THE NELSON GROUP
ENGINEERING & DEVELOPING, INC.
1136 EAST HARMONY AVE. • SUITE 205
MESA, ARIZONA 85204
[480] 497-0003 • FAX: [480] 497-0038

CLIENT:

ARISTONE DESIGNS, Inc.

1615 East Weber Drive

Tempe, Arizona

PROJECT DESCRIPTION AND ADDRESS:

Structural Design of

PRECAST CONCRETE COLUMNS

Great State of Arizona

GENERAL INFORMATION:

BUILDING CODES:

2006 I.B.C.

2003 I.B.C.

NOTES:

FOR ADDITIONAL INFORMATION - SEE BASIS OF DESIGN.

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MESA, ARIZONA 85204
[480] 497-0003 • FAX: [480] 497-0038

BASIS FOR DESIGN:

BUILDING CODE:

- 2006 EDITION OF THE INTERNATIONAL BUILDING CODE.
- 2003 EDITION OF THE INTERNATIONAL BUILDING CODE

LOADS:

- MAXIMUM VERTICAL POINT LOAD ALLOWED, TO BE DETERMINED DURING CALCULATIONS.

FOUNDATIONS:

- TO BE DESIGNED BY THE STRUCTURAL ENGINEER OF RECORD FOR SPECIFIC PROJECTS.

CONCRETE:

- MINIMUM 28 DAY STRENGTH = 3,000 P.S.I. EXCEPT AS FOLLOWS:

COLUMNS ---------- 4,000 p.s.i..

REINFORCING:

- BARS #4 AND SMALLER: - F_Y = 40,000 P.S.I..
- BARS #5 AND LARGER: - F_Y = 60,000 P.S.I..

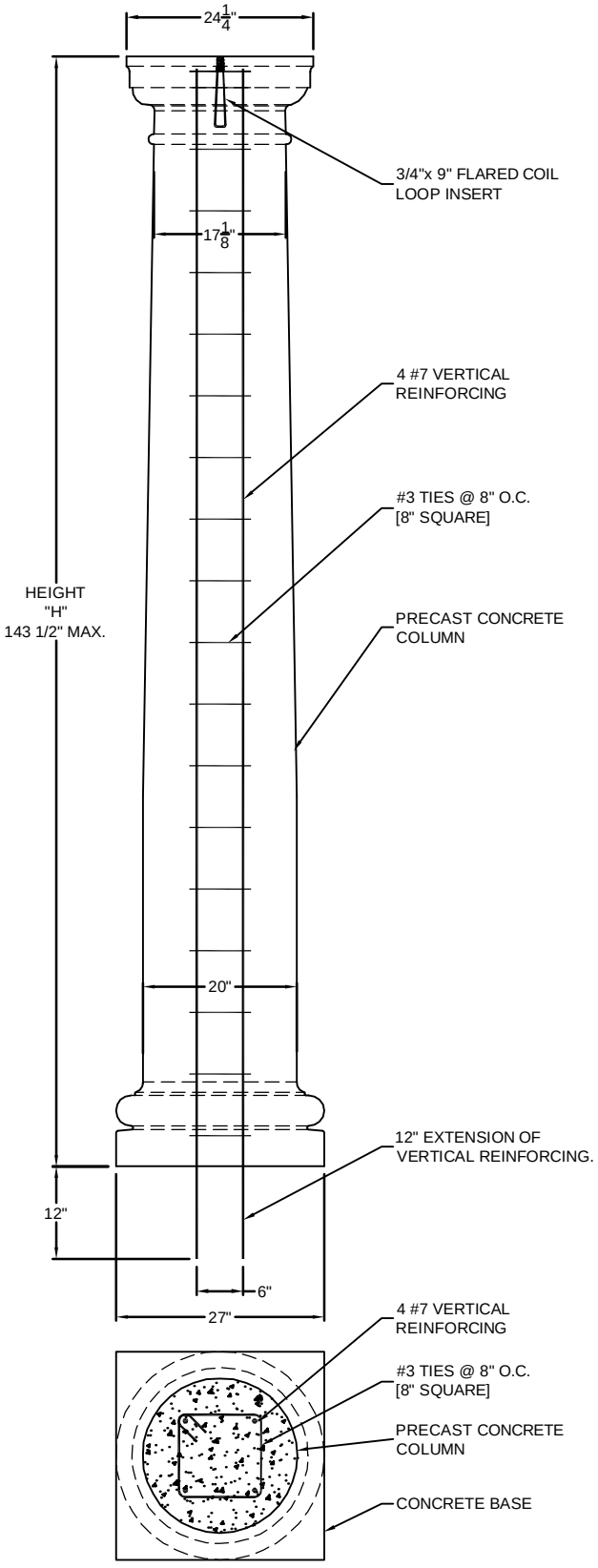
INSERTS:

- COIL LOOP INSERTS SHALL BE MANUFACTURED BY 'DAYTON RICHMOND' OR EQUIVALENT WITH CURRENT 'ICC' EVALUATION REPORT.

CT–27 – ALLOWABLE LOADS			
HEIGHT		ALLOWABLE LOADS	
DESIGN	ACTUAL [H]	VERTICAL	MOMENT
12'-0"	143 1/2"	30.0 kips	7.5 ft-kips

GENERAL STRUCTURAL NOTES

A. BUILDING CODES:
   2006 EDITION OF INTERNATIONAL BUILDING CODE.
   2003 EDITION OF INTERNATIONAL BUILDING CODE.
B. CONCRETE STRENGTH = 4,000 PSI.
C. REINFORCING STRENGTH: Fy = 40,000 PSI
D. ALL CONCRETE SHALL BE VIBRATED DURING PLACEMENT.
E. REINFORCING SHALL BE RESTRAINED DURING PLACEMENT OF CONCRETE.
F. REINFORCING AND CONCRETE PLACEMENT SHALL CONFORM TO "ACI 318" SPECIFICATION AND REQUIREMENTS.
G. CONNECTION AT TOP AND BOTTOM SHALL BE SPECIFIED, ON CONSTRUCTION DOCUMENTS, BY THE ENGINEER OF RECORD.
H. ALL COLUMNS SHALL BE BRACED AGAINST SIDESWAY.
I. COIL LOOP INSERTS SHALL BE MANUFACTURED BY DAYTON RICHMOND OR EQUIVALENT.



COLUMN SECTION
CT–27

Registered Professional Engineer (Structural)
CERTIFICATE NO.
26915
CRAIG A. NELSON
Date Signed .....
ARIZONA, U.S.A.

CT-27 **PRECAST CONCRETE COLUMN LOAD TABLE**

SCALE: NONE

THE NELSON GROUP
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Mesa, Arizona 85204
Ph: [480] 497–0003 Fax: [480] 497–0038

ARISTONE® DESIGNS, Inc.
1615 East Weber Drive
Tempe, Arizona

DATE:	DRWN BY:	4 OF
01.30.08	C.A.N.	
JOB NO.	REV'D BY:	36
07-155	C.A.N.	

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[480] 497-0003 • FAX: [480] 497-0038

COLUMN 'CT-27'

GRAVITY LOADS:

- **DESIGN VALUES:**

  L_{MAX} ..... 143 1/2" ..... USE 12'-0"

  F'_C ..... 4,000 PSI

  F_Y ..... 40,000 PSI

  DIA. [DESIGN] ..... 15" ..... [Actual Dia. = 17.125" Minimum]

  CONC. COVER ..... 2.5" ..... [Actual Cover = 2.5" + 1.25" = 3.75"]

  LOAD ECCENTRICITY ... 6"

  CONNECTIONS AT TOP AND BOTTOM OF COLUMN SHALL BE DETAILED BY DESIGN ENGINEER.

- **DESIGN LOADS:**

  P_1 = 30,000 #

  LOAD ARE ENTERED INTO THE DESIGN PROGRAM AS LIVE LOADS SO THAT THE HIGHER LOAD FACTOR OF 1.7 WOULD BE APPLIED TO LOADS. THIS PRODUCES A MORE CONSERVATIVE DESIGN.

- **ALLOWABLE MOMENTS:** [DETERMINED FROM DESIGN PROGRAM RESULTS]

  P_1 = 30,000 # ..... M_1 = 7.5 ft-kips

  REFER TO ATTACHED CALCULATIONS RESULTS FROM "ENERCALC" DESIGN PROGRAM FOR ADDITIONAL INFORMATION.

The Nelson Group
Engineering & Developing, Inc.
1136 East Harmony Ave., Ste 205
Mesa, Arizona 85204

Title : ARISTONE - COLUMN DESIGN **Job #** 07-155
Dsgnr: C.A.N. **Date:**
Description : ARISTONE DESIGNS, Inc.
1615 East Weber Drive
Scope : 2006 IBC: Structural Design of Reinforced Concrete Columns

Circular Concrete Column

Description CT-27-12 [30.0k & 7.5k-f]]

General Information

Code Ref: ACI 318-02, 1997 UBC, 2003 IBC, 2003 NFPA 5000

Diameter	15.000 in	f'c	4,000.0 psi	Total Height	12.000 ft
Number of Bars	4	Fy	40,000.0 psi	Unbraced Length	12.000 ft
Bar Size	7	Seismic Zone	4	Eff. Length Factor	1.000
Total Rebar Area	2.400 in2	LL & ST Loads Act Separate		Column is BRACED	
Rebar Percent	1.358 %	Spiral Ties NOT Used			
Bar Cover	2.500 in				

Loads

Note: Load factoring supports 2003 IBC and 2003 NFPA 5000 by virtue of their references to ACI 318-02 for concrete design. Factoring of entered loads to ultimate loads within this program is according to ACI 318-02 C.2

	Dead Load	Live Load	Short Term	Eccentricity
Axial Loads	k	30.000 k	k	6.000 in
Applied Moments...				
@ Top	k-ft	7.500 k-ft	k-ft	
@ Bottom	k-ft	k-ft	k-ft	

Summary

Column is OK

Column Diameter= 15.00in, with 4 #7 Bars

	ACI C-1	ACI C-2	ACI C-3
Applied Pu : Max Factored	**51.00** k	**0.00** k	**0.00** k
Allowable Pn * Phi @ Design Ecc.	**68.16** k	**0.00** k	**0.00** k
M-critical	38.25 k-ft	0.00 k-ft	0.00 k-ft
Combined Eccentricity	9.0000 in	0.0000 in	0.0000 in
Magnification Factor	1.04	0.00	0.00
Design Eccentricity	9.3737 in	0.0000 in	0.0000 in
Magnified Design Moment	39.84 k-ft	0.00 k-ft	0.00 k-ft
Po * 0.80	550.94 k	550.94 k	550.94 k
P : Balanced	241.74 k	241.74 k	241.74 k
Ecc : Balanced	5.1790 in	5.1790 in	5.1790 in

Slenderness *per ACI 318-02 Section 10.12 & 10.13*

Actual k Lu / r 38.400 Elastic Modulus 3,605.0 ksi Beta 0.850

	ACI Eq. C-1	ACI Eq. C-2	ACI Eq. C-3
Neutral Axis Distance	4.7175 in	19.7475 in	19.7475 in
Phi	0.7278	0.6500	0.6500
Max Limit kl/r	34.0000	34.0000	34.0000
Beta = M:sustained/M:max	0.0000	0.0000	0.0000
Cm	1.0000	1.0000	1.0000
EI / 1000	3,583.44	0.00	0.00
Pc : pi^2 E I / (k Lu)^2	1,705.59	0.00	0.00
alpha: MaxPu / (.75 Pc)	0.0399	0.0000	0.0000
Delta	1.0415	0.0000	0.0000
Ecc: Ecc Loads + Moments	9.0000	0.0000	0.0000 in
Design Ecc = Ecc * Delta	**0.0000**	**0.0000**	**0.0000** in

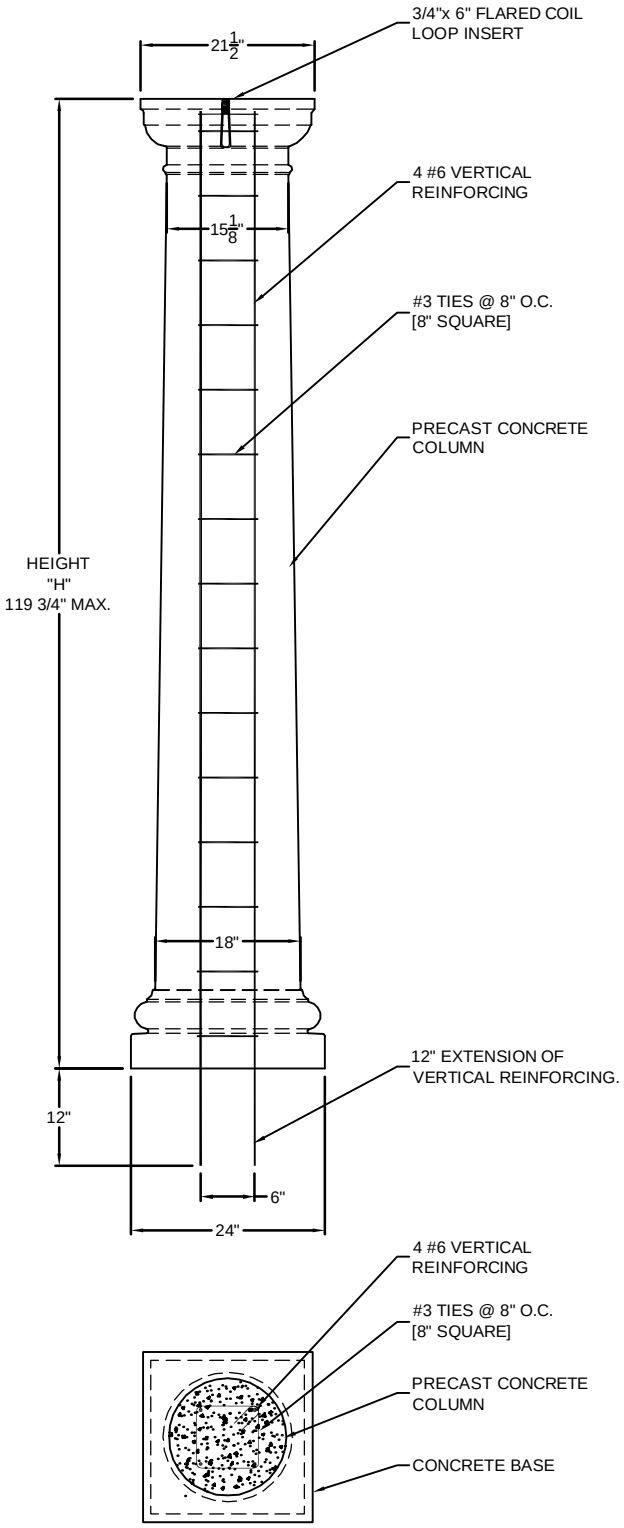
ACI Factors (per ACI 318-02, applied internally to entered loads)

ACI C-1 & C-2 DL	1.400	ACI C-2 Group Factor	0.750	Add"l "1.4" Factor for Seismic	1.400
ACI C-1 & C-2 LL	1.700	ACI C-3 Dead Load Factor	0.900	Add"l "0.9" Factor for Seismic	0.900
ACI C-1 & C-2 ST	1.700	ACI C-3 Short Term Factor	1.300		
....seismic = ST * :	1.100				

CT–24 – ALLOWABLE LOADS			
HEIGHT		ALLOWABLE LOADS	
DESIGN	ACTUAL [H]	VERTICAL	MOMENT
10'-0"	119 1/2"	25.0 kips	5.0 ft-kips

GENERAL STRUCTURAL NOTES

A. BUILDING CODES:
   2006 EDITION OF INTERNATIONAL BUILDING CODE.
   2003 EDITION OF INTERNATIONAL BUILDING CODE.
B. CONCRETE STRENGTH = 4,000 PSI.
C. REINFORCING STRENGTH: Fy = 40,000 PSI
D. ALL CONCRETE SHALL BE VIBRATED DURING PLACEMENT.
E. REINFORCING SHALL BE RESTRAINED DURING PLACEMENT OF CONCRETE.
F. REINFORCING AND CONCRETE PLACEMENT SHALL CONFORM TO "ACI 318" SPECIFICATION AND REQUIREMENTS.
G. CONNECTION AT TOP AND BOTTOM SHALL BE SPECIFIED, ON CONSTRUCTION DOCUMENTS, BY THE ENGINEER OF RECORD.
H. ALL COLUMNS SHALL BE BRACED AGAINST SIDESWAY.
I. COIL LOOP INSERTS SHALL BE MANUFACTURED BY DAYTON RICHMOND OR EQUIVALENT.



COLUMN SECTION
CT24

Registered Professional Engineer (Structural)
CERTIFICATE NO.
26915
CRAIG A. NELSON
Date Signed .....
ARIZONA, U.S.A.

CT-24

PRECAST CONCRETE COLUMN LOAD TABLE

SCALE: NONE

THE NELSON GROUP
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Tempe, Arizona

DATE:	DRWN BY:	7 OF
01.30.08	C.A.N.	
JOB NO.	REV'D BY:	36
07-155	C.A.N.	

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COLUMN 'CT-24'

GRAVITY LOADS:

- **DESIGN VALUES:**

  L_{MAX} ..... 119 1/2" ..... USE 10'-0"

  F'_C ..... 4,000 PSI

  F_Y ..... 40,000 PSI

  DIA. [DESIGN] ..... 14" ..... [Actual Dia. = 15.125" Minimum]

  CONC. COVER ..... 2.0" ..... [Actual Cover = 2.0" + .5" = 2.5"]

  LOAD ECCENTRICITY ... 6"

  CONNECTIONS AT TOP AND BOTTOM OF COLUMN SHALL BE DETAILED BY DESIGN ENGINEER.

- **DESIGN LOADS:**

  P_1 = 25,000 #

  LOAD ARE ENTERED INTO THE DESIGN PROGRAM AS LIVE LOADS SO THAT THE HIGHER LOAD FACTOR OF 1.7 WOULD BE APPLIED TO LOADS. THIS PRODUCES A MORE CONSERVATIVE DESIGN.

- **ALLOWABLE MOMENTS:** [DETERMINED FROM DESIGN PROGRAM RESULTS]

  P_1 = 25,000 # ..... M_1 = 5.0 ft-kips

  REFER TO ATTACHED CALCULATIONS RESULTS FROM "ENERCALC" DESIGN PROGRAM FOR ADDITIONAL INFORMATION.

The Nelson Group
Engineering & Developing, Inc.
1136 East Harmony Ave., Ste 205
Mesa, Arizona 85204

Title : ARISTONE - COLUMN DESIGN **Job #** 07-155
Dsgnr: C.A.N. **Date:**
Description : ARISTONE DESIGNS, Inc.
1615 East Weber Drive
Scope : 2006 IBC: Structural Design of Reinforced Concrete Columns

Circular Concrete Column

Description CT-24-10 [25.0k & 5.0k-f]]

General Information

Code Ref: ACI 318-02, 1997 UBC, 2003 IBC, 2003 NFPA 5000

Diameter	14.000 in	f'c	4,000.0 psi	Total Height	10.000 ft
Number of Bars	4	Fy	40,000.0 psi	Unbraced Length	10.000 ft
Bar Size	6	Seismic Zone	4	Eff. Length Factor	1.000
Total Rebar Area	1.760 in2	LL & ST Loads Act Separate		Column is BRACED	
Rebar Percent	1.143 %	Spiral Ties NOT Used			
Bar Cover	2.000 in				

Loads

Note: Load factoring supports 2003 IBC and 2003 NFPA 5000 by virtue of their references to ACI 318-02 for concrete design.
Factoring of entered loads to ultimate loads within this program is according to ACI 318-02 C.2

	Dead Load	Live Load	Short Term	Eccentricity
Axial Loads	k	25.000 k	k	6.000 in
Applied Moments...				
@ Top	k-ft	5.000 k-ft	k-ft	
@ Bottom	k-ft	k-ft	k-ft	

Summary

Column is OK

Column Diameter= 14.00in, with 4 #6 Bars

	ACI C-1	ACI C-2	ACI C-3
Applied Pu : Max Factored	**42.50** k	**0.00** k	**0.00** k
Allowable Pn * Phi @ Design Ecc.	**56.64** k	**0.00** k	**0.00** k
M-critical	29.75 k-ft	0.00 k-ft	0.00 k-ft
Combined Eccentricity	8.4000 in	0.0000 in	0.0000 in
Magnification Factor	1.03	0.00	0.00
Design Eccentricity	8.6634 in	0.0000 in	0.0000 in
Magnified Design Moment	30.68 k-ft	0.00 k-ft	0.00 k-ft
Po * 0.80	470.24 k	470.24 k	470.24 k
P : Balanced	217.62 k	217.62 k	217.62 k
Ecc : Balanced	4.5862 in	4.5862 in	4.5862 in

Slenderness *per ACI 318-02 Section 10.12 & 10.13*

Actual k Lu / r 34.286 Elastic Modulus 3,605.0 ksi Beta 0.850

	ACI Eq. C-1	ACI Eq. C-2	ACI Eq. C-3
Neutral Axis Distance	4.1270 in	18.7570 in	18.7570 in
Phi	0.7380	0.6500	0.6500
Max Limit kl/r	34.0000	34.0000	34.0000
Beta = M:sustained/M:max	0.0000	0.0000	0.0000
Cm	1.0000	1.0000	1.0000
EI / 1000	2,719.24	0.00	0.00
Pc : pi^2 E I / (k Lu)^2	1,863.73	0.00	0.00
alpha: MaxPu / (.75 Pc)	0.0304	0.0000	0.0000
Delta	1.0314	0.0000	0.0000
Ecc: Ecc Loads + Moments	8.4000	0.0000	0.0000 in
Design Ecc = Ecc * Delta	**0.0000**	**0.0000**	**0.0000** in

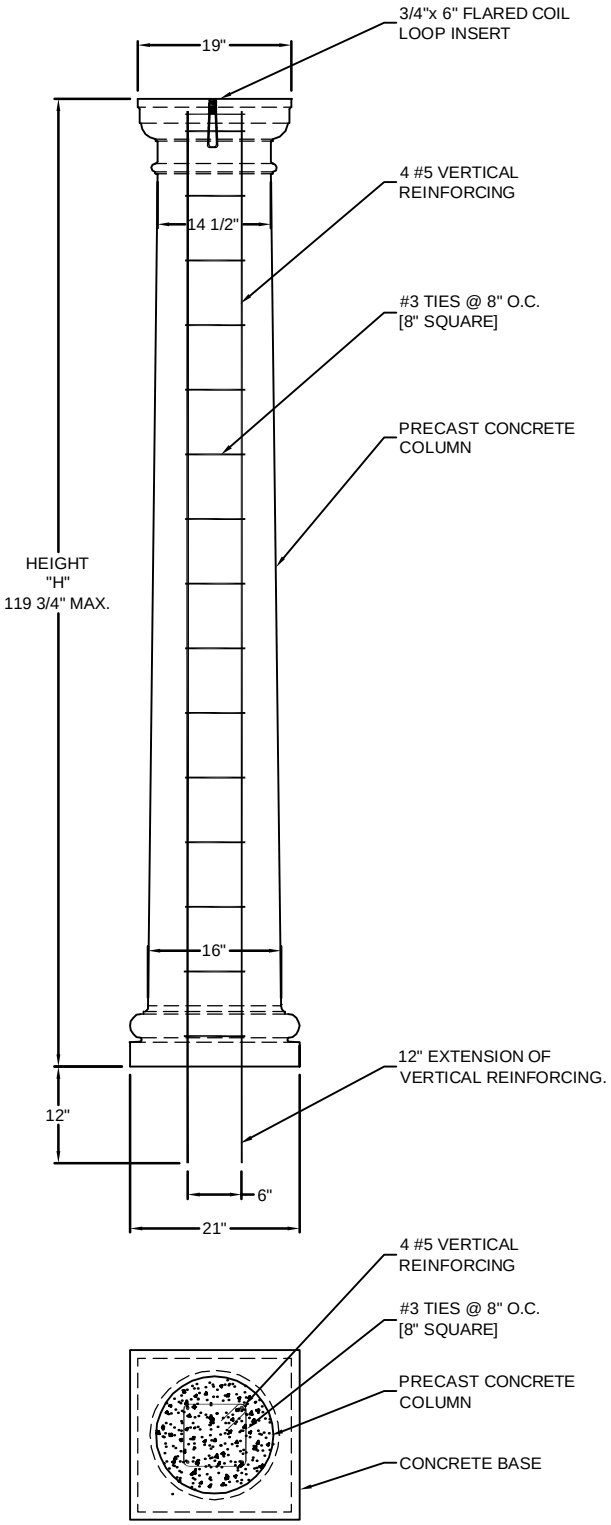
ACI Factors (per ACI 318-02, applied internally to entered loads)

ACI C-1 & C-2 DL	1.400	ACI C-2 Group Factor	0.750	Add"l "1.4" Factor for Seismic	1.400
ACI C-1 & C-2 LL	1.700	ACI C-3 Dead Load Factor	0.900	Add"l "0.9" Factor for Seismic	0.900
ACI C-1 & C-2 ST	1.700	ACI C-3 Short Term Factor	1.300		
....seismic = ST * :	1.100				

CT–21 – ALLOWABLE LOADS			
HEIGHT		ALLOWABLE LOADS	
DESIGN	ACTUAL [H]	VERTICAL	MOMENT
10'-0"	119 3/4"	22.0 kips	2.5 ft-kips

GENERAL STRUCTURAL NOTES

A. BUILDING CODES:
   2006 EDITION OF INTERNATIONAL BUILDING CODE.
   2003 EDITION OF INTERNATIONAL BUILDING CODE.
B. CONCRETE STRENGTH = 4,000 PSI.
C. REINFORCING STRENGTH: Fy = 40,000 PSI
D. ALL CONCRETE SHALL BE VIBRATED DURING PLACEMENT.
E. REINFORCING SHALL BE RESTRAINED DURING PLACEMENT OF CONCRETE.
F. REINFORCING AND CONCRETE PLACEMENT SHALL CONFORM TO "ACI 318" SPECIFICATION AND REQUIREMENTS.
G. CONNECTION AT TOP AND BOTTOM SHALL BE SPECIFIED, ON CONSTRUCTION DOCUMENTS, BY THE ENGINEER OF RECORD.
H. ALL COLUMNS SHALL BE BRACED AGAINST SIDESWAY.
I. COIL LOOP INSERTS SHALL BE MANUFACTURED BY DAYTON RICHMOND OR EQUIVALENT.



COLUMN SECTION
CT21

Registered Professional Engineer (Structural)
CERTIFICATE NO.
26915
CRAIG A. NELSON
Date Signed .....
ARIZONA, U.S.A.

CT-21

PRECAST CONCRETE COLUMN LOAD TABLE

SCALE: NONE

THE NELSON GROUP
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ARISTONE® DESIGNS, Inc.
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Tempe, Arizona

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MESA, ARIZONA 85204
[480] 497-0003 • FAX: [480] 497-0038

COLUMN 'CT-21'

GRAVITY LOADS:

- **DESIGN VALUES:**

  L_{MAX} ..... 119 3/4" ..... USE 10'-0"

  F'_C ..... 4,000 PSI

  F_Y ..... 40,000 PSI

  DIA. [DESIGN] ..... 12.5" ..... [Actual Dia. = 14.5" Minimum]

  CONC. COVER ..... 1.25" ..... [Actual Cover = 1.25" + 1.0" = 2.25"]

  LOAD ECCENTRICITY ... 6"

  CONNECTIONS AT TOP AND BOTTOM OF COLUMN SHALL BE DETAILED BY DESIGN ENGINEER.

- **DESIGN LOADS:**

  P_1 = 22,000 #

  LOAD ARE ENTERED INTO THE DESIGN PROGRAM AS LIVE LOADS SO THAT THE HIGHER LOAD FACTOR OF 1.7 WOULD BE APPLIED TO LOADS. THIS PRODUCES A MORE CONSERVATIVE DESIGN.

- **ALLOWABLE MOMENTS:** [DETERMINED FROM DESIGN PROGRAM RESULTS]

  P_1 = 22,000 # ..... M_1 = 2.5 ft-kips

  REFER TO ATTACHED CALCULATIONS RESULTS FROM "ENERCALC" DESIGN PROGRAM FOR ADDITIONAL INFORMATION.

The Nelson Group
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1136 East Harmony Ave., Ste 205
Mesa, Arizona 85204

Title : ARISTONE - COLUMN DESIGN **Job #** 07-155
Dsgnr: C.A.N. **Date:**
Description : ARISTONE DESIGNS, Inc.
1615 East Weber Drive
Scope : 2006 IBC: Structural Design of Reinforced Concrete Columns

Circular Concrete Column

Description CT-21-10 [22.0k & 2.5k-f]]

General Information

Code Ref: ACI 318-02, 1997 UBC, 2003 IBC, 2003 NFPA 5000

Diameter	12.500 in	f'c	4,000.0 psi	Total Height	10.000 ft
Number of Bars	4	Fy	40,000.0 psi	Unbraced Length	10.000 ft
Bar Size	5	Seismic Zone	4	Eff. Length Factor	1.000
Total Rebar Area	1.240 in2	LL & ST Loads Act Separate		Column is BRACED	
Rebar Percent	1.010 %	Spiral Ties NOT Used			
Bar Cover	1.250 in				

Loads

Note: Load factoring supports 2003 IBC and 2003 NFPA 5000 by virtue of their references to ACI 318-02 for concrete design.
Factoring of entered loads to ultimate loads within this program is according to ACI 318-02 C.2

	Dead Load	Live Load	Short Term	Eccentricity
Axial Loads	k	22.000 k	k	6.000 in
Applied Moments...				
@ Top	k-ft	2.500 k-ft	k-ft	
@ Bottom	k-ft	k-ft	k-ft	

Summary

Column is OK

Column Diameter= 12.50in, with 4 #5 Bars

	ACI C-1	ACI C-2	ACI C-3
Applied Pu : Max Factored	**37.40** k	**0.00** k	**0.00** k
Allowable Pn * Phi @ Design Ecc.	**44.63** k	**0.00** k	**0.00** k
M-critical	22.95 k-ft	0.00 k-ft	0.00 k-ft
Combined Eccentricity	7.3636 in	0.0000 in	0.0000 in
Magnification Factor	1.04	0.00	0.00
Design Eccentricity	7.6873 in	0.0000 in	0.0000 in
Magnified Design Moment	23.96 k-ft	0.00 k-ft	0.00 k-ft
Po * 0.80	370.10 k	370.10 k	370.10 k
P : Balanced	183.08 k	183.08 k	183.08 k
Ecc : Balanced	3.9044 in	3.9044 in	3.9044 in

Slenderness *per ACI 318-02 Section 10.12 & 10.13*

Actual k Lu / r 38.400 Elastic Modulus 3,605.0 ksi Beta 0.850

	ACI Eq. C-1	ACI Eq. C-2	ACI Eq. C-3
Neutral Axis Distance	3.4762 in	17.3462 in	17.3462 in
Phi	0.7404	0.6500	0.6500
Max Limit kl/r	34.0000	34.0000	34.0000
Beta = M:sustained/M:max	0.0000	0.0000	0.0000
Cm	1.0000	1.0000	1.0000
EI / 1000	1,728.12	0.00	0.00
Pc : pi^2 E I / (k Lu)^2	1,184.44	0.00	0.00
alpha: MaxPu / (.75 Pc)	0.0421	0.0000	0.0000
Delta	1.0440	0.0000	0.0000
Ecc: Ecc Loads + Moments	7.3636	0.0000	0.0000 in
Design Ecc = Ecc * Delta	**0.0000**	**0.0000**	**0.0000** in

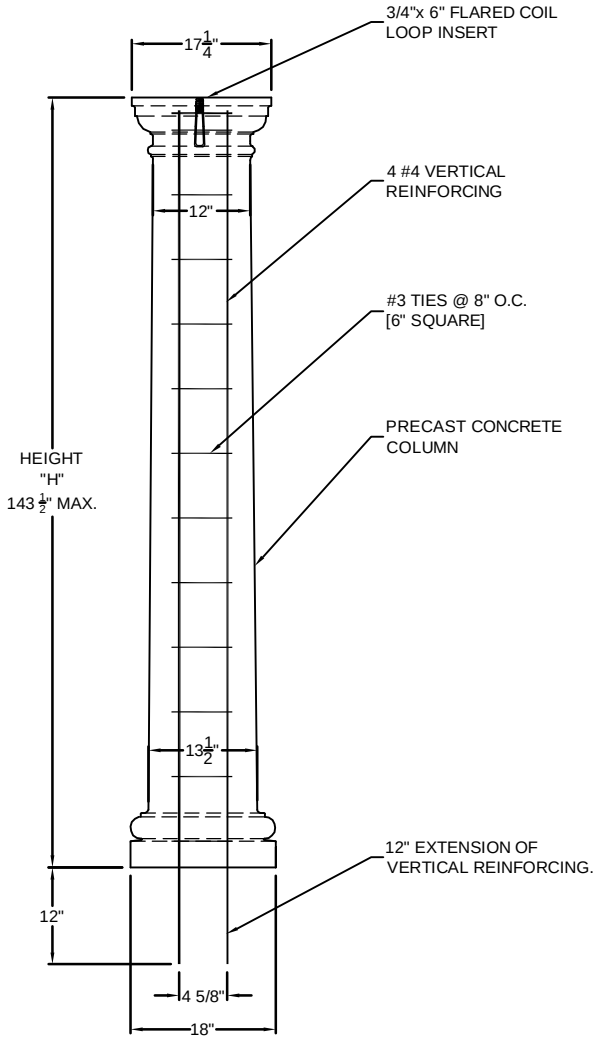
ACI Factors (per ACI 318-02, applied internally to entered loads)

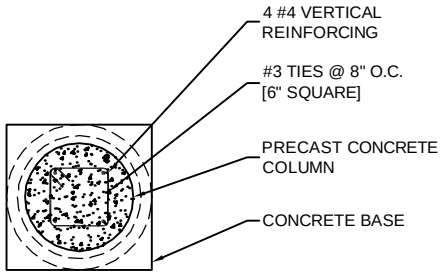
ACI C-1 & C-2 DL	1.400	ACI C-2 Group Factor	0.750	Add"l "1.4" Factor for Seismic	1.400
ACI C-1 & C-2 LL	1.700	ACI C-3 Dead Load Factor	0.900	Add"l "0.9" Factor for Seismic	0.900
ACI C-1 & C-2 ST	1.700	ACI C-3 Short Term Factor	1.300		
....seismic = ST * :	1.100				

CT–18 – ALLOWABLE LOADS			
HEIGHT		ALLOWABLE LOADS	
DESIGN	ACTUAL [H]	VERTICAL	MOMENT
12'-0"	143 1/2"	15.0 kips	2.0 ft-kips

GENERAL STRUCTURAL NOTES

A. BUILDING CODES:
   2006 EDITION OF INTERNATIONAL BUILDING CODE.
   2003 EDITION OF INTERNATIONAL BUILDING CODE.
B. CONCRETE STRENGTH = 4,000 PSI.
C. REINFORCING STRENGTH: Fy = 40,000 PSI
D. ALL CONCRETE SHALL BE VIBRATED DURING PLACEMENT.
E. REINFORCING SHALL BE RESTRAINED DURING PLACEMENT OF CONCRETE.
F. REINFORCING AND CONCRETE PLACEMENT SHALL CONFORM TO "ACI 318" SPECIFICATION AND REQUIREMENTS.
G. CONNECTION AT TOP AND BOTTOM SHALL BE SPECIFIED, ON CONSTRUCTION DOCUMENTS, BY THE ENGINEER OF RECORD.
H. ALL COLUMNS SHALL BE BRACED AGAINST SIDESWAY.
I. COIL LOOP INSERTS SHALL BE MANUFACTURED BY DAYTON RICHMOND OR EQUIVALENT.





COLUMN SECTION
CT–18

Registered Professional Engineer (Structural)
CERTIFICATE NO.
26915
CRAIG A. NELSON
Date Signed .....
ARIZONA, U.S.A.

CT-18

PRECAST CONCRETE COLUMN LOAD TABLE

SCALE: NONE

THE NELSON GROUP
ENGINEERING & DEVELOPING, INC.
1136 East Harmony Ave., Suite 205
Mesa, Arizona 85204
Ph: [480] 497–0003 Fax: [480] 497–0038

ARISTONE® DESIGNS, Inc.
1615 East Weber Drive
Tempe, Arizona

DATE:	DRWN BY:	13 OF
01.30.08	C.A.N.	
JOB NO.	REV'D BY:	36
07-155	C.A.N.	

THE NELSON GROUP
ENGINEERING & DEVELOPING, INC.
1136 EAST HARMONY AVE. • SUITE 205
MESA, ARIZONA 85204
[480] 497-0003 • FAX: [480] 497-0038

COLUMN 'CT-18'

GRAVITY LOADS:

- **DESIGN VALUES:**

  L_{MAX} ..... 144" ..... USE 12'-0"

  F'_C ..... 4,000 PSI

  F_Y ..... 40,000 PSI

  DIA. [DESIGN] ..... 10" ..... [Actual Dia. = 12" Minimum]

  CONC. COVER ..... 1.25" ..... [Actual Cover = 1.25" + 1" = 2.25"]

  LOAD ECCENTRICITY ... 4"

  CONNECTIONS AT TOP AND BOTTOM OF COLUMN SHALL BE DETAILED BY DESIGN ENGINEER.

- **DESIGN LOADS:**

  P_1 = 15,000 #

  LOAD ARE ENTERED INTO THE DESIGN PROGRAM AS LIVE LOADS SO THAT THE HIGHER LOAD FACTOR OF 1.7 WOULD BE APPLIED TO LOADS. THIS PRODUCES A MORE CONSERVATIVE DESIGN.

- **ALLOWABLE MOMENTS:** [DETERMINED FROM DESIGN PROGRAM RESULTS]

  P_1 = 15,000 # ..... M_1 = 2.0 ft-kips

  REFER TO ATTACHED CALCULATIONS RESULTS FROM "ENERCALC" DESIGN PROGRAM FOR ADDITIONAL INFORMATION.

The Nelson Group
Engineering & Developing, Inc.
1136 East Harmony Ave., Ste 205
Mesa, Arizona 85204

Title : ARISTONE - COLUMN DESIGN **Job #** 07-155
Dsgnr: C.A.N. **Date:**
Description : ARISTONE DESIGNS, Inc.
1615 East Weber Drive
Scope : 2006 IBC: Structural Design of Reinforced Concrete Columns

Circular Concrete Column

Description CT-18-12 [15.0k & 2.0k-f]

General Information

Code Ref: ACI 318-02, 1997 UBC, 2003 IBC, 2003 NFPA 5000

Diameter	10.000 in	f'c	4,000.0 psi	Total Height	12.000 ft
Number of Bars	4	Fy	40,000.0 psi	Unbraced Length	12.000 ft
Bar Size	4	Seismic Zone	4	Eff. Length Factor	1.000
Total Rebar Area	0.800 in2	LL & ST Loads Act Separate		Column is BRACED	
Rebar Percent	1.019 %	Spiral Ties NOT Used			
Bar Cover	1.250 in				

Loads

Note: Load factoring supports 2003 IBC and 2003 NFPA 5000 by virtue of their references to ACI 318-02 for concrete design. Factoring of entered loads to ultimate loads within this program is according to ACI 318-02 C.2

	Dead Load	Live Load	Short Term	Eccentricity
Axial Loads	k	15.000 k	k	4.000 in
Applied Moments...				
@ Top	k-ft	2.000 k-ft	k-ft	
@ Bottom	k-ft	k-ft	k-ft	

Summary

Column is OK

Column Diameter= 10.00in, with 4 #4 Bars

	ACI C-1	ACI C-2	ACI C-3
Applied Pu : Max Factored	**25.50** k	**0.00** k	**0.00** k
Allowable Pn * Phi @ Design Ecc.	**27.50** k	**0.00** k	**0.00** k
M-critical	11.90 k-ft	0.00 k-ft	0.00 k-ft
Combined Eccentricity	5.6000 in	0.0000 in	0.0000 in
Magnification Factor	1.11	0.00	0.00
Design Eccentricity	6.2286 in	0.0000 in	0.0000 in
Magnified Design Moment	13.24 k-ft	0.00 k-ft	0.00 k-ft
Po * 0.80	237.05 k	237.05 k	237.05 k
P : Balanced	113.68 k	113.68 k	113.68 k
Ecc : Balanced	3.1629 in	3.1629 in	3.1629 in

Slenderness *per ACI 318-02 Section 10.12 & 10.13*

Actual k Lu / r 57.600 Elastic Modulus 3,605.0 ksi Beta 0.850

	ACI Eq. C-1	ACI Eq. C-2	ACI Eq. C-3
Neutral Axis Distance	2.7950 in	13.3750 in	13.3750 in
Phi	0.7478	0.6500	0.6500
Max Limit kl/r	34.0000	34.0000	34.0000
Beta = M:sustained/M:max	0.0000	0.0000	0.0000
Cm	1.0000	1.0000	1.0000
EI / 1000	707.84	0.00	0.00
Pc : pi^2 E I / (k Lu)^2	336.91	0.00	0.00
alpha: MaxPu / (.75 Pc)	0.1009	0.0000	0.0000
Delta	1.1122	0.0000	0.0000
Ecc: Ecc Loads + Moments	5.6000	0.0000	0.0000 in
Design Ecc = Ecc * Delta	**0.0000**	**0.0000**	**0.0000** in

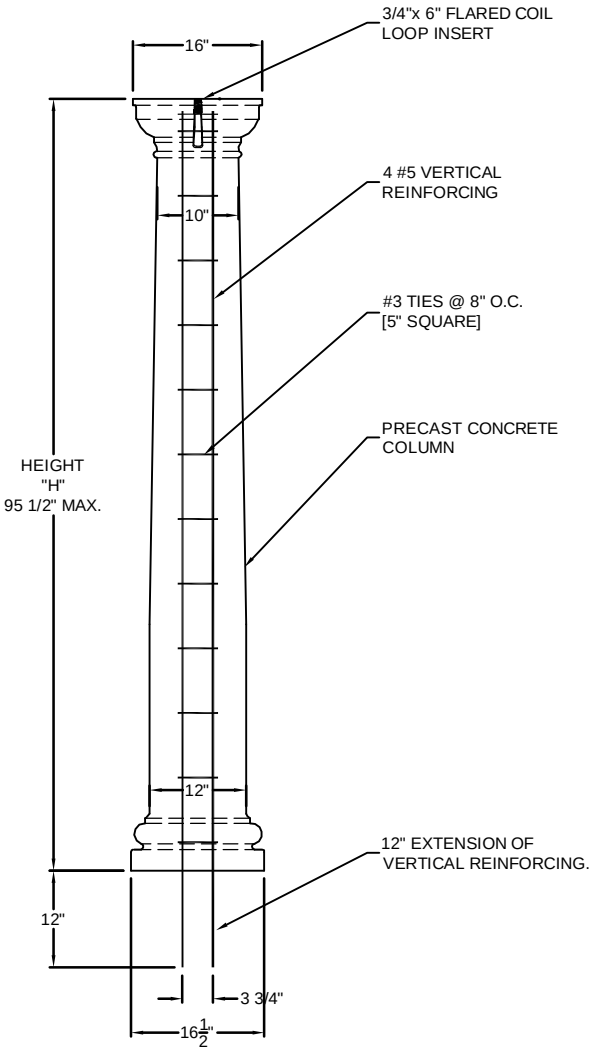
ACI Factors (per ACI 318-02, applied internally to entered loads)

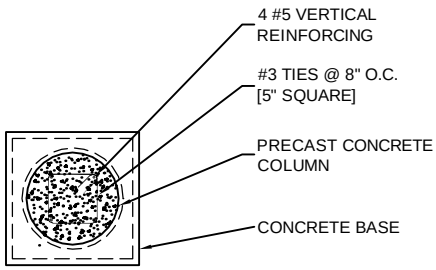
ACI C-1 & C-2 DL	1.400	ACI C-2 Group Factor	0.750	Add"l "1.4" Factor for Seismic	1.400
ACI C-1 & C-2 LL	1.700	ACI C-3 Dead Load Factor	0.900	Add"l "0.9" Factor for Seismic	0.900
ACI C-1 & C-2 ST	1.700	ACI C-3 Short Term Factor	1.300		
....seismic = ST * :	1.100				

CT–16 – ALLOWABLE LOADS			
HEIGHT		ALLOWABLE LOADS	
DESIGN	ACTUAL [H]	VERTICAL	MOMENT
8'-0"	95 1/2"	10.0 kips	1.5 ft-kips

GENERAL STRUCTURAL NOTES

A. BUILDING CODES:
   2006 EDITION OF INTERNATIONAL BUILDING CODE.
   2003 EDITION OF INTERNATIONAL BUILDING CODE.
B. CONCRETE STRENGTH = 4,000 PSI.
C. REINFORCING STRENGTH: Fy = 40,000 PSI
D. ALL CONCRETE SHALL BE VIBRATED DURING PLACEMENT.
E. REINFORCING SHALL BE RESTRAINED DURING PLACEMENT OF CONCRETE.
F. REINFORCING AND CONCRETE PLACEMENT SHALL CONFORM TO "ACI 318" SPECIFICATION AND REQUIREMENTS.
G. CONNECTION AT TOP AND BOTTOM SHALL BE SPECIFIED, ON CONSTRUCTION DOCUMENTS, BY THE ENGINEER OF RECORD.
H. ALL COLUMNS SHALL BE BRACED AGAINST SIDESWAY.
I. COIL LOOP INSERTS SHALL BE MANUFACTURED BY DAYTON RICHMOND OR EQUIVALENT.





COLUMN SECTION
CT16

Registered Professional Engineer (Structural)
CERTIFICATE NO. 26915
CRAIG A. NELSON
Date Signed .....
ARIZONA, U.S.A.

CT-16 **PRECAST CONCRETE COLUMN LOAD TABLE**

SCALE: NONE

THE NELSON GROUP
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MESA, ARIZONA 85204
[480] 497-0003 • FAX: [480] 497-0038

COLUMN 'CT-16'

GRAVITY LOADS:

- **DESIGN VALUES:**

  L_{MAX} ..... 95 1/2"" ..... USE 8'-0"

  F'_C ..... 4,000 PSI

  F_Y ..... 40,000 PSI

  DIA. [DESIGN] ..... 8" ..... [Actual Dia. = 10" Minimum]

  CONC. COVER ..... 1.0" ..... [Actual Cover = 1.0" + 1.0" = 2.0"]

  LOAD ECCENTRICITY ... 3"

  CONNECTIONS AT TOP AND BOTTOM OF COLUMN SHALL BE DETAILED BY DESIGN ENGINEER.

- **DESIGN LOADS:**

  P_1 = 10,000 #

  LOAD ARE ENTERED INTO THE DESIGN PROGRAM AS LIVE LOADS SO THAT THE HIGHER LOAD FACTOR OF 1.7 WOULD BE APPLIED TO LOADS. THIS PRODUCES A MORE CONSERVATIVE DESIGN.

- **ALLOWABLE MOMENTS:** [DETERMINED FROM DESIGN PROGRAM RESULTS]

  P_1 = 10,000 # ..... M_1 = 1.5 ft-kips

  REFER TO ATTACHED CALCULATIONS RESULTS FROM "ENERCALC" DESIGN PROGRAM FOR ADDITIONAL INFORMATION.

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1136 East Harmony Ave., Ste 205
Mesa, Arizona 85204

Title : ARISTONE - COLUMN DESIGN **Job #** 07-155
Dsgnr: C.A.N. **Date:**
Description : ARISTONE DESIGNS, Inc.
1615 East Weber Drive
Scope : 2006 IBC: Structural Design of Reinforced Concrete Columns

Circular Concrete Column

Description CT-16-8 [10.0k & 1.5k-f]

General Information

Code Ref: ACI 318-02, 1997 UBC, 2003 IBC, 2003 NFPA 5000

Diameter	8.000 in	f'c	4,000.0 psi	Total Height	8.000 ft
Number of Bars	4	Fy	40,000.0 psi	Unbraced Length	8.000 ft
Bar Size	4	Seismic Zone	4	Eff. Length Factor	1.000
Total Rebar Area	0.800 in2	LL & ST Loads Act Separate		Column is BRACED	
Rebar Percent	1.592 %	Spiral Ties NOT Used			
Bar Cover	1.000 in				

Loads

Note: Load factoring supports 2003 IBC and 2003 NFPA 5000 by virtue of their references to ACI 318-02 for concrete design. Factoring of entered loads to ultimate loads within this program is according to ACI 318-02 C.2

	Dead Load	Live Load	Short Term	Eccentricity
Axial Loads	k	10.000 k	k	3.000 in
Applied Moments...				
@ Top	k-ft	1.500 k-ft	k-ft	
@ Bottom	k-ft	k-ft	k-ft	

Summary

Column is OK

Column Diameter= 8.00in, with 4 #4 Bars

	ACI C-1	ACI C-2	ACI C-3
Applied Pu : Max Factored	**17.00** k	**0.00** k	**0.00** k
Allowable Pn * Phi @ Design Ecc.	**21.00** k	**0.00** k	**0.00** k
M-critical	6.80 k-ft	0.00 k-ft	0.00 k-ft
Combined Eccentricity	4.8000 in	0.0000 in	0.0000 in
Magnification Factor	1.08	0.00	0.00
Design Eccentricity	5.1780 in	0.0000 in	0.0000 in
Magnified Design Moment	7.34 k-ft	0.00 k-ft	0.00 k-ft
Po * 0.80	160.15 k	160.15 k	160.15 k
P : Balanced	72.26 k	72.26 k	72.26 k
Ecc : Balanced	2.8712 in	2.8712 in	2.8712 in

Slenderness *per ACI 318-02 Section 10.12 & 10.13*

Actual k Lu / r 48.000 Elastic Modulus 3,605.0 ksi Beta 0.850

	ACI Eq. C-1	ACI Eq. C-2	ACI Eq. C-3
Neutral Axis Distance	2.5640 in	10.7940 in	10.7940 in
Phi	0.7084	0.6500	0.6500
Max Limit kl/r	34.0000	34.0000	34.0000
Beta = M:sustained/M:max	0.0000	0.0000	0.0000
Cm	1.0000	1.0000	1.0000
EI / 1000	289.93	0.00	0.00
Pc : pi^2 E I / (k Lu)^2	310.49	0.00	0.00
alpha: MaxPu / (.75 Pc)	0.0730	0.0000	0.0000
Delta	1.0788	0.0000	0.0000
Ecc: Ecc Loads + Moments	4.8000	0.0000	0.0000 in
Design Ecc = Ecc * Delta	**0.0000**	**0.0000**	**0.0000** in

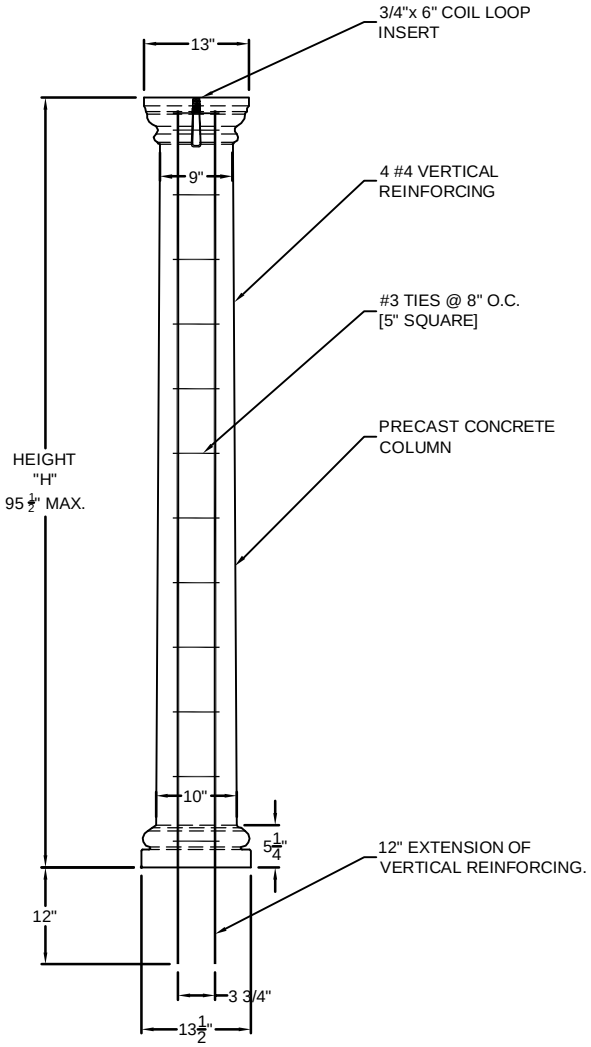
ACI Factors (per ACI 318-02, applied internally to entered loads)

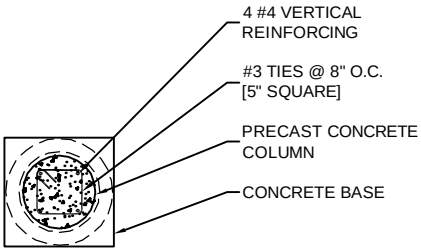
ACI C-1 & C-2 DL	1.400	ACI C-2 Group Factor	0.750	Add"l "1.4" Factor for Seismic	1.400
ACI C-1 & C-2 LL	1.700	ACI C-3 Dead Load Factor	0.900	Add"l "0.9" Factor for Seismic	0.900
ACI C-1 & C-2 ST	1.700	ACI C-3 Short Term Factor	1.300		
....seismic = ST * :	1.100				

CT–13 – ALLOWABLE LOADS			
HEIGHT		ALLOWABLE LOADS	
DESIGN	ACTUAL [H]	VERTICAL	MOMENT
8'-0"	95 1/2"	10.0 kips	1.5 ft-kips

GENERAL STRUCTURAL NOTES

A. BUILDING CODES:
   2006 EDITION OF INTERNATIONAL BUILDING CODE.
   2003 EDITION OF INTERNATIONAL BUILDING CODE.
B. CONCRETE STRENGTH = 4,000 PSI.
C. REINFORCING STRENGTH: Fy = 40,000 PSI
D. ALL CONCRETE SHALL BE VIBRATED DURING PLACEMENT.
E. REINFORCING SHALL BE RESTRAINED DURING PLACEMENT OF CONCRETE.
F. REINFORCING AND CONCRETE PLACEMENT SHALL CONFORM TO "ACI 318" SPECIFICATION AND REQUIREMENTS.
G. CONNECTION AT TOP AND BOTTOM SHALL BE SPECIFIED, ON CONSTRUCTION DOCUMENTS, BY THE ENGINEER OF RECORD.
H. ALL COLUMNS SHALL BE BRACED AGAINST SIDESWAY.
I. COIL LOOP INSERTS SHALL BE MANUFACTURED BY DAYTON RICHMOND OR EQUIVALENT.





COLUMN SECTION
CT–13

Registered Professional Engineer (Structural)
CERTIFICATE NO.
26915
CRAIG A. NELSON
Date Signed .....
ARIZONA, U.S.A.

CT-13

PRECAST CONCRETE COLUMN LOAD TABLE

SCALE: NONE

THE NELSON GROUP
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[480] 497-0003 • FAX: [480] 497-0038

COLUMN 'CT-13'

GRAVITY LOADS:

- **DESIGN VALUES:**

  L_{MAX} ..... 95½" ..... USE 8'-0"

  F'_C ..... 4,000 PSI

  F_Y ..... 40,000 PSI

  DIA. [DESIGN] ..... 8.0" ..... [Actual Dia. = 9.0" Minimum]

  CONC. COVER ..... 1.0" ..... [Actual Cover = 1.0" + 0.5" = 1.5"]

  LOAD ECCENTRICITY ... 3"

  CONNECTIONS AT TOP AND BOTTOM OF COLUMN SHALL BE DETAILED BY DESIGN ENGINEER.

- **DESIGN LOADS:**

  P_1 = 10,000 #

  LOAD ARE ENTERED INTO THE DESIGN PROGRAM AS LIVE LOADS SO THAT THE HIGHER LOAD FACTOR OF 1.7 WOULD BE APPLIED TO LOADS. THIS PRODUCES A MORE CONSERVATIVE DESIGN.

- **ALLOWABLE MOMENTS:** [DETERMINED FROM DESIGN PROGRAM RESULTS]

  P_1 = 10,000 # ..... M_1 = 1.5 ft-kips

  REFER TO ATTACHED CALCULATIONS RESULTS FROM "ENERCALC" DESIGN PROGRAM FOR ADDITIONAL INFORMATION.

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Title : ARISTONE - COLUMN DESIGN **Job #** 07-155
Dsgnr: C.A.N. **Date:**
Description : ARISTONE DESIGNS, Inc.
1615 East Weber Drive
Scope : 2006 IBC: Structural Design of Reinforced Concrete Columns

Circular Concrete Column

Description CT-13-8 [10.0k & 1.5k-f]

General Information

Code Ref: ACI 318-02, 1997 UBC, 2003 IBC, 2003 NFPA 5000

Diameter	8.000 in	f'c	4,000.0 psi	Total Height	8.000 ft
Number of Bars	4	Fy	40,000.0 psi	Unbraced Length	8.000 ft
Bar Size	4	Seismic Zone	4	Eff. Length Factor	1.000
Total Rebar Area	0.800 in2	LL & ST Loads Act Separate		Column is BRACED	
Rebar Percent	1.592 %	Spiral Ties NOT Used			
Bar Cover	1.000 in				

Loads

Note: Load factoring supports 2003 IBC and 2003 NFPA 5000 by virtue of their references to ACI 318-02 for concrete design. Factoring of entered loads to ultimate loads within this program is according to ACI 318-02 C.2

	Dead Load	Live Load	Short Term	Eccentricity
Axial Loads	k	10.000 k	k	3.000 in
Applied Moments...				
@ Top	k-ft	1.500 k-ft	k-ft	
@ Bottom	k-ft	k-ft	k-ft	

Summary

Column is OK

Column Diameter= 8.00in, with 4 #4 Bars

	ACI C-1	ACI C-2	ACI C-3
Applied Pu : Max Factored	**17.00** k	**0.00** k	**0.00** k
Allowable Pn * Phi @ Design Ecc.	**21.00** k	**0.00** k	**0.00** k
M-critical	6.80 k-ft	0.00 k-ft	0.00 k-ft
Combined Eccentricity	4.8000 in	0.0000 in	0.0000 in
Magnification Factor	1.08	0.00	0.00
Design Eccentricity	5.1780 in	0.0000 in	0.0000 in
Magnified Design Moment	7.34 k-ft	0.00 k-ft	0.00 k-ft
Po * 0.80	160.15 k	160.15 k	160.15 k
P : Balanced	72.26 k	72.26 k	72.26 k
Ecc : Balanced	2.8712 in	2.8712 in	2.8712 in

Slenderness *per ACI 318-02 Section 10.12 & 10.13*

Actual k Lu / r 48.000 Elastic Modulus 3,605.0 ksi Beta 0.850

	ACI Eq. C-1	ACI Eq. C-2	ACI Eq. C-3
Neutral Axis Distance	2.5640 in	10.7940 in	10.7940 in
Phi	0.7084	0.6500	0.6500
Max Limit kl/r	34.0000	34.0000	34.0000
Beta = M:sustained/M:max	0.0000	0.0000	0.0000
Cm	1.0000	1.0000	1.0000
EI / 1000	289.93	0.00	0.00
Pc : pi^2 E I / (k Lu)^2	310.49	0.00	0.00
alpha: MaxPu / (.75 Pc)	0.0730	0.0000	0.0000
Delta	1.0788	0.0000	0.0000
Ecc: Ecc Loads + Moments	4.8000	0.0000	0.0000 in
Design Ecc = Ecc * Delta	**0.0000**	**0.0000**	**0.0000** in

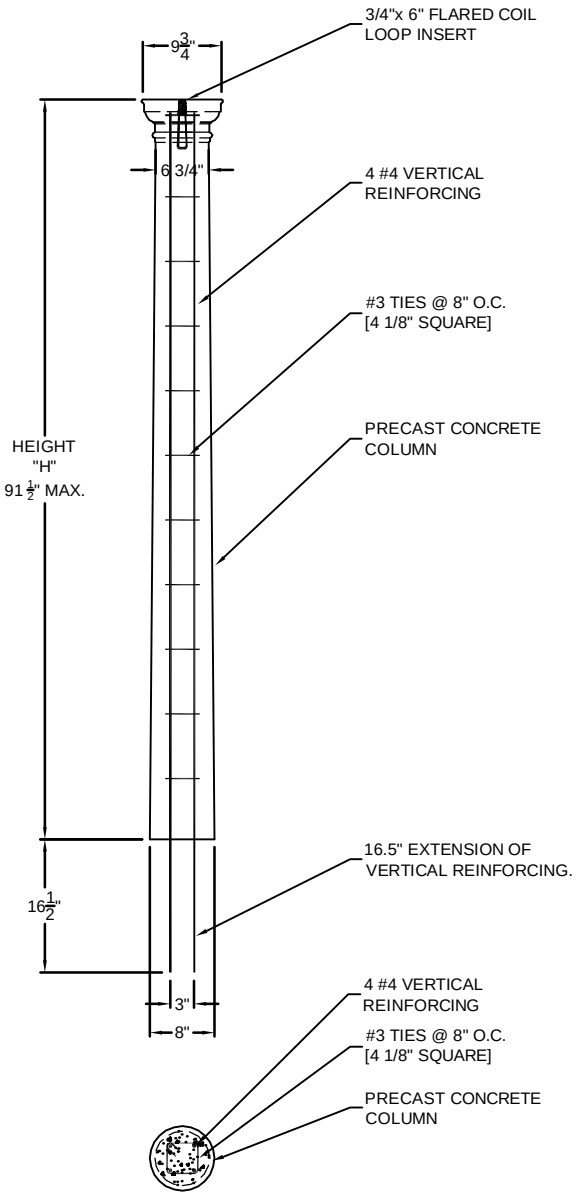
ACI Factors (per ACI 318-02, applied internally to entered loads)

ACI C-1 & C-2 DL	1.400	ACI C-2 Group Factor	0.750	Add"l "1.4" Factor for Seismic	1.400
ACI C-1 & C-2 LL	1.700	ACI C-3 Dead Load Factor	0.900	Add"l "0.9" Factor for Seismic	0.900
ACI C-1 & C-2 ST	1.700	ACI C-3 Short Term Factor	1.300		
....seismic = ST * :	1.100				

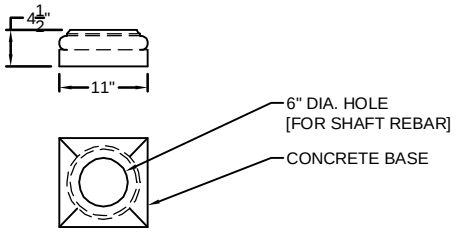
CT–11 – ALLOWABLE LOADS			
HEIGHT		ALLOWABLE LOADS	
DESIGN	ACTUAL [H]	VERTICAL	MOMENT
7'-8"	91 1/2"	5.0 kips	1.0 ft-kips

GENERAL STRUCTURAL NOTES

A. BUILDING CODES:
   2006 EDITION OF INTERNATIONAL BUILDING CODE.
   2003 EDITION OF INTERNATIONAL BUILDING CODE.
B. CONCRETE STRENGTH = 4,000 PSI.
C. REINFORCING STRENGTH: Fy = 40,000 PSI
D. ALL CONCRETE SHALL BE VIBRATED DURING PLACEMENT.
E. REINFORCING SHALL BE RESTRAINED DURING PLACEMENT OF CONCRETE.
F. REINFORCING AND CONCRETE PLACEMENT SHALL CONFORM TO "ACI 318" SPECIFICATION AND REQUIREMENTS.
G. CONNECTION AT TOP AND BOTTOM SHALL BE SPECIFIED, ON CONSTRUCTION DOCUMENTS, BY THE ENGINEER OF RECORD.
H. ALL COLUMNS SHALL BE BRACED AGAINST SIDESWAY.
I. COIL LOOP INSERTS SHALL BE MANUFACTURED BY DAYTON RICHMOND OR EQUIVALENT.



COLUMN SECTION
CT–11



BASE SECTION – ELEVATION
CT–11

CT-13 **PRECAST CONCRETE COLUMN LOAD TABLE**

SCALE: NONE

THE NELSON GROUP
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[480] 497-0003 • FAX: [480] 497-0038

COLUMN 'CT-11'

GRAVITY LOADS:

- **DESIGN VALUES:**

  L_{MAX} ..... 71½" ..... USE 7'-8"

  F'_C ..... 4,000 PSI

  F_Y ..... 40,000 PSI

  DIA. [DESIGN] ..... 6.75" ..... [Actual Dia. = 6.75" Minimum]

  CONC. COVER ..... 1.00" ..... [Actual Cover = 1.00"]

  LOAD ECCENTRICITY ... 3"

  CONNECTIONS AT TOP AND BOTTOM OF COLUMN SHALL BE DETAILED BY DESIGN ENGINEER.

- **DESIGN LOADS:**

  P_1 = 5,000 #

  LOAD ARE ENTERED INTO THE DESIGN PROGRAM AS LIVE LOADS SO THAT THE HIGHER LOAD FACTOR OF 1.7 WOULD BE APPLIED TO LOADS. THIS PRODUCES A MORE CONSERVATIVE DESIGN.

- **ALLOWABLE MOMENTS:** [DETERMINED FROM DESIGN PROGRAM RESULTS]

  P_1 = 5,000 # ..... M_1 = 1.5 ft-kips

  REFER TO ATTACHED CALCULATIONS RESULTS FROM "ENERCALC" DESIGN PROGRAM FOR ADDITIONAL INFORMATION.

The Nelson Group
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1136 East Harmony Ave., Ste 205
Mesa, Arizona 85204

Title : ARISTONE - COLUMN DESIGN **Job #** 07-155
Dsgnr: C.A.N. **Date:**
Description : ARISTONE DESIGNS, Inc.
1615 East Weber Drive
Scope : 2006 IBC: Structural Design of Reinforced Concrete Columns

Circular Concrete Column

Description CT-11-8 [5.0k & 1.5k-f]

General Information

Code Ref: ACI 318-02, 1997 UBC, 2003 IBC, 2003 NFPA 5000

Diameter	6.750 in	f'c	4,000.0 psi	Total Height	8.000 ft
Number of Bars	4	Fy	40,000.0 psi	Unbraced Length	8.000 ft
Bar Size	4	Seismic Zone	4	Eff. Length Factor	1.000
Total Rebar Area	0.800 in2	LL & ST Loads Act Separate		Column is BRACED	
Rebar Percent	2.236 %	Spiral Ties NOT Used			
Bar Cover	1.000 in				

Loads

Note: Load factoring supports 2003 IBC and 2003 NFPA 5000 by virtue of their references to ACI 318-02 for concrete design. Factoring of entered loads to ultimate loads within this program is according to ACI 318-02 C.2

	Dead Load	Live Load	Short Term	Eccentricity
Axial Loads	k	5.000 k	k	3.000 in
Applied Moments...				
@ Top	k-ft	1.500 k-ft	k-ft	
@ Bottom	k-ft	k-ft	k-ft	

Summary

Column is OK

Column Diameter= 6.75in, with 4 #4 Bars

	ACI C-1	ACI C-2	ACI C-3
Applied Pu : Max Factored	**8.50** k	**0.00** k	**0.00** k
Allowable Pn * Phi @ Design Ecc.	**10.18** k	**0.00** k	**0.00** k
M-critical	4.67 k-ft	0.00 k-ft	0.00 k-ft
Combined Eccentricity	6.6000 in	0.0000 in	0.0000 in
Magnification Factor	1.08	0.00	0.00
Design Eccentricity	7.1122 in	0.0000 in	0.0000 in
Magnified Design Moment	5.04 k-ft	0.00 k-ft	0.00 k-ft
Po * 0.80	120.76 k	120.76 k	120.76 k
P : Balanced	49.59 k	49.59 k	49.59 k
Ecc : Balanced	2.7519 in	2.7519 in	2.7519 in

Slenderness *per ACI 318-02 Section 10.12 & 10.13*

Actual k Lu / r 56.889 Elastic Modulus 3,605.0 ksi Beta 0.850

	ACI Eq. C-1	ACI Eq. C-2	ACI Eq. C-3
Neutral Axis Distance	2.0334 in	8.9334 in	8.9334 in
Phi	0.7817	0.6500	0.6500
Max Limit kl/r	34.0000	34.0000	34.0000
Beta = M:sustained/M:max	0.0000	0.0000	0.0000
Cm	1.0000	1.0000	1.0000
EI / 1000	146.94	0.00	0.00
Pc : pi^2 E I / (k Lu)^2	157.36	0.00	0.00
alpha: MaxPu / (.75 Pc)	0.0720	0.0000	0.0000
Delta	1.0776	0.0000	0.0000
Ecc: Ecc Loads + Moments	6.6000	0.0000	0.0000 in
Design Ecc = Ecc * Delta	**0.0000**	**0.0000**	**0.0000** in

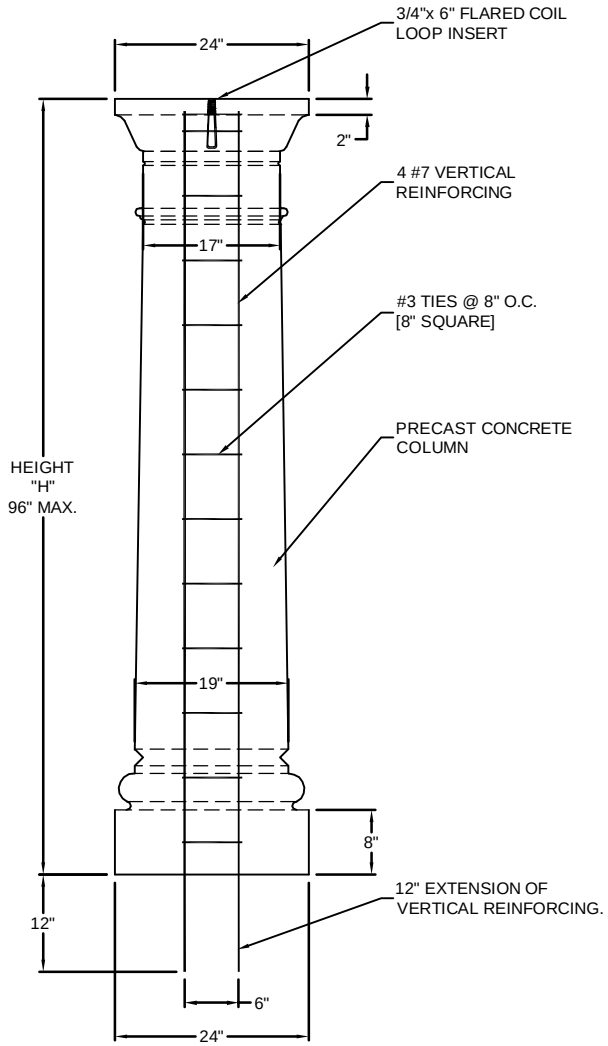
ACI Factors (per ACI 318-02, applied internally to entered loads)

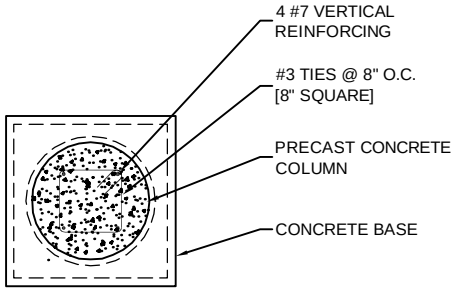
ACI C-1 & C-2 DL	1.400	ACI C-2 Group Factor	0.750	Add"l "1.4" Factor for Seismic	1.400
ACI C-1 & C-2 LL	1.700	ACI C-3 Dead Load Factor	0.900	Add"l "0.9" Factor for Seismic	0.900
ACI C-1 & C-2 ST	1.700	ACI C-3 Short Term Factor	1.300		
....seismic = ST * :	1.100				

CS–24 – ALLOWABLE LOADS			
HEIGHT		ALLOWABLE LOADS	
DESIGN	ACTUAL [H]	VERTICAL	MOMENT
8'-0"	96"	30.0 kips	7.0 ft-kips

GENERAL STRUCTURAL NOTES

A. BUILDING CODES:
   2006 EDITION OF INTERNATIONAL BUILDING CODE.
   2003 EDITION OF INTERNATIONAL BUILDING CODE.
B. CONCRETE STRENGTH = 4,000 PSI.
C. REINFORCING STRENGTH: Fy = 40,000 PSI
D. ALL CONCRETE SHALL BE VIBRATED DURING PLACEMENT.
E. REINFORCING SHALL BE RESTRAINED DURING PLACEMENT OF CONCRETE.
F. REINFORCING AND CONCRETE PLACEMENT SHALL CONFORM TO "ACI 318" SPECIFICATION AND REQUIREMENTS.
G. CONNECTION AT TOP AND BOTTOM SHALL BE SPECIFIED, ON CONSTRUCTION DOCUMENTS, BY THE ENGINEER OF RECORD.
H. ALL COLUMNS SHALL BE BRACED AGAINST SIDESWAY.
I. COIL LOOP INSERTS SHALL BE MANUFACTURED BY DAYTON RICHMOND OR EQUIVALENT.





COLUMN SECTION
CS24

Registered Professional Engineer (Structural)
CERTIFICATE NO.
26915
CRAIG A. NELSON
Date Signed .....
ARIZONA, U.S.A.

CS-24 **PRECAST CONCRETE COLUMN LOAD TABLE**

SCALE: NONE

THE NELSON GROUP
ENGINEERING & DEVELOPING, INC.
1136 East Harmony Ave., Suite 205
Mesa, Arizona 85204
Ph: [480] 497-0003 Fax: [480] 497-0038

ARISTONE® DESIGNS, Inc.
1615 East Weber Drive
Tempe, Arizona

DATE:	DRWN BY:	25 OF
01.30.08	C.A.N.	
JOB NO.	REV'D BY:	36
07-155	C.A.N.	

THE NELSON GROUP
ENGINEERING & DEVELOPING, INC.
1136 EAST HARMONY AVE. • SUITE 205
MESA, ARIZONA 85204
[480] 497-0003 • FAX: [480] 497-0038

COLUMN 'CS-24'

GRAVITY LOADS:

- **DESIGN VALUES:**

  L_{MAX} ..... 96" ..... USE 8'-0"

  F'_C ..... 4,000 PSI

  F_Y ..... 40,000 PSI

  DIA. [DESIGN] ..... 15" ..... [Actual Dia. = 17" Minimum]

  CONC. COVER ..... 2.5" ..... [Actual Cover = 2.5" + 1.5" = 3.5"]

  LOAD ECCENTRICITY ... 6"

  CONNECTIONS AT TOP AND BOTTOM OF COLUMN SHALL BE DETAILED BY DESIGN ENGINEER.

- **DESIGN LOADS:**

  P_1 = 30,000 #

  LOAD ARE ENTERED INTO THE DESIGN PROGRAM AS LIVE LOADS SO THAT THE HIGHER LOAD FACTOR OF 1.7 WOULD BE APPLIED TO LOADS. THIS PRODUCES A MORE CONSERVATIVE DESIGN.

- **ALLOWABLE MOMENTS:** [DETERMINED FROM DESIGN PROGRAM RESULTS]

  P_1 = 30,000 # ..... M_1 = 7.0 ft-kips

  REFER TO ATTACHED CALCULATIONS RESULTS FROM "ENERCALC" DESIGN PROGRAM FOR ADDITIONAL INFORMATION.

The Nelson Group
Engineering & Developing, Inc.
1136 East Harmony Ave., Ste 205
Mesa, Arizona 85204

Title : ARISTONE - COLUMN DESIGN **Job #** 07-155
Dsgnr: C.A.N. **Date:**
Description : ARISTONE DESIGNS, Inc.
1615 East Weber Drive
Scope : 2006 IBC: Structural Design of Reinforced Concrete Columns

Circular Concrete Column

Description CS-24-8 [30.0k & 7.0k-f]]

General Information

Code Ref: ACI 318-02, 1997 UBC, 2003 IBC, 2003 NFPA 5000

Diameter	15.000 in	f'c	4,000.0 psi	Total Height	8.000 ft
Number of Bars	4	Fy	40,000.0 psi	Unbraced Length	8.000 ft
Bar Size	7	Seismic Zone	4	Eff. Length Factor	1.000
Total Rebar Area	2.400 in2	LL & ST Loads Act Separate		Column is BRACED	
Rebar Percent	1.358 %	Spiral Ties NOT Used			
Bar Cover	2.500 in				

Loads

Note: Load factoring supports 2003 IBC and 2003 NFPA 5000 by virtue of their references to ACI 318-02 for concrete design. Factoring of entered loads to ultimate loads within this program is according to ACI 318-02 C.2

	Dead Load	Live Load	Short Term	Eccentricity
Axial Loads	k	30.000 k	k	6.000 in
Applied Moments...				
@ Top	k-ft	7.000 k-ft	k-ft	
@ Bottom	k-ft	k-ft	k-ft	

Summary

Column is OK

Column Diameter= 15.00in, with 4 #7 Bars

	ACI C-1	ACI C-2	ACI C-3
Applied Pu : Max Factored	**51.00** k	**0.00** k	**0.00** k
Allowable Pn * Phi @ Design Ecc.	**73.62** k	**358.11** k	**358.11** k
M-critical	37.40 k-ft	0.00 k-ft	0.00 k-ft
Combined Eccentricity	8.8000 in	0.0000 in	0.0000 in
Magnification Factor	1.00	1.00	1.00
Design Eccentricity	8.8000 in	0.0000 in	0.0000 in
Magnified Design Moment	37.40 k-ft	0.00 k-ft	0.00 k-ft
Po * 0.80	550.94 k	550.94 k	550.94 k
P : Balanced	241.74 k	241.74 k	241.74 k
Ecc : Balanced	5.1790 in	5.1790 in	5.1790 in

Slenderness *per ACI 318-02 Section 10.12 & 10.13*

Actual k Lu / r 25.600 | Elastic Modulus 3,605.0 ksi | Beta 0.850

	ACI Eq. C-1	ACI Eq. C-2	ACI Eq. C-3
Neutral Axis Distance	4.8975 in	19.7475 in	19.7475 in
Phi	0.7091	0.6500	0.6500
Max Limit kl/r	34.0000	34.0000	34.0000
Beta = M:sustained/M:max	0.0000	0.0000	0.0000
Cm	1.0000	1.0000	1.0000
EI / 1000	0.00	0.00	0.00
Pc : pi^2 E I / (k Lu)^2	0.00	0.00	0.00
alpha: MaxPu / (.75 Pc)	0.0000	0.0000	0.0000
Delta	1.0000	0.0000	0.0000
Ecc: Ecc Loads + Moments	8.8000	0.0000	0.0000 in
Design Ecc = Ecc * Delta	**0.0000**	**0.0000**	**0.0000** in

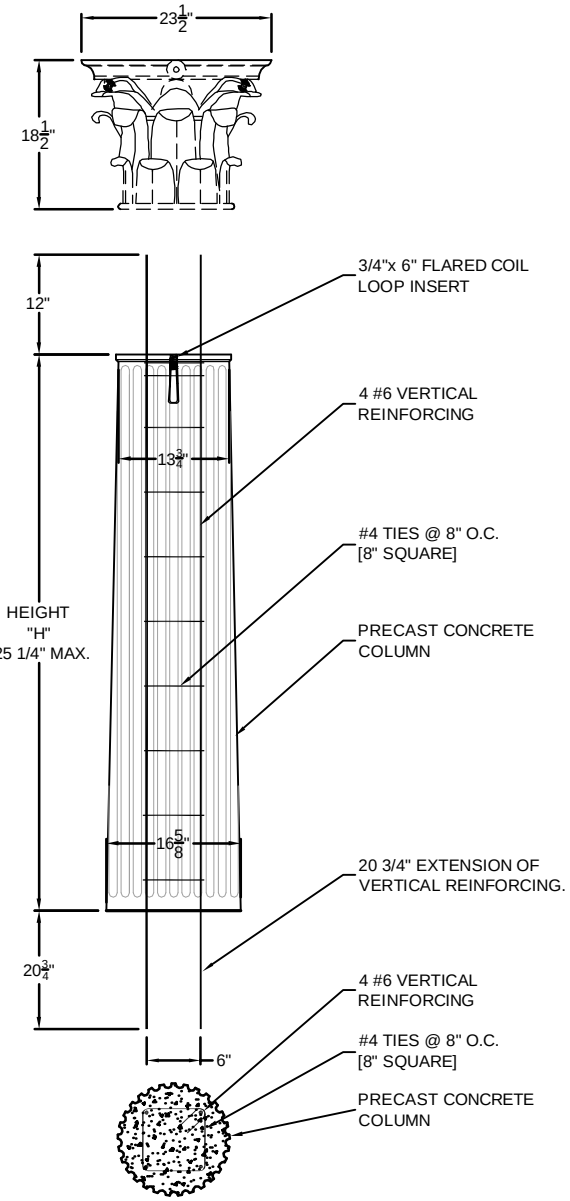
ACI Factors (per ACI 318-02, applied internally to entered loads)

ACI C-1 & C-2 DL	1.400	ACI C-2 Group Factor	0.750	Add"l "1.4" Factor for Seismic	1.400
ACI C-1 & C-2 LL	1.700	ACI C-3 Dead Load Factor	0.900	Add"l "0.9" Factor for Seismic	0.900
ACI C-1 & C-2 ST	1.700	ACI C-3 Short Term Factor	1.300		
....seismic = ST * :	1.100				

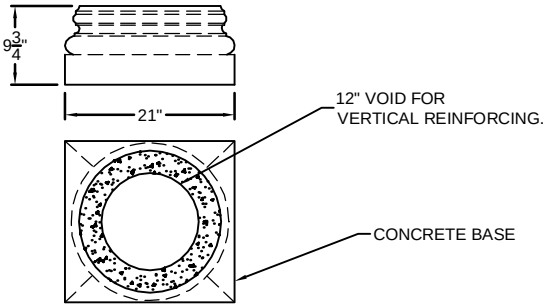
CCF–21 – ALLOWABLE LOADS			
HEIGHT		ALLOWABLE LOADS	
DESIGN	ACTUAL [H]	VERTICAL	MOMENT
12'-9"	153 1/2"	15.0 kips	2.0 ft-kips

GENERAL STRUCTURAL NOTES

A. BUILDING CODES:
   2006 EDITION OF INTERNATIONAL BUILDING CODE.
   2003 EDITION OF INTERNATIONAL BUILDING CODE.
B. CONCRETE STRENGTH = 4,000 PSI.
C. REINFORCING STRENGTH: Fy = 40,000 PSI
D. ALL CONCRETE SHALL BE VIBRATED DURING PLACEMENT.
E. REINFORCING SHALL BE RESTRAINED DURING PLACEMENT OF CONCRETE.
F. REINFORCING AND CONCRETE PLACEMENT SHALL CONFORM TO "ACI 318" SPECIFICATION AND REQUIREMENTS.
G. CONNECTION AT TOP AND BOTTOM SHALL BE SPECIFIED, ON CONSTRUCTION DOCUMENTS, BY THE ENGINEER OF RECORD.
H. ALL COLUMNS SHALL BE BRACED AGAINST SIDESWAY.
I. COIL LOOP INSERTS SHALL BE MANUFACTURED BY DAYTON RICHMOND OR EQUIVALENT.



COLUMN SECTION
CCF–21



BASE SECTION – ELEVATION
CCF–21

Registered Professional Engineer (Structural)
CERTIFICATE NO. 26915
CRAIG A. NELSON
Date Signed .....
ARIZONA, U.S.A.

CCF-21 PRECAST CONCRETE COLUMN LOAD TABLE

SCALE: NONE

THE NELSON GROUP
ENGINEERING & DEVELOPING, INC.
1136 East Harmony Ave., Suite 205
Mesa, Arizona 85204
Ph: [480] 497–0003 Fax: [480] 497–0038

ARISTONE® DESIGNS, Inc.
1615 East Weber Drive
Tempe, Arizona

DATE:	DRWN BY:	28 OF
01.30.08	C.A.N.	
JOB NO.	REV'D BY:	36
07-155	C.A.N.	

THE NELSON GROUP
ENGINEERING & DEVELOPING, INC.
1136 EAST HARMONY AVE. • SUITE 205
MESA, ARIZONA 85204
[480] 497-0003 • FAX: [480] 497-0038

COLUMN 'CCF-21'

GRAVITY LOADS:

- **DESIGN VALUES:**

  L_{MAX} ..... 153.5" ..... USE 12'-9"

  F'_C ..... 4,000 PSI

  F_Y ..... 40,000 PSI

  DIA. [DESIGN] ..... 11.5" ..... [Actual Dia. = 12.75" Minimum]

  CONC. COVER ..... 1.0" ..... [Actual Cover = 1.0" + 1.25" = 2.25"]

  LOAD ECCENTRICITY ... 4"

  CONNECTIONS AT TOP AND BOTTOM OF COLUMN SHALL BE DETAILED BY DESIGN ENGINEER.

- **DESIGN LOADS:**

  P_1 = 15,000 #

  LOAD ARE ENTERED INTO THE DESIGN PROGRAM AS LIVE LOADS SO THAT THE HIGHER LOAD FACTOR OF 1.7 WOULD BE APPLIED TO LOADS. THIS PRODUCES A MORE CONSERVATIVE DESIGN.

- **ALLOWABLE MOMENTS:** [DETERMINED FROM DESIGN PROGRAM RESULTS]

  P_1 = 15,000 # ..... M_1 = 2.0 ft-kips

  REFER TO ATTACHED CALCULATIONS RESULTS FROM "ENERCALC" DESIGN PROGRAM FOR ADDITIONAL INFORMATION.

The Nelson Group
Engineering & Developing, Inc.
1136 East Harmony Ave., Ste 205
Mesa, Arizona 85204

Title : ARISTONE - COLUMN DESIGN **Job #** 07-155
Dsgnr: C.A.N. **Date:**
Description : ARISTONE DESIGNS, Inc.
1615 East Weber Drive
Scope : 2006 IBC: Structural Design of Reinforced Concrete Columns

Circular Concrete Column

Description CCF-21-12 [15.0k & 2.0k-f]]

General Information

Code Ref: ACI 318-02, 1997 UBC, 2003 IBC, 2003 NFPA 5000

Diameter	11.500 in	f'c	4,000.0 psi	Total Height	12.750 ft
Number of Bars	4	Fy	40,000.0 psi	Unbraced Length	12.750 ft
Bar Size	5	Seismic Zone	4	Eff. Length Factor	1.000
Total Rebar Area	1.240 in2	LL & ST Loads Act Separate		Column is BRACED	
Rebar Percent	1.194 %	Spiral Ties NOT Used			
Bar Cover	1.000 in				

Loads

Note: Load factoring supports 2003 IBC and 2003 NFPA 5000 by virtue of their references to ACI 318-02 for concrete design.
Factoring of entered loads to ultimate loads within this program is according to ACI 318-02 C.2

	Dead Load	Live Load	Short Term	Eccentricity
Axial Loads	k	15.000 k	k	4.000 in
Applied Moments...				
@ Top	k-ft	2.000 k-ft	k-ft	
@ Bottom	k-ft	k-ft	k-ft	

Summary

Column is OK

Column Diameter= 11.50in, with 4 #5 Bars

	ACI C-1	ACI C-2	ACI C-3
Applied Pu : Max Factored	**25.50** k	**0.00** k	**0.00** k
Allowable Pn * Phi @ Design Ecc.	**50.09** k	**0.00** k	**0.00** k
M-critical	11.90 k-ft	0.00 k-ft	0.00 k-ft
Combined Eccentricity	5.6000 in	0.0000 in	0.0000 in
Magnification Factor	1.07	0.00	0.00
Design Eccentricity	5.9902 in	0.0000 in	0.0000 in
Magnified Design Moment	12.73 k-ft	0.00 k-ft	0.00 k-ft
Po * 0.80	318.83 k	318.83 k	318.83 k
P : Balanced	198.46 k	157.04 k	157.04 k
Ecc : Balanced	2.7266 in	3.7349 in	3.7349 in

Slenderness *per ACI 318-02 Section 10.12 & 10.13*

Actual k Lu / r 53.217 Elastic Modulus 3,605.0 ksi Beta 0.850

	ACI Eq. C-1	ACI Eq. C-2	ACI Eq. C-3
Neutral Axis Distance	4.2957 in	16.2057 in	16.2057 in
Phi	0.6500	0.6500	0.6500
Max Limit kl/r	34.0000	34.0000	34.0000
Beta = M:sustained/M:max	0.0000	0.0000	0.0000
Cm	1.0000	1.0000	1.0000
EI / 1000	1,238.02	0.00	0.00
Pc : pi^2 E I / (k Lu)^2	521.97	0.00	0.00
alpha: MaxPu / (.75 Pc)	0.0651	0.0000	0.0000
Delta	1.0697	0.0000	0.0000
Ecc: Ecc Loads + Moments	5.6000	0.0000	0.0000 in
Design Ecc = Ecc * Delta	**0.0000**	**0.0000**	**0.0000** in

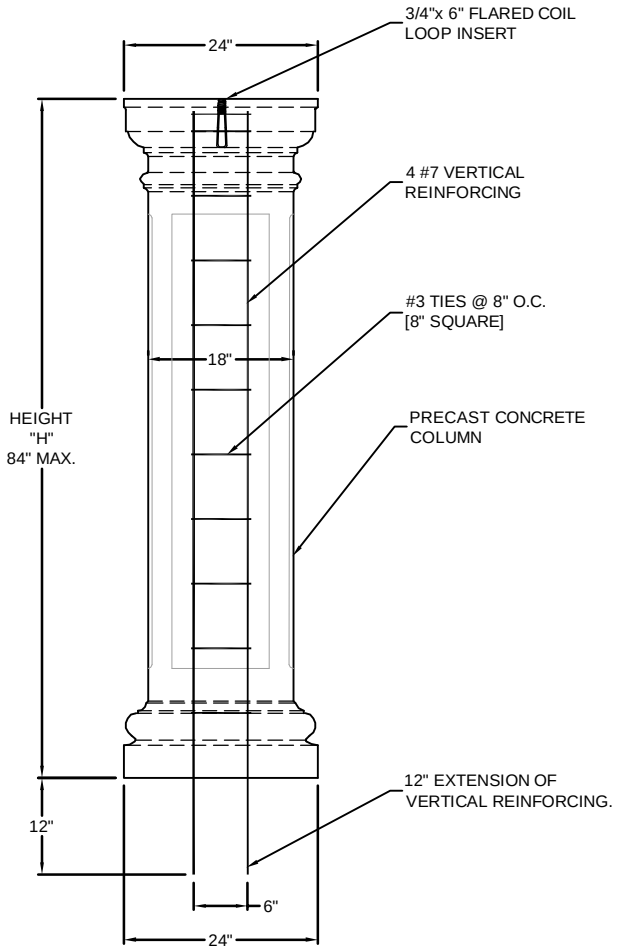
ACI Factors (per ACI 318-02, applied internally to entered loads)

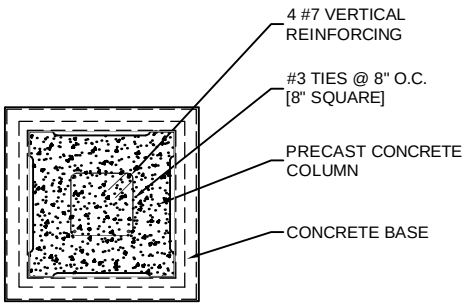
ACI C-1 & C-2 DL	1.400	ACI C-2 Group Factor	0.750	Add"l "1.4" Factor for Seismic	1.400
ACI C-1 & C-2 LL	1.700	ACI C-3 Dead Load Factor	0.900	Add"l "0.9" Factor for Seismic	0.900
ACI C-1 & C-2 ST	1.700	ACI C-3 Short Term Factor	1.300		
....seismic = ST * :	1.100				

CSQ–24 – ALLOWABLE LOADS			
HEIGHT		ALLOWABLE LOADS	
DESIGN	ACTUAL [H]	VERTICAL	MOMENT
7'-0"	84"	25.0 kips	10.0 ft-kips

GENERAL STRUCTURAL NOTES

A. BUILDING CODES:
   2006 EDITION OF INTERNATIONAL BUILDING CODE.
   2003 EDITION OF INTERNATIONAL BUILDING CODE.
B. CONCRETE STRENGTH = 4,000 PSI.
C. REINFORCING STRENGTH: Fy = 40,000 PSI
D. ALL CONCRETE SHALL BE VIBRATED DURING PLACEMENT.
E. REINFORCING SHALL BE RESTRAINED DURING PLACEMENT OF CONCRETE.
F. REINFORCING AND CONCRETE PLACEMENT SHALL CONFORM TO "ACI 318" SPECIFICATION AND REQUIREMENTS.
G. CONNECTION AT TOP AND BOTTOM SHALL BE SPECIFIED, ON CONSTRUCTION DOCUMENTS, BY THE ENGINEER OF RECORD.
H. ALL COLUMNS SHALL BE BRACED AGAINST SIDESWAY.
I. COIL LOOP INSERTS SHALL BE MANUFACTURED BY DAYTON RICHMOND OR EQUIVALENT.





COLUMN SECTION
CSQ–24

Registered Professional Engineer (Structural)
CERTIFICATE NO.
26915
CRAIG A. NELSON
Date Signed .....
ARIZONA, U.S.A.

CSQ-24 **PRECAST CONCRETE COLUMN LOAD TABLE**

SCALE: NONE

THE NELSON GROUP
ENGINEERING & DEVELOPING, INC.
1136 East Harmony Ave., Suite 205
Mesa, Arizona 85204
Ph: [480] 497–0003 Fax: [480] 497–0038

ARISTONE® DESIGNS, Inc.
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07-155	C.A.N.	

THE NELSON GROUP
ENGINEERING & DEVELOPING, INC.
1136 EAST HARMONY AVE. • SUITE 205
MESA, ARIZONA 85204
[480] 497-0003 • FAX: [480] 497-0038

COLUMN 'CSQ-24'

GRAVITY LOADS:

- **DESIGN VALUES:**

  L_{MAX} ..... 84" ..... USE 7'-0"

  F'_C ..... 4,000 PSI

  F_Y ..... 40,000 PSI

  H = W [DESIGN] ..... 15" ..... [Actual Dia. = 17" Minimum]

  CONC. COVER ..... 4.5" ..... [Actual Cover = 4.5" + 1.0" = 5.5"]

  LOAD ECCENTRICITY ... 6"

  CONNECTIONS AT TOP AND BOTTOM OF COLUMN SHALL BE DETAILED BY DESIGN ENGINEER.

- **DESIGN LOADS:**

  P_1 = 25,000 #

  LOAD ARE ENTERED INTO THE DESIGN PROGRAM AS LIVE LOADS SO THAT THE HIGHER LOAD FACTOR OF 1.7 WOULD BE APPLIED TO LOADS. THIS PRODUCES A MORE CONSERVATIVE DESIGN.

- **ALLOWABLE MOMENTS:** [DETERMINED FROM DESIGN PROGRAM RESULTS]

  P_1 = 25,000 # ..... M_1 = 10.0 ft-kips

  REFER TO ATTACHED CALCULATIONS RESULTS FROM "ENERCALC" DESIGN PROGRAM FOR ADDITIONAL INFORMATION.

The Nelson Group
Engineering & Developing, Inc.
1136 East Harmony Ave., Ste 205
Mesa, Arizona 85204

Title : ARISTONE - COLUMN DESIGN **Job #** 07-155
Dsgnr: C.A.N. **Date:**
Description : ARISTONE DESIGNS, Inc.
1615 East Weber Drive
Scope : 2006 IBC: Structural Design of Reinforced Concrete Columns

Rectangular Concrete Column

Description CSQ-24-8 25.0k & 10.0k-ft]

General Information

Code Ref: ACI 318-02, 1997 UBC, 2003 IBC, 2003 NFPA 5000

Width	15.000 in	f'c	4,000.0 psi	Total Height	7.000 ft
Depth	15.000 in	Fy	40,000.0 psi	Unbraced Length	7.000 ft
Rebar:		Seismic Zone	2	Eff. Length Factor	1.000
2- # 7 d =	4.500 in	LL & ST Loads Act Together		Column is BRACED	
2- # 7 d =	10.500 in				

Loads

Note: Load factoring supports 2003 IBC and 2003 NFPA 5000 by virtue of their references to ACI 318-02 for concrete design. Factoring of entered loads to ultimate loads within this program is according to ACI 318-02 C.2

	Dead Load	Live Load	Short Term	Eccentricity
Axial Loads	0.000 k	25.000 k	k	6.000 in
Applied Moments...				
@ Top	k-ft	10.000 k-ft	k-ft	
@ Bottom	k-ft	10.000 k-ft	k-ft	

Summary

Column is OK

15.00 x 15.00in Column, Rebar: 2-#7 @ 4.50in, 2-#7 @ 10.50in

	ACI C-1	ACI C-2	ACI C-3
Applied : Pu : Max Factored	**42.50** k	**31.88** k	**0.00** k
Allowable : Pn * Phi @ Design Ecc.	**74.49** k	**74.49** k	**168.94** k
M-critical	38.25 k-ft	28.69 k-ft	0.00 k-ft
Combined Eccentricity	10.800 in	10.800 in	6.000 in
Magnification Factor	1.00	1.00	1.00
Design Eccentricity	10.800 in	10.800 in	6.000 in
Magnified Design Moment	38.25 k-ft	28.69 k-ft	0.00 k-ft
Po * .80	682.27 k	682.27 k	682.27 k
P : Balanced	298.82 k	298.82 k	298.82 k
Ecc : Balanced	5.470 in	5.470 in	5.470 in

Slenderness

per ACI 318-95 Section 10.12 & 10.13

Actual k Lu / r 18.667 | Elastic Modulus 3,605.0 ksi | Beta 0.850

	ACI Eq. C-1	ACI Eq. C-2	ACI Eq. C-3
Neutral Axis Distance	3.8100 in	3.8100 in	6.4650 in
Phi	0.7581	0.7581	0.6500
Max Limit kl/r	39.3333	39.3333	34.0000
Beta = M:sustained/M:max	0.0000	0.0000	1.0000
Cm	1.0000	1.0000	1.0000
EI / 1000	0.00	0.00	0.00
Pc : pi^2 E I / (k Lu)^2	0.00	0.00	0.00
alpha: MaxPu / (.75 Pc)	0.0000	0.0000	0.0000
Delta	1.0000	1.0000	1.0000
Ecc: Ecc Loads + Moments	10.800	10.800	6.000 in
Design Ecc = Ecc * Delta	**10.800**	**10.800**	**6.000** in

ACI Factors

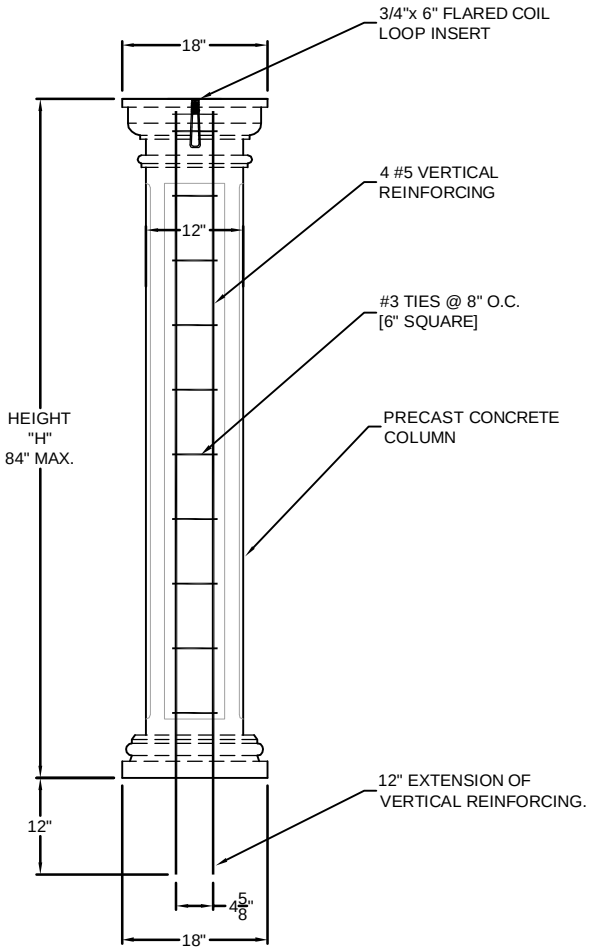
(per ACI 318-02, applied internally to entered loads)

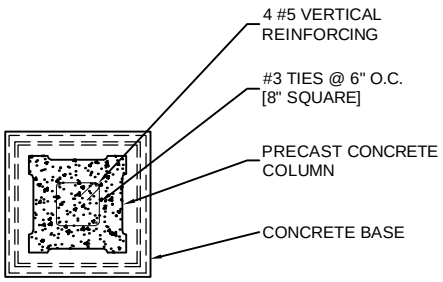
ACI C-1 & C-2 DL	1.400	ACI C-2 Group Factor	0.750	Add"l "1.4" Factor for Seismic	1.400
ACI C-1 & C-2 LL	1.700	ACI C-3 Dead Load Factor	0.900	Add"l "0.9" Factor for Seismic	0.900
ACI C-1 & C-2 ST	1.700	ACI C-3 Short Term Factor	1.300		
....seismic = ST * :	1.100				

CSQ–18 – ALLOWABLE LOADS			
HEIGHT		ALLOWABLE LOADS	
DESIGN	ACTUAL [H]	VERTICAL	MOMENT
7'-0"	84"	10.0 kips	5.0 ft-kips

GENERAL STRUCTURAL NOTES

A. BUILDING CODES:
   2006 EDITION OF INTERNATIONAL BUILDING CODE.
   2003 EDITION OF INTERNATIONAL BUILDING CODE.
B. CONCRETE STRENGTH = 4,000 PSI.
C. REINFORCING STRENGTH: Fy = 40,000 PSI
D. ALL CONCRETE SHALL BE VIBRATED DURING PLACEMENT.
E. REINFORCING SHALL BE RESTRAINED DURING PLACEMENT OF CONCRETE.
F. REINFORCING AND CONCRETE PLACEMENT SHALL CONFORM TO "ACI 318" SPECIFICATION AND REQUIREMENTS.
G. CONNECTION AT TOP AND BOTTOM SHALL BE SPECIFIED, ON CONSTRUCTION DOCUMENTS, BY THE ENGINEER OF RECORD.
H. ALL COLUMNS SHALL BE BRACED AGAINST SIDESWAY.
I. COIL LOOP INSERTS SHALL BE MANUFACTURED BY DAYTON RICHMOND OR EQUIVALENT.





COLUMN SECTION
CSQ–18

CSQ-18 **PRECAST CONCRETE COLUMN LOAD TABLE**

SCALE: NONE

THE NELSON GROUP
ENGINEERING & DEVELOPING, INC.
1136 East Harmony Ave., Suite 205
Mesa, Arizona 85204
Ph: [480] 497–0003 Fax: [480] 497–0038

ARISTONE® DESIGNS, Inc.
1615 East Weber Drive
Tempe, Arizona

DATE:	DRWN BY:	34 OF
01.30.08	C.A.N.	
JOB NO.	REV'D BY:	36
07-155	C.A.N.	

THE NELSON GROUP
ENGINEERING & DEVELOPING, INC.
1136 EAST HARMONY AVE. • SUITE 205
MESA, ARIZONA 85204
[480] 497-0003 • FAX: [480] 497-0038

COLUMN 'CSQ-18'

GRAVITY LOADS:

- **DESIGN VALUES:**

  L_{MAX} ..... 84" ..... USE 7'-0"

  F'_C ..... 4,000 PSI

  F_Y ..... 40,000 PSI

  H = W [DESIGN] ..... 10" ..... [Actual Dia. = 11" Minimum]

  CONC. COVER ..... 3.25" ..... [Actual Cover = 3.25" + 0.5" = 3.75"]

  LOAD ECCENTRICITY ... 4"

  CONNECTIONS AT TOP AND BOTTOM OF COLUMN SHALL BE DETAILED BY DESIGN ENGINEER.

- **DESIGN LOADS:**

  P_1 = 10,000 #

  LOAD ARE ENTERED INTO THE DESIGN PROGRAM AS LIVE LOADS SO THAT THE HIGHER LOAD FACTOR OF 1.7 WOULD BE APPLIED TO LOADS. THIS PRODUCES A MORE CONSERVATIVE DESIGN.

- **ALLOWABLE MOMENTS:** [DETERMINED FROM DESIGN PROGRAM RESULTS]

  P_1 = 10,000 # ..... M_1 = 5.0 ft-kips

  REFER TO ATTACHED CALCULATIONS RESULTS FROM "ENERCALC" DESIGN PROGRAM FOR ADDITIONAL INFORMATION.

The Nelson Group
Engineering & Developing, Inc.
1136 East Harmony Ave., Ste 205
Mesa, Arizona 85204

Title : ARISTONE - COLUMN DESIGN **Job #** 07-155
Dsgnr: C.A.N. **Date:**
Description : ARISTONE DESIGNS, Inc.
1615 East Weber Drive
Scope : 2006 IBC: Structural Design of Reinforced Concrete Columns

Rectangular Concrete Column

Description CSQ-18-8 10.0k & 5.0k-ft]

General Information

Code Ref: ACI 318-02, 1997 UBC, 2003 IBC, 2003 NFPA 5000

Width	10.000 in	f'c	4,000.0 psi	Total Height	7.000 ft
Depth	10.000 in	Fy	40,000.0 psi	Unbraced Length	7.000 ft
Rebar:		Seismic Zone	2	Eff. Length Factor	1.000
2- # 5 d =	3.250 in	LL & ST Loads Act Together		Column is BRACED	
2- # 5 d =	7.875 in				

Loads

Note: Load factoring supports 2003 IBC and 2003 NFPA 5000 by virtue of their references to ACI 318-02 for concrete design. Factoring of entered loads to ultimate loads within this program is according to ACI 318-02 C.2

	Dead Load	Live Load	Short Term	Eccentricity
Axial Loads	0.000 k	10.000 k	k	4.000 in
Applied Moments...				
@ Top	k-ft	5.000 k-ft	k-ft	
@ Bottom	k-ft	5.000 k-ft	k-ft	

Summary

Column is OK

10.00 x 10.00in Column, Rebar: 2-#5 @ 3.25in, 2-#5 @ 7.88in

	ACI C-1	ACI C-2	ACI C-3
Applied : Pu : Max Factored	**17.00** k	**12.75** k	**0.00** k
Allowable : Pn * Phi @ Design Ecc.	**26.33** k	**26.33** k	**82.21** k
M-critical	14.17 k-ft	10.62 k-ft	0.00 k-ft
Combined Eccentricity	10.000 in	10.000 in	4.000 in
Magnification Factor	1.00	1.00	1.00
Design Eccentricity	10.000 in	10.000 in	4.000 in
Magnified Design Moment	14.17 k-ft	10.62 k-ft	0.00 k-ft
Po * .80	308.31 k	308.31 k	308.31 k
P : Balanced	150.44 k	150.44 k	150.44 k
Ecc : Balanced	3.504 in	3.504 in	3.504 in

Slenderness

per ACI 318-95 Section 10.12 & 10.13

Actual k Lu / r 28.000 | Elastic Modulus 3,605.0 ksi | Beta 0.850

	ACI Eq. C-1	ACI Eq. C-2	ACI Eq. C-3
Neutral Axis Distance	2.5350 in	2.5350 in	4.7250 in
Phi	0.7919	0.7919	0.6500
Max Limit kl/r	41.2000	41.2000	34.0000
Beta = M:sustained/M:max	0.0000	0.0000	1.0000
Cm	1.0000	1.0000	1.0000
EI / 1000	0.00	0.00	0.00
Pc : pi^2 E I / (k Lu)^2	0.00	0.00	0.00
alpha: MaxPu / (.75 Pc)	0.0000	0.0000	0.0000
Delta	1.0000	1.0000	1.0000
Ecc: Ecc Loads + Moments	10.000	10.000	4.000 in
Design Ecc = Ecc * Delta	**10.000**	**10.000**	**4.000** in

ACI Factors

(per ACI 318-02, applied internally to entered loads)

ACI C-1 & C-2 DL	1.400	ACI C-2 Group Factor	0.750	Add"l "1.4" Factor for Seismic	1.400
ACI C-1 & C-2 LL	1.700	ACI C-3 Dead Load Factor	0.900	Add"l "0.9" Factor for Seismic	0.900
ACI C-1 & C-2 ST	1.700	ACI C-3 Short Term Factor	1.300		
....seismic = ST * :	1.100				