

ASCE 7-22
SEISMIC BASE SHEAR, DIAPHRAGM LOAD AND ELEMENTS' LATERAL FORCE
IBCPRO

Project : LTK
 Building : Verification Update

REQUIRED INPUT ARE INDICATED BY BLUE COLOR NUMBERS

INPUT

Risk Category Per Table 1.5-1		II	ndim	
Site Classification Per Geotechnical Engineer or Table 20.3-1		D	ndim	
Adjusted 0.2 Second Spectral Acceleration Sms Per Fig. 22-1, 3, 5, 7	Sms =	1.665	g	
Adjusted 1.0 Second Spectral Acceleration Sm1 Per Fig. 22- 2, 6, 8, 9	Sm1 =	1.130	g	
1.0 Second Spectral Acceleration S1	Ss1 =	0.064	g	
R Factor per Table 12.2-1	R =	4.2	ndim	OSBF
Redundancy Factor - Section 12.3.4	ρ =	1	ndim	
Overstrength Factor - per Table 12.2-1 or 15.4.1 & 2	Ω_o =	1	ndim	
Period Parameters Ct - Table 12.8-2	Ct =	0.030	ndim	
Long Period Transition Period TL - Fig. 22-12 to 16	TL =	8.000	second	
Regular Structure and 5 Stories and Less in Height ?		Yes		
Component Importance Factor Per Section 13.1.3	Ip =	1.75	ndim	
Horizontal Force Factors Per Tables 13.5-1 & 13.6-1				
Component Response Modification Factor	Rpo =	1.3	ndim	Ceiling
Component Resonant Ductility Factor	Car =	2.2	ndim	

SEISMIC DESIGN PARAMETERS

Importance Factor Per Table 1.5-2	I =	1.00	ndim
Total Building Height	H =	80.5	ft
Approximate Fundamental Period Per Eq. (12.8-8)	Ta =	0.806	sec
Design Spectral Acceleration SDs for Base Shear	SDs =	1.110	g
Design Spectral Acceleration SD1	SD1 =	0.753	g
SEISMIC DESIGN CATEGORY		D	
Seismic Response/ Base Shear Coefficient Without ρ Factor	Cs =	0.222	ndim
DESIGN BASE SHEAR	V =	6674.07	kips

STORY LATERAL FORCE PER SECTION 12.8.3

STORY	HEIGHT	WEIGHT		LATERAL FORCE		STORY SHEAR		STORY OTM	
LEVEL	hi	w _i	w _x *(h _x) ^k	F _x	F _x /1.4	V _x	V _x /1.4	Mot	Mot/1.4
ID	ft	kips	kips.ft	kips	kips	kips	kips	k ft	k ft
Roof	80.5	10000	1576225	3445	2461	3445	2461		
3rd FL	54.5	10000	1005263	2197	1569	5642	4030	89570	63979
2nd FL	28.3	10000	472160	1032	737	6674	4767	237394	169567
Basement	0	0	0	0	0	6674	4767	426270	304479
SUM		30000		6674	4767				

DIAPHRAGM LOAD PER SECTION 12.10.1.1

STORY LEVEL ID	HEIGHT hi ft	Ft + Σ Fi kips	Σw_i kips	$(Ft + \Sigma Fi) / \Sigma w_i$	DIAPHRAGM LOAD	
					Fpx kips	Fpx/1.4 kips
Roof	80.5	3445	10000	0.34	3445	2461
3rd Fl	54.5	5642	20000	0.28	2821	2015
2nd FL	28.3	6674	30000	0.22	2225	1589
Basement	0	6674	30000	0.22	0	0

COMPONENTS' LATERAL & VERTICAL FORCE PER SECTION 13.3

Design Spectral Acceleration **SDs** & **Ta min** **SDs = 1.110 g** **Ta min = 0.806 sec**
 Ductility Reduction for Comp Above Grade **Rmu = 1.62** ndim Rmu at or below Grade = 1.00

STORY LEVEL ID	HEIGHT hi ft	Wp lbs	COEF. Hf	COEF. (Fp / Wp)	LATERAL/HORZ FORCES				VERT SEISMIC	
					Fp lbs	Fp/1.4 lbs	Uop lbs	Uop Fp lbs	Fpv lbs	Fpv/1.4 lbs
Roof	80.5	100	2.99	2.42	242	173	1.75	424	22	16
3rd Fl	54.5	12500	1.85	1.50	18765	13403	2	37530	2775	1982
2nd FL	28.3	100	1.44	1.16	116	83	1.5	174	22	16
Basement	0	100	1.00	1.31	131	94	1.75	230	22	16

STRUCTURAL WALL'S OUT OF PLANE ANCHORAGE FORCES PER SECTION 12.11

Design Spectral Acceleration **SDs** **SDs = 1.110 g** **Lf = 0 ft**

STORY LEVEL ID	HEIGHT hi ft	Tributary Wp psf	FOR WALL DESIGN		FOR GENERAL ANCHOR DESIGN		ANCHOR NOT @ROOF & NO FLEX DIAPH	
			Fp psf	Fp/1.4 psf	Fp psf	Fp/1.4 lbs/ft	Fp psf	Fp/1.4 psf
Roof	80.5	100	44	32	44	32		
3rd Fl	54.5	100	44	32	44	32	35	25
2nd FL	28.3	100	44	32	44	32	25	18
Basement	0	100	44	32	44	32	20	14

END OF CALCULATIONS