04	95.0	.25	IIa	25.5	46.8	7.0
		7	1ø10+1ø 8	60.2	.05	99.4	.22	IIa	25.7	47.1	7.6
		8	1ø10+1ø10	69.1	.06	105.9	.22	IIa	26.0	47.5	8.7
		9	1ø12+1ø10	79.8	.06	113.0	.24	IIa	26.4	48.1	9.9
		10	1ø16	82.2	.07	113.8	.29	IIa	26.5	48.1	10.1
		11	1ø12+1ø12	90.4	.07	119.4	.23	IIa	26.8	48.6	11.1
		12	1ø16+1ø10	106.4	.09	127.9	.27	IIa	27.4	49.4	12.8
		13	1ø16+1ø12	116.8	.10	132.9	.27	IIa	27.8	49.9	13.9
		14	1ø16+1ø16	142.6	.12	143.6	.25	IIa	28.7	51.1	16.7

FLEXION NEGATIVA (por m)

REFUERZO SUPERIOR POR NERVIO	B400 MOMENTO ULTIMO - ABERTURA FISURA Sección tipo Sección maciza						B500 MOMENTO ULTIMO - ABERTURA FISURA Sección tipo Sección maciza						MOMENTO DE SERVICIO FISUR. POR COMPRESION m·KN/m (6)	MOMENTO FISURAC. MF m·KN/m (8)	RIGIDEZ TOTAL FIS. E·Ib E·If					
	Mu m·KN/m (5)	Ref. inf. (9)	Rel. x/d (10)	Wk mm (7)	Mu m·KN/m (5)	Rel. x/d (10)	Wk mm (7)	Mu m·KN/m (5)	Ref. inf. (9)	Rel. x/d (10)	Wk mm (7)	Mu m·KN/m (5)			Rel. x/d (10)	Wk mm (7)	m·KN/m (6)	m·KN/m (8)	m2·MN/m (8)	
																			E·Ib	E·If
1ø10	0.0	.00	.00	.00	0.0	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	0.0	38.8	44.2	3.0		
2ø 8	0.0	.00	.00	.00	0.0	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	0.0	38.9	44.3	3.4		
1ø12	0.0	.00	.00	.00	0.0	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	0.0	38.9	44.3	3.6		
1ø 8+1ø10	0.0	.00	.00	.00	0.0	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	0.0	39.0	44.4	3.9		
2ø10	0.0	.00	.00	.00	0.0	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	0.0	39.1	44.4	4.3		
1ø10+1ø12	0.0	.00	.00	.00	0.0	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	0.0	39.2	44.5	4.9		
2ø12	0.0	.00	.00	.00	0.0	.00	.00	0.0	.00	.00	.00	0.0	.00	.00	0.0	39.4	44.6	5.4		
1ø10+1ø16	0.0	.00	.00	.00	0.0	.00	.00	43.5	.13	.15	.00	0.0	.00	.00	67.2	39.6	44.7	6.2		
1ø12+1ø16	29.5	.12	.11	.00	0.0	.00	.00	48.5	.15	.14	.00	0.0	.00	.00	69.4	39.7	44.8	6.7		
2ø16	49.5	.15	.10	.00	0.0	.00	.00	60.9	.19	.18	.00	0.0	.00	.00	74.2	40.0	45.0	7.9		
4ø12	55.6	.17	.10	.00	0.0	.00	.00	68.2	.22	.16	.00	0.0	.00	.00	77.3	40.3	45.1	8.7		
2ø16+1ø12	62.3	.20	.13	.00	0.0	.00	.00	76.2	.25	.21	.82.0	.07	.21	.21	79.6	40.5	45.2	9.4		
3ø16	71.7	.24	.15	.76.8	.07	.14	.14	87.1	.30	.21	.95.4	.09	.23	.23	82.9	40.8	45.4	10.5		
4ø16	92.0	.33	.16	101.4	.09	.19	.19	110.1	.41	.22	125.7	.12	.27	.27	89.5	41.6	45.9	12.9		

ESFUERZO CORTANTE POS. Vu (11) (KN/m) VA.25 (simple celosía) : 98.5  
 (KN/m) VA.25 (doble celosía) : 144.1