TEXAS UTILITIES GENERATING CO.
COMANCHE PEAK UNIT 2
CABLE TRAY HANGERS

7Q-D-6

CTH DIMENSIONAL TOLERANCES

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COMANCHE PEAK SES UNIT 2
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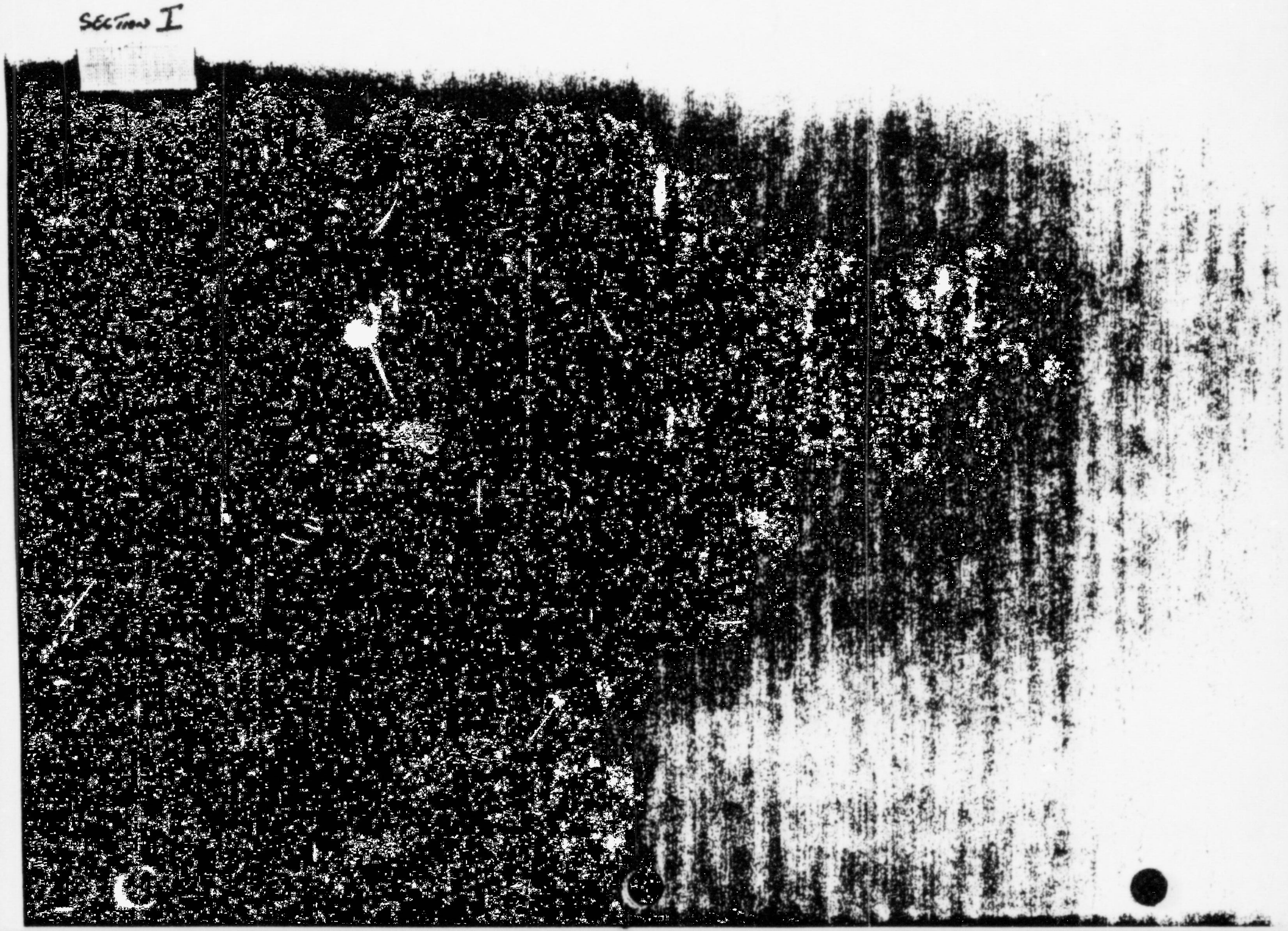

SECTION I

EBASCO SERVICES INCORPORATED
CALCULATION COVER SHEET

FILE NO. 3-7-17(1.2C)

CLIENT TUGCO OFS. NO. 3317.901

PROJECT CPSES DEPT. NO. 460

SUBJECT CABLE TRAY HANGERS DIMENSIONAL TOLERANCE EFFECTS IN DESIGN VERIFICATION

CALCULATION NUMBER 001 (VOLUME I-BOOK 16) NUMBER OF SHEETS 62

PROBLEM:

Determine whether tolerances given in the QC measurement of as-built attributes should be combined in cumulative fashion during design verification.

CONTAINS ASSUMPTIONS WHICH REQUIRE CONFIRMATION ☐ YES ☒ NO

ASSUMPTIONS CONFIRMED ON _____ BY _____

NO.	SE. NOS.	NAME CALCULATION BY	DATE	NAME CHECKED BY	DATE	OPTIONAL NAME REVIEWED OR APPROVED BY	DATE
0	1-61	R.C. IOTTI	8/26/86	T.W. Simms	9/5/86		

PRELIMINARY FINAL ✓ SUPERSEDES CALC. NO. N/A

EBASCO SERVICES INCORPORATED

BY R.C. Iotti DATE 7/14/86 SHEET 1 OF 6

CHKD. BY [illegible] DATE 9/5/86 OFS NO. 3317.901 DEPT. NO. 460

CLIENT TUSCO

PROJECT CPSES

SUBJECT Cable Tray Tolerance Effects in Design Verification

A. Introduction

1. All Unit 1 CTH's have been walked down and as-built by engineering. The precision to which dimensions were recorded is typically to the nearest ½ inch except for thickness for which a 1/32 of an inch was used. All Unit 1 CTH's will be inspected by QC to verify, amongst other things, the accuracy of the as-built information. During the QC inspection an attribute (dimension) will be satisfactory if it meets the originally measured dimension within a tolerance which varies, depending on attributes. The tolerances applied by QC during inspection are stated in QI-QP-11.10-9 Rev 5.

Since a particular attribute dimension will thus be known with confidence only within its tolerance, it is necessary to examine whether design verification of the hangers should apply the tolerances to each attribute or whether that should be done cumulatively (i.e. effect of several tolerances at once).

2. To determine whether the information from the as-built process and that cumulative effects of tolerances needs to be taken into account or not, it is necessary to know the "inherent" accuracy of the as-built process, regardless of QC inspection. This is the same as determining with high confidence the maximum number of attributes per individual hanger that QC would accept only because they fall within the prescribed tolerance, as opposed to the remainder which QC would accept because their measurement exactly duplicates the as-built measurement within the precision of measurement.

3. As part of the Unit 1 CTH program, about 14 percent (610 Lainers) have been independently re-as-built by an engineering surveillance group which remeasured each attribute of the CTH and noted any difference from the original measurement which met or exceeded 1/16 of an inch, even though the dimension may have been well within tolerance. This surveillance is used to provide the basis for this statistical analysis. (See I. Surveillance Data Sheets)

4. In the statistical analysis, any dimension which surveillance found in perfect agreement with the as-built dimension is considered to represent exactly the dimension in the field.

Perfect agreement means agreement within the precision of measurement which is to the nearest 1/16 of an inch (1/32 for inches) except for the following:

a) end distances and gage distances to bolt hole centerlines of base members and clamps are said to be in perfect agreement if they are within 3/16 inch because the distance is measured from bolt centers (rather than hole centers) (see memo EB-RCI-0171)

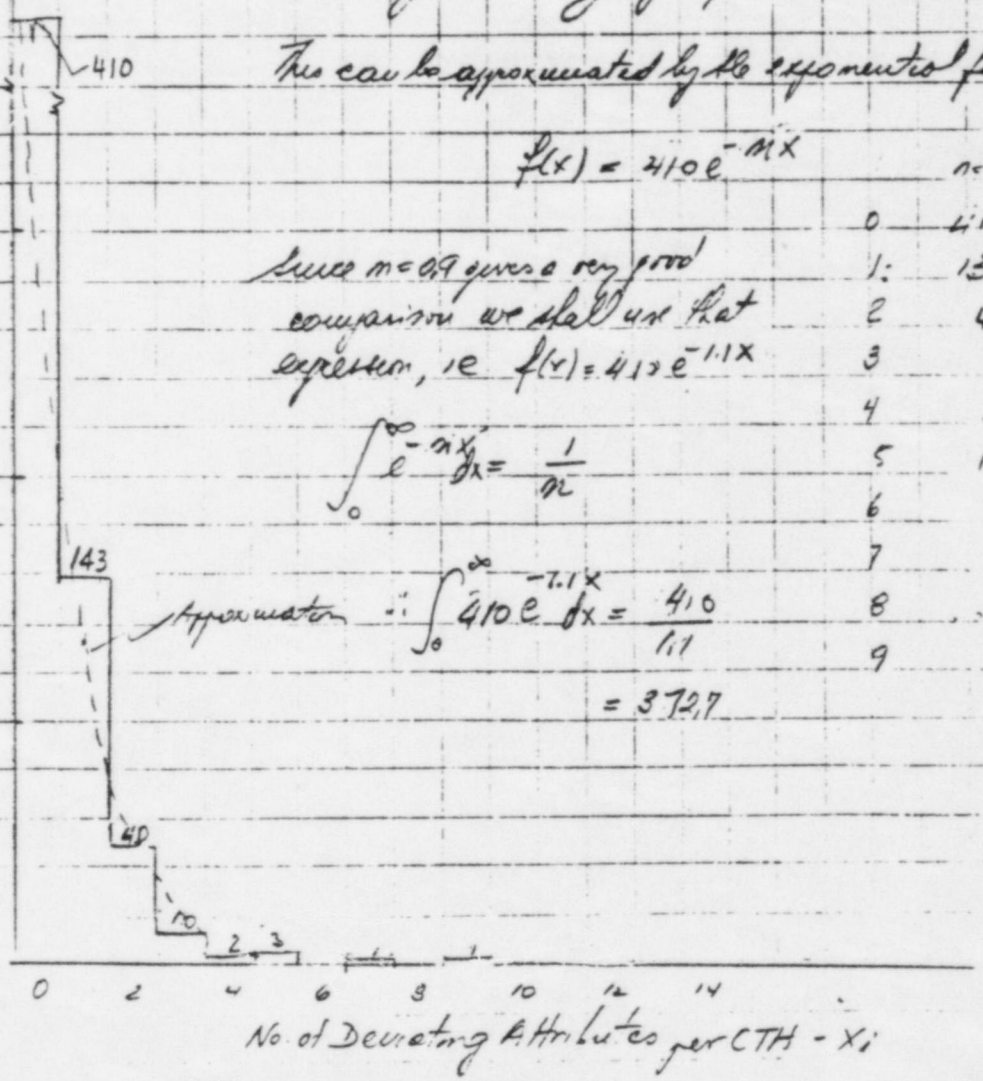
b) certain noted differences in dimensions of member limits and tray locations are so small as being absolutely inconsequential for design and analysis, and hence have been counted as not being a discrepancy since their effect, cumulative or not, would be negligible. These differences in dimensions are

(i) 1/8 of an inch for member lengths up to 6 inches, for workpoint and/or tray locations.
(ii) 5/16 for dimensions from 6 inches to 5 feet
(iii) 1/2 inch for members longer than 5 feet
(iv) 1/8 of an inch in the hole to hole or flange spacing and anchor projections

5. Any discrepancies in the tabulated surveillance results which exceed the tolerances provided to QC are assumed to be caught by QC and corrected, resulting in perfect agreement with actual dimensions

B. Results

The results of the surveillance are attached and they can be summarized in the following graph.



The can be approximated by the exponential function:

$$f(x) = 410e^{-nx}$$

Since n=0.9 gives a very good comparison we shall use the flat expression, ie $f(x) = 410e^{-1.1x}$

$$\int_0^\infty e^{-nx}\,dx = \frac{1}{n}$$

Approximation $\therefore \int_0^\infty 410e^{-1.1x}\,dx = \frac{410}{1.1}$

$= 372.7$

	n=1.1	n=1
0	410	410
1	136	150
2	45	55
3	15	20
4	5.0	too high
5	1.7	
6		
7		etc
8		
9		$\therefore n \approx 1.1$

We can now normalize the curve by using the integral under it, hence

$f = 1.10 e^{-1.10x}$ is the distribution curve (integrated to infinity it yields 1.0)

We are now interested in determining the value of the abscissa at which point the area under the curve totals over 90 percent of the area, i.e.

$$\int_0^x 1.1\, e^{-1.1x}\, dx = 0.90$$

$$\int e^{ax} dx = \frac{1}{a} e^{ax} \Rightarrow 1.1 \left[-\frac{1}{1.1} e^{-1.1x} \right]_0^x = 0.90$$

$$\therefore \quad 1 - e^{-1.1x} = 0.90 \qquad e^{-1.1x} = 0.10$$

$$1.1x = 2.302 \qquad x = 2.09$$ ← this is a result of the distribution assumed

∴ No more than 2 tolerances should be considered at the 90 percent level. However this represents the sample.

Another way is to examine this from the binomial distribution standpoint. Using that approach; with 90 percent confidence we have

$$1 - cl = e^{-n\theta} \sum_{x=1}^{c} \frac{(n\theta)^x}{x!}$$

where cl is the confidence level, ie 0.9, θ is the fraction of the population above a predetermined limit, and c is the number of instances in which the sample produced results above the predetermined

level. If the number of tolerances to be combined is set at less than 2.0, then $\bar{c} = 57$, i.e. all of the instances in the sample above 1 tolerance.

$$0.1 = e^{-610(\theta)}\left[1 + \ldots \frac{61^{x}}{x'}\right] \quad \text{where } \theta = 0.1$$

$x = 51$ and not 57

Thus even at the population at the 90-90 level the tolerances to be combined are no more than 2.0. This is also true at the 95-95 level (see p. 6)

We can now examine those instances where 2 tolerances would have in principle to be combined. In 15 out of 40 cases the measurement was off only 1/16", and in another 9 out of 40 cases, the two tolerances acted for the same attribute, i.e. with point on nib eight (8) out of the 57 instances in which more than 1 tolerance came into play in the sample, the measurements approaching the stipulated tolerance appear. Hence on that basis there is ample confidence that tolerances at their extreme limits should not be applied in cumulative fashion, i.e. at the 95 confidence level

$$0.05 = e^{-610(\theta)}\left[1 + \ldots \frac{610\theta^{8}}{8!}\right] \qquad \text{Let } \theta = .2$$

$$2.83 \times 10^{4} \times 5 \times 10^{-6} = .141$$

θ is too low

Try $\theta = 0.03$ $\quad \frac{1}{1.13 \times 10^{-8}} e^{-18.3}\left[1 - \ldots \frac{18.3^{8}}{8!}\right] \doteq \frac{1}{5.23 \times 10^{5}} = 0.006$ $\quad \therefore \theta$ is too high

$\therefore \theta \doteq 2.5\%$

Is more than 2.5% of the population would have more than two tolerance at or near their extreme values requiring combination in cumulative fashion.

BY R. C. Jotti DATE 8/26/86 SHEET 6 OF 6

CHKD. BY [illegible] DATE 9/5/86 OFS NO. 3317.901 DEPT. NO. 460

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PROJECT CASES

SUBJECT Cable Tray Tolerance Effects on Design Verification

As a result of this analysis we can conclude the following. Since only 17 instances of more than 2 tolerances together have occurred, we have the following confidence that no more than 5 percent of such instances would arise.

$$1 - C.L = \underbrace{e^{-610(.05)}}_{5.67\times10^{-14}} \underbrace{\left[1 + 30.5 + \cdots + \frac{30.5^{17}}{17!}\right]}_{10.1\times10^{10}} = 5.74\times10^{-3}$$

$\therefore$ Confidence Level = 99.5%

a) No more than two tolerances should be ordinarily combined, if at all.

b) Since the instances at which more than one tolerance at its extreme (or near its extreme) value would be combined are rare, it is best to leave combination of tolerances to the individual engineer's judgement.

c) Although not addressed in the preceding, the instances of tolerances at their extreme values, even for single tolerances are rare (see raw data). Thus the use of tolerance should be left to the engineer.

581/8-81

EBASCO SERVICES INCORPORATED

NEW YORK

BY _____ DATE _____ SHEET ____ OF _____

CHKD. BY _____ DATE _____ OFS NO. _____ DEPT. NO. _____

CLIENT TUGCO

PROJECT CPSES

SUBJECT CABLE TRAY TOLERANCE EFFECTS IN DESIGN VERIFICATION

C. SURVEILLANCE DATA SHEETS

FORM 881 REV 7-71

NOTE:
Pgs 1 of 54 THRU 54 of 54
CONTAIN 612 CTH's.
⇒

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM >5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
CTH-1-5797								(1) -1/8	(1) +1/8				
CTH-1-5899	(1) -1/16 (1)												(1) -1/16
CTH-1-5875								(2) +1/8 C -1/8 C					
CTH-1-149					(1) +1/8				(1) -3/16 C				(1) -1/8
CTH-1-6546	(2) -3/16 -3/16								(1) -3/16 C				
CTH-1-6621	(1) +1/8							(1) -1/16 C					
CTH-1-5802	(1) -1/8							(2) +1/8 +1/8 C					(1) -1/8
CTH-1-1830	(1) -1/4							(1) -1/8	(1) +1/8 C				(1) +3/16
CTH-1-1828						(1) +3/16							
CTH-1-5728	(1) -1/8 (1)				(1) -3/16			(1) -1/8 C					
CTH-1-2584		(1) -3/16											(1) +1/8
CTH-1-2589													(1) +1/8

PREPARED By J. BECK CHECKED BY JOHN M. BURCHDEFER 9/9/86

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
CTH-1-2572		(1) +1/8											
CTH-1-480									(2) +3/16 C +1/8 C				(1) +1/8
CTH-1-1492						(1) -1/4							
CTH-1-2362						(1) +3/8			(1) -3/8 C -1/8	(1) -7/16			
CTH-1-1531								(1) -3/16	(2) +1/8 -1/8 C				
CTH-1-6659								(4) +1/4 C +3/8 C +1/8 C +1/8 C					
CTH-1-5306	(3) -1/16 -1/8 (1) -1/8				(4) -1/8 +1/8 +1/8 +1/16			(2) -1/8 +1/8	(2) -1/16 C +1/8 C				(1) -1/4
CTH-1-6772	(5) -1/4 +1/8 +1/8 +1/4 +1/4 +2/16 (3)				(4) +1/8 -1/8 -1/8 -1/8	(1) +1/4		(1) -1/8					
CTH-1-481	(4) -3/16 +1/4 +5/16 (4) -1/8									(1) +3/8	(1) -1/8		(2) -3/16 +1/8
CTH-1-6477								(2) -1/8 -1/8	(4) +1/8 -1/8 -1/8 C C +1/8 C				
CTH-1-6601	(2) +1/4 -1/8 (1)					(1) +1/8 C	(1) +1/8						
CTH-1-1105	(1) +1/8 (1)												

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CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
CTH-1-2632	(3) $-\frac{1}{8}$ $-\frac{3}{16}$ ① $+\frac{3}{16}$				(2) $-\frac{3}{16}$ $-\frac{1}{8}$			(1) $-\frac{1}{8}$ C					
CTH-1- 3014					(1) $+\frac{1}{8}$								
CTH-1- 2413	(4) $+\frac{3}{16}$ $+\frac{1}{8}$ ② $-\frac{1}{16}$ $-\frac{3}{16}$												
CTH-1- 5196							(2) $-\frac{1}{8}$ C $+\frac{1}{8}$ C						
CTH-1- 6116	(3) $-\frac{1}{8}$ $-\frac{1}{8}$ ① $-\frac{1}{8}$	(1) $-\frac{5}{16}$		(1) $-\frac{1}{8}$				(3) $+\frac{1}{8}$ C $-\frac{1}{8}$ C $-\frac{3}{16}$ C	(1) $-\frac{1}{8}$ C				(2) $+\frac{3}{16}$ $-\frac{1}{8}$
CTH-1- 1674	(1) $-\frac{3}{8}$ ①												
CTH-1- 769	(3) $-\frac{1}{8}$ $-\frac{1}{8}$ ① $+\frac{3}{16}$												
CTH-1- 6157									(1) $+\frac{1}{8}$				
CTH-1- 143	(1) $-\frac{3}{8}$												
CTH-1- 5391		(2) $+\frac{1}{8}$ $+\frac{3}{16}$			(1) $-\frac{1}{4}$								
CTH-1- 6128	(3) $-\frac{1}{8}$ $+\frac{1}{8}$ $+\frac{3}{16}$	(1) $-\frac{3}{16}$					(1) $+\frac{1}{8}$ C			(1) $-\frac{1}{8}$			(2) $+\frac{1}{8}$ $+\frac{1}{16}$
CTH-1- 1525		(1) +2											

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CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
CTH-1-4996						(2) +5/16 +1/4							
CTH-1-5008	(2) -3/16 -1/8												
CTH-1-2974								(1) +3/16					(1) -3/8
CTH-1-2461	(6) -1/8 +1/8 (5) +3/16 +1/8				(1) -1/8								
CTH-1-6193					(1) +1/8								
CTH-1-475									(1) +1/8 C				
CTH-1-3961	(2) -1/8 +1/8 (1)				(1) -1/4								
CTH-1-5215	(1) +1/4	(2) +1/8 +1/8				(1) +3/16	(1) +1/8	(2) +1/8 +1/8					(1) +5/16
CTH-1-5553	(2) -1/8 -1/16												(1) +1/8
CTH-1-3616						(1) +1/8		(1) +1/8					
CTH-1-447	(2) -1/4 -3/8								(1) -3/16				
CTH-1-6652			(1) +3/16					(1) +1/16			(1) -1/2		

PREPARED By – J. BECK CHECKED BY JOHN M. BURGHOFFER 9/9/82

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
CTH-1-6162					(2) -1/4 +1/4								
CTH-1-998	(2) +1/8 -3/16 (2)												(1) +3/16
CTH-1-1243													
CTH-1-12586	(1) -1/16 (1)				(1) +1/4								(1) +1/8
CTH-1-6895	(1) -3/16				(1) +1/16		(1), -1/16 C	(1) -1/8 C					
CTH-1-1514									(1) -1/8 C				
CTH-1-2719								(1) +1/8					
CTH-1-12660													(1) +3/16
CTH-1-6036						(1) +1/8							
CTH-1-6443													
CTH-1-6362													
CTH-1-776						(1) +1/8		(1) -1/8					

PREPARED BY R. RADELICH

CHECKED BY JOHN M. BORGHOFFER 9/9/96

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
CTH-1-1263					(1) +1/16								
CTH-1-1312	(1) +3/16	(1) +1/8			(2) +1/16 +1/16				(1) -1/8 C				
CTH-1-4976													
CTH-1-6150													
CTH-1-1314	(1) +1/16								(3) C +1/16 C +1/16 +1/16				
CTH-1-6040					(1) -1/4		(1) +1/8 C						
CTH-1-1656									(1) -1/16 C				
CTH-1-6039	(1) +3/16 (2) -1/8				(3) -1/2 +3/16 -3/8		(1) +3/16 C	(1) +1/8					
CTH-1-1014									(1) -1/8				(2) -1/8 -1/8
CTH-1-6542													
CTH-1-4617	(1) +1/16								(2) +1/16 -1/16				(1) -1/16
CTH-1-6431													

PREPARED BY R RADELICH CHECKED BY JOHN M. BURCHOFFER 9/9/86

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
CTH-1-5955	(3) +1/8												
CTH-1-2775													
CTH-1-1461													
CTH-1-1117													
CTH-1-2654	(2) -1/4 +1/8												
GTH-1-600	NOT SURVEYED						(4) +1/4 +1/8 -1/8 +1/8						
CTH-1-5845	(4) -1/16												
CTH-1-2262													
CTH-1-2101							(2) -1/8						
CTH-1-2124	(2) -1/8 (1) -1/8						(1) -1/8						
CTH-1-2031													
CTH-1-2074							(1) -1/8	(3) -1/8 E	(1) -1/8			(1) -1/8	

PREPARED BY: R. RADELKM

CHECKED BY JOHN H. BURGHOFFER 9/9/82

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
CTH-1-12661								(1) +1/8					
CTH-1-6411	(1) +1/8												
CTH-1-6165					(1) +1/8				(1) +1/8 C				(1) +1/8
CTH-1-6127	(1) −1/8							(1) +1/8					
CTH-1-12476	(2) −1/16 +1/16 (2)							(1) +3/8	(2) +1/16 −1/16				(1) +1/8
CTH-1-289									(1) +1/16				(1) +1/16
CTH-1-13086	(2) −1/8 +1/16							(1) −1/16 C					
CTH-1-6483		(1) −1/8				(1) +3/16			(3) +1/16 C +1/16 C +1/16 C				(2) +1/16 +1/8
CTH-1-6316								(1) +1/8	(4) −1/16 C −1/16 C −1/16 C				(1) +1/8
CTH-1-1113								(1) +1/8	(1) +1/8				
CTH-1-6668													
CTH-1-5801					(4) −3/16 +1/16 −1/8 +1/4				(2) +1/8 C +1/8 C				

PREPARED BY R RADCLIFF CHECKED BY JOHN M. BURGHOFFER 9/9/86

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CTH-1-6614	(1) -1/16							(3) +1/8 +1/8 c -1/8 c					
CTH-1-1123	(1) +3/16 (1)												
CTH-1-485					(1) -1/4								(1) +1/8
CTH-1-486								(1) +1/8					
CTH-1-1692	(3) -1/16 +3/16 (2) -1/8							(1) -1/4					(1) +1/8
CTH-1-1846					(1) -11/16			(1) -1/8					
CTH-1-148	(2) +1/8 -5/16 (1)				(1) +1/16								(1) -1/8
CTH-1-201	(1) +1/8	(2) +1/8 +1/8	(1) +1/8										
CTH-1-1999	(1) -1/4												
CTH-1-408	(1) -5/16												
CTH-1-1004								(1) +7/16	(1) +1/8 c				
CTH-1-6381	(1) +3/16								(2) +1/8 c +1/16				

PREPARED BY R. RADELICH

CHECKED BY JOHN M. BURGHOFFER 9/9/86

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
CTH-1-6322						(1) +1/8			(2) c -1/16 c -3/16				(1) +1/8
CTH-1-6167 (B)	(11) +1/2 -1/8 +3/16 +1/16 +1/4 +1/16 +1/16 +1/16 +1/8 +1/16				(2) +1/8 +3/16	(1) +1/8	(1) -1/16						(2) +1/8 -1/8
CTH-1-6006								(4) +1/16 +1/16 +1/8 -1/16					
CTH-1-3630	(2) -1/16 (1) -1/4				(1) -1/8			(3) +1/8 +1/8 c +1/8					(1) -1/8
CTH-1-1678	(3) -1/16 +1/8 -1/8												
CTH-1-5654	(1) -5/16				(1) +3/4	(1) -7/8		(1) +1/8	(2) c -1/8 c +1/8				
CTH-1-12578	(1) -3/8							(1) -3/16	(3) c -3/16 c -1/8 c -1/8				
CTH-1-6118					(1) -3/16								(1) +3/16
CTH-1-2681	NOT SURVEYED												
CTH-1-6110	(5) -1/8 +1/16 (4) -1/8 -3/8 -1/8	(1) +1/8			(1) -1/8								
CTH-1-5655													
CTH-1-1229					(1) -1/8		(1) -1/8 c	(2) +1/8 -1/16 c	(1) -1/8				

PREPARED BY R RADELICH CHECKED BY JOHN M. BURGHOFFER 9/9/82

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
CTH-1-6614	(1) -1/16							(3) +1/8 +1/8 C -1/8 C					
CTH-1-1123	(1) +3/16 (1)												
CTH-1-485					(1) -1/4								(1) +1/8
CTH-1-486								(1) +1/8					
CTH-1-1692	(3) -1/16 (2) +3/16 -1/8							(1) -1/4					(1) +1/8
CTH-1-1846					(1) -11/16			(1) -1/8					
CTH-1-148	(2) +1/8 -5/16 (1)				(1) +1/16								(1) -1/8
CTH-1-201	(1) +1/8	(2) +1/8 +1/8	(1) +1/8										
CTH-1-1999	(1) -1/4												
CTH-1-408	(1) -5/16												
CTH-1-1004								(1) +1/16	(1) +1/8 C				
CTH-1-6381	(1) +3/16								(2) +1/8 C +1/16				

PREPARED BY R. RADLICH

CHECKED BY JOHN M. BURGHOFFER 9/9/86

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
CTH-1-7073	(1) +1/8 (1)												
CTH-1-3985	(1) +1/8												
CTH-1-7072													
CTH-1-5942	(1) +1/4				(1) -1/8								
CTH-1-5981													
CTH-1-5732	(1) +5/16							(1) -1/16					
CTH-1-905	NOT SURVEYED												
CTH-1-1987	(1) +1/8 (1)							(2) +3/16 +3/16		(1) +1/4			
CTH-1-6523	(3) +1/8 +1/8 (3) +3/16				(1) +1/16		(1) +1/8 C	(1) +1/16 C					
CTH-1-6633	(2) +1/8 (1) +1/16					(2) +1/8 +1/16	(3) -3/16 C -1/8 C -1/8 C	(1) +3/16					
CTH-1-6054	(2) -1/16 +1/16 (1)					(1) -1/8			(3) -1/8 C -1/8 C -1/8 C				(1) -1/8
CTH-1-5533	(1) +1/16 (1)			(1) +1/4				(1) -1/8					

PREPARED BY R RADELICH CHECKED BY JOHN M. BURGHOFFER 9/9/86

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
CTH-1-1346	(1) +1/16								(1) +1/16				(2) +1/16 +1/8
CTH-1-4946													
CTH-1-5872													
CTH-1-1351	(2) +1/4 +1/4												
CTH-1-3977													
CTH-1-638	(1) -1/8				(3) +1/8 +1/8 +1/8			(1) +1/16	(1) +1/8				
CTH-1-256	(1) +1/16							(1) +1/16	(2) +1/16 C +1/8 C				
CTH-1-269	(2) -1/8 +1/16 (1)							(1) +1/16 C					
CTH-1-2363	(1) +1/8 (1)												
CTH-1-3975													
CTH-1-3976	(1) -1/8												
CTH-1-7065													

PREPARED BY R. RADELICH CHECKED BY JOHN M. BURGHOFFER 9/9/96

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
CTH-1-2730									(1) +1/8				(1) +1/8
CTH-1-5078						(1) +3/16							
CTH-1-1350	(1) +1/16						(1) +1/16 C						(2) +1/8 +1/16
CTH-1-398													
CTH-1-2474													
CTH-1-5798	(2) +1/8 (2) -1/8			(1) +1/4	(2) +3/16 +7/16				(1) +1/8 C				(1) +1/8
CTH-1-5112	(1) +5/16						(3) -1/16 C +1/8 C -1/8 C						(1) -1/8
CTH-1-1736													(1) -1/4
CTH-1-1858													
CTH-1-1124													(2) -1/4 +1/8
CTH-1-5752													
CTH-1-5154	(3) +1/8 (2) -3/16 +1/16						(1) +1/8 C		(1) -1/16 C				

PREPARED BY: R. RADELICH

CHECKED BY JOHN M. BURGHOFFER 9/9/86

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
CTH-1-345								(1) +1/8					(1) +1/8
CTH-1-176	(1) +1/8												
CTH-1-1178													
CTH-1-1162								(1) +1/8					
CTH-1-175													
CTH-1-1667							(1) -1/8			(1) +3/16			
CTH-1-2904	(4) +1/8, +1/8, +7/16, +7/16					(1) +1/8		(1) +1/8					
CTH-1-354	(1) +1/8									(1) +1/8			(1) +1/8
CTH-1-2916													
CTH-1-2915													
CTH-1-7121	(1) +1/8	(1) ± 1/2		(1) -1/8									
CTH-1-6424							(1) -1/8 C		(2) -1/16 -1/8 C				(2) +1/8 -1/8

PREPARED BY: R. RADELICH CHECKED BY JOHN M BURCHFIELD 9/7/86

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
CTH-1-7005	(1) +1/4 (1)				(1) -1/8		(2) -1/8 c -1/8 c		(1) +1/8 c				
CTH-1-7034						(1) -1/8		(2) +1/16 +1/4					
CTH-1-912													
CTH-1-5840	(1) +1/8 (1)					(1) +1/8		(1) -1/8 c					
CTH-1-2867													
CTH-1-1137													
CTH-1-2961													
CTH-1-1266													
CTH-1-5138		(1) +1/8											(1) +1/8
CTH-1-5119													
CTH-1-2689		(1) -3/16											
CTH-1-1265	(1) +3/16												

PREPARED BY R. RADELICH

CHECKED BY JOHN M. BURGHOFFER 9/9/86

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
CTH-1-12431	(1) $-\frac{1}{16}, +\frac{1}{8}$ $-\frac{1}{16}, +\frac{1}{4}$ (3)									(1) $-\frac{1}{2}$			(2) $-\frac{1}{8}$ $-\frac{1}{4}$
CTH-1-62													
CTH-1-4747	(2) $-\frac{3}{16}$ $-\frac{3}{16}$ (2)								(1) $-\frac{1}{8}$				
CTH-1-7024	(2) $+\frac{1}{8}$ (1) $-\frac{1}{16}$				(1) $-\frac{3}{16}$	(1) $+\frac{3}{16}$	(2) $+\frac{1}{8}$ C $+\frac{1}{16}$ C			(1) $+\frac{1}{2}$			(2) $-\frac{1}{8}$ $+\frac{1}{16}$
CTH-1-7106	(2) $+\frac{1}{8}$ $+\frac{1}{16}$							(1) $+\frac{1}{16}$					
CTH-1-5829							(1) $+\frac{1}{4}$ C						
CTH-1-5874													
CTH-1-6504					(1) $-\frac{1}{4}$								
CTH-1-12364	(2) $-\frac{1}{8}$ $-\frac{1}{16}$ (2)												
CTH-1-12372	(3) $-\frac{3}{8}$ $+\frac{1}{16}$ (3) $-\frac{1}{16}$							(2) $+\frac{1}{16}$	(2) $+\frac{1}{16}$ $-\frac{1}{8}$ C	(3) $-\frac{1}{2}$ $-\frac{3}{16}$ $+\frac{1}{8}$			(1) $-\frac{1}{16}$
CTH-1-232	(3) $+\frac{1}{8}$ $+\frac{1}{16}$ $-\frac{3}{16}$								(1) $-\frac{1}{16}$ C				
CTH-1-2907							(1) $+\frac{1}{8}$						

PREPARED BY R. RADELICH

CHECKED BY JOHN H BORGHOFFER 9/15/82

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
CTH-1-2623													
CTH-1-6434								(1) -1/4					
CTH-1-5844					(1) +1/4								
CTH-1-5836	(1) -1/8												
CTH-1-5333	(1) +1/16												
CTH-1-2283													
CTH-1-5334	(2) +1/4 +3/8												
CTH-1-4965									(1) -1/8				
CTH-1-6085													
CTH-1-6664								(2) +1/4 +3/8					
CTH-1-6064	(5) -3/16 +1/16, +1/8 +1/4, +3/8									(1) -1/4			
CTH-1-5334													

PREPARED BY: E. ROJAS CHECKED BY JOHN M. BURGHOFFER 9/9/86

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
CTH-1-5922	(1) +1/4 (1)				(1) -3/16								
CTH-1-2601	(3) -1/8 -3/8 (2) -3/8				(1) -1/4			(1) +1/4					
CTH-1-2480								(1) -1/8	(1) +1/4				
CTH-1-3957													
CTH-1-2609													
CTH-1-13137													
CTH-1-2637	(1) ±1/8							(1) -1/8		(1) -1/16			
CTH-1-1565									(1) -1/8				(1) ±1/8
CTH-1-2565	(2) -1/4 -1/8												(1) ±1/8
CTH-1-2527	(1) -1/8 (1)												
CTH-1-2622	(2) -3/16 -1/4				(2) -3/16 -1/8								
CTH-1-5338								(1) +3/16					

PREPARED BY: E. ROJAS CHECKED BY JOHN M. BURCHDEFER 9/9/96

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
CTH - 1-1815	(4) +1/8 -3/8 -3/16 (2) -3/16					(1) +3/4		(1) +7/8	(1) -1/8				(2) +1/4 +1/8
CTH - 1-12632								(2) +1/8 +1/8					
CTH - 1-2668	(1) +3/4												
CTH - 1-5791													
CTH - 1-6092								(1) +1/8					
CTH - 1-5735	(1) -5/8 (1)												
CTH - 1-6084													
CTH - 1-5756											(1) +1/2		
CTH - 1-3336													
CTH - 1-5751					(1) -1/8								
CTH - 1-5743	(5) -7/8 -1/8 -1/8 (3) -1/4 +1/8	(2) -1/8 +3/8	(1) +1/4					(1) -1/8					
CTH - 1-6086													

PREPARED BY: E. ROJAS CHECKED BY JOHN M. BURGHOFFER 9/9/86

CTH NO.	DIMENSION FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
CTH-1-5040						(2) +3/4							
CTH-1-198								(1) +1/4					(1) +1/4
CTH-1-6773													
CTH-1-189									(1) +1/4				
CTH-1-2082													
CTH-1-568								(1) +1/4					(1) -1/4
CTH-1-1926	(1) -1/8						(1) +1/4						(1) +1/4
CTH-1-1923													
CTH-1-6792								(1) -1/4	(1) +1/4				
CTH-1-13014													
CTH-1-6856								(1) +1/4 C					(2) +1/4 +1/4
CTH-1-13052	(1) +1/8							(1) -1/4 C					(1) -1/16

PREPARED BY: E ROJAS

CHECKED BY JOHN M. BURGHOFFER 9/7/86

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
CTH - 1 - 6275	(1) +1/8 ①												
CTH - 1 - 1615													(1) +1/8
CTH - 1 - 6372	(1) +1/8 ①						(1) +1/8 C						
CTH - 1 - 4725	(1) - 1/8												
CTH - 1 - 2756								(1) - 1/8					
CTH - 1 - 6949								(2) +1/8 C -1/8					(1) -1/8
CTH - 1 - 12490								(1) - 3/16	(1) +1/8				
CTH - 1 - 1908		(3) -1/8 -1/8 -1/8							(1) -1/8				
CTH - 1 - 5619								(1) +1/8					
CTH - 1 - 2709													(1) +1/8
CTH - 1 - 5912	(1) -1/8 ①				(1) +1/8		(2) -1/16 C -1/8 C		(1) +1/16 C	(2) +1/8 -1/8			(1) +1/8
CTH - 1 - 5934	(4) +1/8 -1/8 +1/16 +3/16												

PREPARED BY: E. ROJAS CHECKED BY JOHN M. BURCHOFFER 9/9/96

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
CTH-1-5891	(3) $-\frac{1}{8}$ $+\frac{1}{16}$ $+\frac{1}{16}$				(1) $+\frac{1}{8}$			(2) $+\frac{1}{16}$ $+\frac{1}{8}$		(1) $-\frac{5}{8}$			
CTH-1-5796	(1) $+\frac{1}{8}$												
CTH-1-2371	(6) $+\frac{1}{8}$ $+\frac{3}{16}$ $-\frac{1}{16}$ $-\frac{1}{16}$ (2) $-\frac{3}{16}$ $-\frac{1}{16}$	(2) $-\frac{1}{16}$ $-\frac{1}{16}$	(1) $-\frac{1}{8}$	(1) $-\frac{1}{8}$	(1) $-\frac{1}{16}$				(1) $-\frac{1}{16}$ C		(1) $-\frac{1}{4}$		(1) $-\frac{1}{8}$
CTH-1-4990					(1) $-\frac{1}{4}$			(1) $+\frac{1}{4}$	(1) $-\frac{1}{4}$ C				
CTH-1-3114	(2) $-\frac{1}{4}$ $-\frac{1}{4}$ (2)												
CTH-1-6003	(3) $-\frac{1}{16}$ $-\frac{1}{16}$ (1) $-\frac{1}{16}$						(1) $-\frac{1}{4}$ C	(2) $-\frac{1}{4}$ $-\frac{1}{4}$	(2) $+\frac{1}{4}$ C $-\frac{1}{4}$ C				(1) $+\frac{1}{4}$
CTH-1-1938													
CTH-1-6790													(1) $-\frac{1}{8}$
CTH-1-461	(1) $+\frac{1}{8}$ (1)						(1) $-\frac{7}{16}$ C						(1) $-\frac{1}{4}$
CTH-1-464	(1) $+\frac{5}{16}$						(1) $-\frac{3}{8}$ C						(1) $+\frac{1}{4}$
CTH-1-476	(1) $-\frac{1}{8}$ (1)				(3) $-\frac{1}{8}$ $+\frac{1}{8}$ $+\frac{1}{16}$								
CTH-1-4730													

PREPARED BY: E. ROSAS CHECKED BY JOHN M. BURGHOFFER 9/1/86

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
4929								(1) $+\frac{1}{8}$					
5147													
4493													
726													
4444	(1) $-\frac{1}{8}$												
4313	(1) $+\frac{1}{8}$ (1)												
5637													
3944		(1) $+\frac{5}{16}$											
5231	(1) $+\frac{1}{8}$												(1) $+\frac{3}{16}$
3904													
1292													
2766	(3) $+\frac{1}{8}$ $+\frac{1}{8}$ $-\frac{1}{8}$			(1) $-\frac{1}{8}$				(1) $+\frac{1}{8}$					

PREPARED BY P WINKLER CHECKED BY JOHN M. BURGHOFFER 9/9/86

THINK NO
SEP FOR SCREW ON
GALV TRAYS -

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
770													
282													
1587													
4723													(1) +1/8
12497	(1) +1/8												
5601													
5547													
1560	(1) +1/8 (1)				(1) +1/8								
5146										(1) -1/4			
1586													
3935													
4704								(1) -3/16 +1/8					

PREPARED BY P WINKLER CHECKED BY JOHN M. BURGHOFFER 9/9/86

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
5920	(1) +1/4 ①				(1) -1/4			(1) +1/8					
7028								(2) -1/8 -1/16 C +1/8		(1) +1/8			(1) -1/8
470								(1) -1/8 C					
520													
6854					(1) -3/16								
12685	(3) +1/16 -1/16 -5/16 -1/8	(1) -1/8				(2) +9/16 -1/16							(1) +1/8
6457													
1871	(1) -1/4								(1) -1/8	(1) +1/8			
5948								(1) -1/8					
1489									(1) +1/8				
1590													(1) +1/8
1577													

PREPARED BY P. WINKLER CHECKED BY JOHN H. BURCHHOFFER 9/9/76

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
6536	(3) $+\frac{3}{16}+\frac{7}{8}$ (3) $-\frac{1}{8}$						(1) $+\frac{1}{8}$ C						
5924	(1) $+\frac{3}{8}$								(1) $-\frac{1}{16}$				
5324													
1015	(3) $+\frac{1}{8}+\frac{1}{4}$ (2) $+\frac{1}{8}$					(1) $+\frac{1}{8}$		(2) $+\frac{1}{8}$ C $+\frac{1}{8}$ C	(3) $+\frac{1}{8}$ C $+\frac{1}{8}$ C $+\frac{1}{8}$ C				
6171	(3) $-\frac{1}{8}$ (2) $+\frac{1}{8}-\frac{1}{8}$				(2) $+\frac{1}{8}$ $-\frac{1}{16}$				(2) $-\frac{1}{8}$ C $\frac{1}{8}$ C				(1) $+\frac{1}{16}$
7043	(2) $-\frac{1}{8}-\frac{1}{8}$ (2)					(1) $-\frac{1}{8}$		(1) $+\frac{1}{8}$ C					
5523													(1) $+\frac{1}{16}$
7041									(1) $+\frac{1}{8}$ C	(1) $+\frac{1}{8}$			
7086	(1) $+\frac{1}{8}$				(1) $+\frac{1}{8}$				(1) $+\frac{1}{8}$ C				-
6580	(1) $-\frac{1}{8}$ (1)							(1) $-\frac{1}{8}$ C					(2) $\frac{1}{8}$ $\frac{3}{16}$
6015													
6019													

PREPARED BY P. WINKLER CHECKED BY JOHN M. BURGHOFFER 9/9/86

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM >5'-0 TO ≤ 10'-0	DIMENSIONS >10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
5720	(2) -1/4 -1/8								(1) -1/8 C				
5472	(1) -1/16 (1)												
6061	(3) +1/8 -1/4 (1) -1/8				(1) +1/8			(2) -1/8 +1/8			(2) -1/4 -3/16		(2) +1/8 +1/8
6046	(1) +1/16 (1)					(2) +1/8	(2) -1/8 -1/8						
5959					(1) +1/8								
5945	(2) +3/8 +1/4 (1)							(2) -1/8 -1/8 C	(2) -1/8 +1/8 C				
5724	(1) -1/2 (1)												
5819	(3) +11/16 +1/8 (1) +3/8							(2) +1/8 C -1/8 +1/8 C +1/8 C					
5492	(1) +1/16					(1) -1/8							(1) +1/8
5453									(1) -1/8 C				
5741	(3) +3/8 -7/8 +1 1/4		(1) -1/8		(1) -1/16			(1) -1/16					
6499	(1) +1/8					(1) -1/8	(1) 1/8			(1) +1/8			(1) +1/2

PREPARED BY P. WINKLER CHECKED BY JOHN M. BURCHFIEL 9/7/82

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
1494.		(1) $-\frac{1}{4}$											
1231								(1) $+1/16$	(3) $-\frac{1}{8}-\frac{1}{8}$ $\frac{1}{8}$ C				
1068													
5365									(1) $-\frac{1}{8}$ C				
237													
5493	(2) $+3/16$ $\frac{3}{8}$				(1) $-\frac{1}{8}$	(1) $+\frac{1}{8}$		(1) $+1/16$					
1579								(2) $+\frac{1}{8}$ $\frac{3}{8}$ C C					
1991													
4719	(10) $+\frac{1}{16}+\frac{1}{8}+\frac{1}{16}+\frac{3}{8}$ $+\frac{1}{8}+\frac{3}{8}+\frac{1}{8}+\frac{1}{16}$ (4) $+\frac{1}{16}+\frac{1}{8}$	(1) $+3/16$			(4) $+1/8$ $-\frac{1}{8}-\frac{1}{8}-\frac{1}{4}$	(1) $-\frac{1}{8}$	(1) $-\frac{1}{8}$	(1) $+\frac{1}{16}$	(3) $\frac{11}{8}\frac{1}{16}$ $+\frac{1}{16}$ C	(1) $+\frac{1}{8}$			(4) $+\frac{3}{16}-\frac{1}{8}$ $-\frac{1}{8}+\frac{1}{4}$
2150	(2) $-1/8-\frac{1}{4}$								(1) $+\frac{1}{8}$				
7040										(1) $-\frac{1}{4}$			(1) $+1/16$
5515	(1) $-\frac{1}{4}$ (1)												

PREPARED BY P. WINKLER CHECKED BY JOHN M. BURGHOFFER 9/9/82

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
12055													
1964								(1) $-\frac{1}{8}$ C	(1) $+\frac{1}{8}$ C				(2) $+\frac{1}{8}$ $-\frac{1}{16}$
1457													
1963						(1) $+\frac{1}{2}$							
6472	(1) $-\frac{1}{8}$ $-\frac{1}{16}$ (3) $-\frac{1}{16}$							(4) $+\frac{1}{2}$ $+\frac{1}{8}$C C $+\frac{1}{2}$ C $+\frac{1}{16}$		(1) $+\frac{1}{8}$			(2) $+\frac{1}{8}$ $+\frac{1}{8}$
3170	(1) $+\frac{1}{8}$ $-\frac{1}{8}$ $-\frac{1}{16}$	(1) +2											$-\frac{1}{8}$
2551	(4) $-\frac{1}{8}$ $+\frac{1}{16}$ (3) $+\frac{1}{16}$ $+\frac{1}{16}$				(1) $-\frac{1}{16}$								
1460						(1) $-\frac{1}{8}$		(3) $-\frac{1}{8}$ $-\frac{1}{8}$ $-\frac{1}{16}$ C C		(1) $+\frac{1}{8}$			(1) $-\frac{1}{16}$
3152						(2) $+\frac{1}{8}$ $-\frac{1}{2}$							
1952									(1) $-\frac{1}{8}$				(1) $+\frac{1}{8}$
1633	(1) $-\frac{1}{8}$ (1)												
2553									(1) $+\frac{1}{8}$				

PREPARED BY JOHN M. BURCHOFFER CHECKED BY JOHN M BURCHOFFER 9/9/86 RECHECKED BY Tommy Caldwell 9/11/86

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
5944	(1) $-\frac{3}{16}$							(1) $-\frac{1}{8}$	(1) $+\frac{1}{8}$				
3579	(1) $+\frac{1}{16}$	(2) $-\frac{3}{8}$ $-\frac{3}{8}$											
5036						(1) $+\frac{1}{4}$			(1) $+\frac{1}{8}$ C				
1507													
261									(2) $-\frac{1}{8}$ $+\frac{3}{16}$				
2636	(1) $-\frac{1}{4}$												
2662													
1271	(3) $+\frac{1}{8}$ $+\frac{3}{16}$ (1) $+\frac{3}{16}$					(1) $-\frac{11}{16}$		(1) $+\frac{1}{8}$ C					(1) $+\frac{1}{8}$
262								(1) $-\frac{1}{8}$ C					(2) $+\frac{1}{8}$ $+\frac{1}{8}$
1950	(1) $+\frac{1}{8}$ (1)					(1) $+\frac{1}{8}$							
12582	(2) $-\frac{3}{16}$ (2) $+\frac{3}{16}$		(1) $-\frac{5}{16}$		(1) $+\frac{1}{16}$			(1) $-\frac{1}{2}$ C $+\frac{1}{2}$ C	(1) $-\frac{1}{8}$ C				(1) $+\frac{3}{16}$
7021	(1) $-\frac{1}{8}$				(1) $-\frac{1}{8}$	(1) $-\frac{1}{2}$		(2) $+\frac{3}{16}$ $+\frac{1}{8}$					

PREPARED BY JOHN M BURGHOFFER CHECKED BY JOHN M. BURGHOFFER 9/9/86 RECHECKED by Tommy D. Gerwood 9/11/86

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
6962													
333									(1) $+\frac{1}{8}$				
6345													
6775									(1) $-\frac{1}{8}$ C				(1) $+\frac{1}{8}$
362													
1396	(2) $+\frac{1}{8}$ (4) $+\frac{1}{8}$												
5876	(1) $+\frac{1}{8}$ (1)	(3) $-\frac{1}{16}$ $-\frac{1}{8}$ $-\frac{1}{16}$											(1) $-\frac{1}{8}$
247	(1) $+\frac{1}{8}$				(1) $+\frac{1}{8}$								
1436	(2) $+\frac{1}{8}$ $+\frac{1}{16}$ (3)				(1) $+\frac{1}{8}$			(2) $+\frac{1}{8}$ C $+\frac{1}{8}$ C	(1) $+\frac{1}{8}$				
5018									(1) $-\frac{1}{8}$				(2) $+\frac{1}{8}$ $-\frac{1}{16}$
426									(1) $+\frac{1}{8}$ C				
2761	(1) $+\frac{1}{16}$				(1) $+\frac{3}{8}$	(1) $+\frac{1}{8}$		(3) $+\frac{1}{8}$ $+\frac{1}{16}$ C $-\frac{1}{16}$ C					

PREPARED BY JOHN M BURGHOFFER CHECKED BY JOHN M. BURGHOFFER 9/9/86 RECHECKED BY Tommy D. Griswold 9/11/86

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
2571		(1) $-\frac{1}{8}$											
1375	(1) $+\frac{1}{8}$							(1) $-\frac{1}{8}$ C	(1) $-\frac{1}{8}$				
5258	(2) $+\frac{1}{8}$ (1) $+\frac{1}{16}$												(2) $+\frac{1}{8}$ $-\frac{1}{16}$
2652	(2) $-\frac{1}{16}$ $-\frac{1}{16}$							(1) $-\frac{1}{16}$ C	(1) $-\frac{1}{16}$ C				
5647													
1452					(1) $+\frac{1}{8}$			(1) $-\frac{1}{8}$	(1) $-\frac{1}{8}$				
4740													
6030								(1) $+\frac{1}{8}$ C					
6059									(1) $+\frac{1}{8}$ C				
5459													
2655	(1) $-\frac{1}{8}$							(1) $+\frac{1}{8}$					
3612													

PREPARED BY JOHN M. BURGHOFFER CHECKED BY JOHN M BURGHOFFER 9/9/94 RECHECKED BY Tommy D Kenwood 9/9/94

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
5514	(2) +⅛ +⅛ (2)								(1) +¼ C				
6590	(1) +⅛ (1)							(1) +⅛	(1) +⅛ C				(1) -⅛
7114	(1) +⅛												
3862	(1) -3/16	(1) -⅛			(2) +¼ -⅛		(2) -⅛ -⅛	(1) -1/16					
12421	(1) -3/16							(2) -¼ -⅛					
1541								(1) +⅛					
1524													
1564													
2526													(1) -3/16
2007	(2) +⅛ -¼												
490	(1) -⅛							(2) -⅛ C +¼ C					
1247	(5) +⅛ +⅛ +⅛ -⅛ +1/16 (3)					(2) -¼ -⅜	(1) -⅛ C	(3) +3/16 +3/16 +⅛ C	(1) -⅛ C				(1) -3/16

PREPARED BY JOHN M BURGHOFFER CHECKED BY JOHN M. BURGHOFFER 9/5/86 RECHECKED BY TOMMY D. GRISWOLD 9/11/86

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
5199													
5025	(2) $+\frac{1}{16}$ $-\frac{1}{8}$ ①												
77													(1) $+\frac{1}{8}$
6194	(2) $+\frac{1}{8}$ $+\frac{1}{16}$					(1) $-\frac{1}{16}$		(1) $+\frac{1}{16}$	(2) $-\frac{1}{8}$ C $-\frac{1}{8}$ C				
1976								(1) $-\frac{1}{8}$					
1495								(2) $-\frac{1}{8}$ C $-\frac{5}{16}$ C					
1924	(2) $+\frac{1}{16}$ $+\frac{1}{8}$							(1) $+\frac{1}{16}$	(2) $+\frac{1}{8}$ $-\frac{1}{16}$ C				(1) $-\frac{1}{16}$
1616	(1) $+\frac{1}{16}$								(3) $+\frac{1}{16}$ $+\frac{1}{8}$ C $+\frac{1}{8}$ C				
1440		(1) $+\frac{1}{16}$							(1) $+\frac{1}{8}$				
1628	(2) $-\frac{1}{16}$ $-\frac{1}{8}$							(1) $+\frac{1}{16}$ C	(2) $-\frac{1}{8}$ $+\frac{1}{16}$ C				(2) $+\frac{1}{8}$ $+\frac{1}{8}$
1516													
728										(1) $-\frac{1}{16}$	(1) $+\frac{3}{16}$		

PREPARED BY JOHN M. BURCHOFFER CHECKED BY JOHN M. BURCHOFFER 9/9/86 RECHECKED by TOMMY D GRISWOLD 9/11/86

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
4949													
4952													
5225										(1) $+\frac{5}{8}$			(1) $+\frac{1}{8}$
3136		(2) $+\frac{1}{2}$ $+\frac{3}{16}$											
2744		(1) $+\frac{1}{4}$				(1) $+\frac{1}{8}$			(1) $+\frac{1}{8}$	(2) $+\frac{3}{16}$ $\pm\frac{1}{16}$			
2844													
2582	(1) $-\frac{1}{8}$												
2484													
2392	(2) $+\frac{1}{2}$ $\pm\frac{3}{16}$								(1) $+\frac{1}{8}$				(3) $+\frac{1}{8}$ $+\frac{1}{8}$ $-\frac{1}{8}$
2412	(1) $-\frac{1}{16}$					(1) $+\frac{1}{8}$		(2) $+\frac{1}{8}$ $\pm\frac{1}{8}$					
2673													
2659	(1) $-\frac{3}{16}$												(2) $+\frac{1}{8}$ $-\frac{3}{16}$

PREPARED BY LUIS O. MORA CHECKED BY JOHN M. BURGHOFFER 9/9/86

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
1459	(1) -1/4												
6953													
6948							(1) -1/8 C	(1) +1/8 C					
5257		(1) +1/8				(1) +1/4			(1) +1/8 C				
2626								(1) ±1/8					
1458									(1) -1/8 C				
1504	(1) +1/8	(1) +1 1/2							(1) +1/8 C				
1083	(3) -1/4 +1/8 (1) +1/16	(1) +1/8			(1) +1/8			(1) +1/16	(1) +1/16				(1) +3/16
1425						(1) +1/4		(1) +1/8					(1) +1/8
1430													
1466									(1) +1/16				
4950													

PREPARED BY LUIS O. MORA CHECKED BY JOHN M. BURGHOFFER 9/9/86

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
6788					(1) -1/8			(2) C +1/2 C -3/16					
1880								(3) +1/16 C -1/16 C +1/16	(1) -1/8 C				
1534		(1) -3/16											
1816 (6)	(8) -1/8 -3/16 +1/4 +1/8, -1/8 +1/4 +1/8, -1/8							(2) +1/16 -1/16					
6950 (7)	(1) +1/8						(1) +1/8 C	(2) +1/8 +1/8 C	(1) +1/8 C				(1) -1/8
4751	(1) -1/8							(1) +1/8 C					
3155													
12581													
4752 (1)	(1) -1/8							(1) -1/8 C					
5281								(1) +1/8					(1) +1/8
3604								(2) C +1/8 C +1/8					(1) -1/8
1912		(2) +3/16 +1/8							(1) -1/8 C				(1) +1/16

PREPARED BY LUIS D. MORA CHECKED BY JOHN M. BURGHOFFER 9/9/86

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
411									(2) +3/16 +1/8				(1) -1/8
358	(2) -1/8 -1/8 (1)					(1) -3/16				(1) +1/8			
3646	(2) -1/4 -1/8								(2) +1/8 -1/8				(1) +1/8
5882	(2) +1/8 -1/8 +1/8 -1/8 (4) +1/8 +1/8								(3) C +1/8 C +1/8 C +1/8	(3) +1/8 +1/8 -1/8			(2) +1/8 +1/8
5898						(1) +1/4		(1) -1/8	(1) +1/16	(1) -3/16			(1) +1/8
1685	(1) -1/8								(1) -1/8				
1796	(2) +1/8 -1/8 (1)												(1) +1/4
2501	(1) +1/8 (1)												(2) +1/8 +1/16
5877					(1) -1/4								(1) +1/8
177	(3) -1/8 +1/16 (2) +1/16							(1) +1/16 C					(2) +1/8 +3/16
1872								(1) +1/8					
3929									(1) -1/8				

PREPARED BY LUIS O. MORA CHECKED BY JOHN M BURCHOFFER 9/9/86

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
5480													
1842								(1) +1/8	(1) -1/8				
1857													
5451													
5463	(1) -1/8 ①						(1) -1/8	(1) -1/8					
5490	(1) +3/8 -1/8				(1) +1/8								
6056													(1) +1/8
6057								(1) +1/8					
6596				(1) +3/4	(2) +1/4 +1/8				(1) -1/8				
6109					(1) +1/8			(2) +1/8 c +1/8	(1) +5/16 c				
6156													
5027		(2) +3/16 +3/8											

PREPARED BY LUIS O. MORA CHECKED BY JOHN M. BURGHOFFER 9/8/82

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
BB3	(2) $-\frac{1}{8}$ ② $\frac{1}{16}$				(1) $-\frac{3}{8}$								(1) $-\frac{1}{8}$
6170									(1) $-\frac{1}{8}$ C				(1) $-\frac{1}{8}$
5686													
1845	(1) $-\frac{1}{2}$ ①				(1) $-\frac{7}{16}$			(1) $-\frac{1}{8}$					(1) $+\frac{1}{8}$
6937	(2) $+\frac{3}{16}, +\frac{1}{8}$ ②				(1) $+\frac{1}{4}$								
6020													
6813	(1) $-\frac{3}{16}$	(3) $-\frac{3}{16}$ $-\frac{3}{16}$ $-\frac{3}{16}$			(1) $+\frac{1}{8}$				(1) $+\frac{1}{16}$ C				(2) $-\frac{3}{16}$ $-\frac{1}{8}$
5993	(1) $-\frac{1}{8}$												
5475						(1) $+\frac{1}{4}$		(1) $+\frac{1}{16}$	(1) $+\frac{1}{8}$ C				
1057													
5978									(2) $+\frac{1}{8}$ C $-\frac{1}{8}$				
1948													

PREPARED BY LUIS O. MORA CHECKED BY JOHN M. BURGHOFFER 9/9/86

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
6169													
1388	(5) -1/16 -1/8 -1/4 -1/2 -1/4 -1/4 (1)	(1) -1/8				(1) ±1/4							
6158								(1) ±1/16					
6129													
4980													
3581		(1) ±1/8											
4987									(1) ±1/16 E				(1) ±1/8
1398					(1) +1/8								
4973								(1) ±1/8					
2794													
1217													
4984					(2) -1/8 -1/4								

PREPARED BY LUIS O. MORA CHECKED BY JOHN M. BURGHOFFER 9/9/86

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
2543						(1) ±1/8		(1) +3/16	(2) -3/16 +1/8				
6421													
397					(1) -1/8								
4972					(1) -1/8			(4) C +1/16 C -1/8 C -3/16, +1/8					(2) +1/16 ±1/16
4957									(1) ±1/8				
2691	(1) ±1/4	(2) +1/8 +1/8											
4293	(3) +3/16 +3/8 (1) -1/8							(2) +1/8 -1/4					
2445					(1) -1/16								
1076		(2) -2 1/2 +1						(2) +3/16 -1/16					
346													
4291	(1) -3/16				(2) +1/4 -1/2			(3) -1/8 -1/8 C -1/8	(1) -1/8 C				
1152								(2) +1/16 ±1/8	(1) -1/16				(1) ±1/8

PREPARED BY LUIS O. MORA CHECKED BY JOHN M. BURGHOFFER 9/9/82

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST. BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
6012	(1) $+\frac{1}{8}$												
6071													(1) $-\frac{1}{16}$
1270	(1) $+\frac{1}{16}$ ①												
1138													
642													
5548													(1) $+\frac{1}{8}$
3302	(2) $+\frac{1}{8}+\frac{1}{8}$ ①												(2) $-\frac{1}{16}$ $\frac{7}{8}$
820	(1) $-\frac{1}{16}$ ①							(2) $+\frac{1}{16}$ C $-\frac{1}{16}$ C					
781													
5549						(1) $+\frac{1}{16}$							
6520	(2) $-\frac{1}{16}-\frac{1}{8}$ ①												
6511	(2) $-\frac{1}{8}-\frac{1}{8}$ ②												

PREPARED BY JOHN M. BURGHOFFER CHECKED BY JOHN M. BURGHOFFER 9/9/86 RECHECKED BY Tommy D Griswold 9/11/86

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
5478		(1) $-\frac{1}{4}$							(1) $+\frac{1}{8}$				
5472	(1) $-\frac{1}{16}$ ①												
6018	(1) $+\frac{1}{8}$ ①							(1) $-\frac{1}{8}$	(1) $-\frac{1}{8}$ C				(1) $+\frac{1}{8}$
65					(1) $-\frac{1}{16}$				(2) $\frac{1}{8}-\frac{1}{16}$ C C				
6510				(6) $+\frac{1}{8}$ $+\frac{1}{8}$ $+\frac{1}{8}$ $+\frac{1}{16}$ $+\frac{1}{16}$ $+\frac{1}{16}$	(1) $-\frac{1}{8}$				(2) $+\frac{1}{8}-\frac{1}{8}$ C C				
5177	(1) $+\frac{1}{8}$ ①	(1) $+\frac{5}{16}$						(1) $+\frac{1}{8}$ C					
6152	(1) $+\frac{1}{8}$				(1) $-\frac{1}{8}$								
6904	(1) $+\frac{1}{16}$												
6603	(2) $+\frac{1}{8}$ $+\frac{1}{16}$ ①												(1) $-\frac{1}{16}$
6513													
2970													
12498	(2) $-\frac{1}{8}$ $+\frac{1}{8}$ ②							(1) $+\frac{1}{16}$					(1) $+\frac{1}{8}$

PREPARED BY JOHN M. BURGHOFFER CHECKED BY JOHN M. BURGHOFFER 9/9/86 RECHECKED BY Tommy D. Greswell 9/11/86

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST. BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
3303								(1) $+\frac{1}{2}$					(1) $+\frac{1}{2}$
555													
907	(2) $+\frac{1}{8}$ $+\frac{1}{8}$												
1082													
238													
554					(2) $-\frac{1}{8}$ $-\frac{1}{8}$	(1) $-\frac{1}{8}$			(1) $+\frac{1}{8}$ C				
6441	(3) $-\frac{3}{16}$ $-\frac{1}{8}$ (2) $+\frac{1}{8}$					(1) $-\frac{3}{16}$							
1705						(1) $-\frac{1}{8}$							
59.43	(2) $-\frac{3}{16}$ $\frac{1}{8}$					(1) $+\frac{1}{8}$							
46		(3) $+1-4\frac{1}{2}$ $+1\frac{1}{4}$	(1) $+\frac{1}{8}$			(1) $+\frac{3}{16}$							
6860													
6894	(1) $+\frac{1}{2}$							(1) $+\frac{1}{8}$					

PREPARED BY JOHN M. BURGHOFFER CHECKED BY JOHN M. BURGHOFFER 9/11/96 RECHECKED BY TOMMY D. GRISWOLD 9/11/96

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
CTH-1-12078					(1) + 3/16			(1) + 1/16		(2) - 1/8 + 5/16			
CTH-1-5921	(1) - 1/8 (1)	(1) + 1/8			(1) + 1/8								
CTH-1-6038					(2) - 5/16 + 3/16								
CTH-1-5933	(1) - 1/8				(1) - 5/16			(1) + 1/8					
CTH-1-6433													(6) - 1/4
CTH-1-6436	(1) + 1/8 (1)					(2) + 3/16 + 1/8							
CTH-1-4928													
CTH-1-5816													
CTH-1-5725													
CTH-1-587													

PREPARED BY : E. ROJAS CHECKED BY JOHN M. BURGHOFFER 9/9/86

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
CTH-1-1499	(1) +1/8				(1) +1/8 −1/8			(1) −3/16					
CTH-1-1050	(3) +1/8 −3/8 +1/8												
CTH-1-1496	(4) +1/8 +1/8 −3/16 −3/8 (2)			(1) +1/8	(1) −1/8			(3) −1/8 −1/2 −1/4	(1) +1/8	(2) +1/8 +1/8			(2) −3/16 +1/8
CTH-1-1111	(1) +1/8				(2) −1/8 −1/2 +1/2								
CTH-1-1471				(1) +3/16									
CTH-1-1533	(2) +3/16 +1/8												(1) +1/8
CTH-1-2594	(3) +1/16 +1/16 (1) +1/16												
CTH-1-1506	(1) −1/8 (1)												
CTH-1-1580	(2) +1/8 +1/8					(1) −3/8							
CTH-1-3633					(1) +1/8			(1) −1/8					
CTH1-6063								(1) −1/8					
CTH-1-2469													

PREPARED By — J. BECK CHECKED BY JOHN M. BURGHOFFER 9/9/86

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
CTH-1-5232	(1) $-\frac{1}{8}$												
CTH-1-5830	(5) $-\frac{3}{16}$ $+\frac{1}{2}$ (1)								(1) $-\frac{1}{8}$				
CTH-1-6166								(1) $-\frac{3}{16}$	(2) $+\frac{1}{16}$ C $+\frac{1}{8}$ C				
CTH-1-259								(1) $-\frac{1}{8}$ C					
CTH-1-6432	(2) $-\frac{1}{8}$ $-\frac{1}{8}$							(2) $-\frac{1}{8}$ $-\frac{1}{16}$					
CTH-1-1453								(1) $+\frac{1}{8}$	(1) $-\frac{1}{8}$				
CTH-1-6315	(5) $+\frac{1}{8}$ $+\frac{1}{8}$ $-\frac{1}{16}$	(1) $+\frac{1}{8}$			(1) $+\frac{3}{16}$	(1) $-\frac{3}{16}$		(11) $+\frac{1}{16}$ $+\frac{1}{8}$ $+\frac{1}{8}$ $+\frac{3}{16}$ $+\frac{1}{8}$ $+\frac{1}{16}$ $+\frac{1}{16}$ $+\frac{1}{8}$ $+\frac{1}{8}$ $+\frac{3}{16}$ $+\frac{3}{16}$	(5) $+\frac{1}{8}$ C $-\frac{1}{8}$ C $-\frac{1}{16}$ C $-\frac{1}{16}$ C	(8) $-\frac{1}{8}$ $+\frac{3}{16}$ $-\frac{1}{16}$ $+\frac{3}{16}$ $-\frac{1}{16}$			(1) $+\frac{1}{8}$
	$-\frac{1}{16}$ $+\frac{1}{8}$ (4)												
CTH-1-2349													
CTH-1-4919	(1) $-\frac{1}{8}$				(1) $+\frac{1}{8}$	(1) $-\frac{1}{8}$		(1) $+\frac{1}{16}$	(4) $+\frac{1}{16}$ $+\frac{1}{4}$ C C $-\frac{1}{8}$ $-\frac{1}{8}$ C				$+\frac{1}{8}$ (2) $+\frac{3}{16}$
CTH-1-5775	(2) $-\frac{1}{16}$ (2) $-\frac{1}{4}$												

PREPARED By - J. BECK CHECKED BY - JOHN M. BURGHOFFER 9/9/86

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
5559													
5517								(1) +1/16 C	(1) -1/8 C				
2447													
3966										(1) -1			
12494													
5280													
5511	(1) -1 (1)												
2502					(1) +1/16								
1462						(1) -1/8							

PREPARED BY JOHN M BURGHOFFER CHECKED BY JOHN M. BURGHOFFER 9/9/86 RECHECKED by Tommy D Gatewood 9/11/86

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CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
CTH-1-5737	(2) $\frac{1}{8}$-$\frac{3}{16}$ (1)							(1) +3/16					
CTH-1-2598													
CTH-1-2264													
CTH-1-5469													
CTH-1-5983													

PREPARED BY R RADELICH CHECKED BY JOHN M. BURCHHOFFER 9/9/86

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
4948	(1) $\pm\frac{1}{8}$	(1) $+\frac{1}{8}$											
5007						(1) $-\frac{1}{8}$							
5144									(1) $\pm\frac{1}{8}$	(1) $-\frac{1}{8}$			(2) $-\frac{1}{8}$ $-\frac{1}{8}$
2745	(1) $+\frac{1}{8}$ (1)												
3358													
4967													
2660	(2) $-\frac{5}{16}$ (1) $+\frac{1}{8}$							(1) $\pm\frac{1}{8}$					(2) $+\frac{1}{8}+\frac{5}{16}$ $+\frac{1}{8}$
↓													

PREPARED BY P. WINKLER CHECKED BY JAHN M. BURGHOFFER 9/9/86

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
2285								(1) $+\frac{1}{8}$					
1439													
2593					(1) $+\frac{1}{8}$	(2) $-\frac{1}{8}$ $-\frac{3}{16}$			(1) $-\frac{1}{8}$ C				
2149	(1) $+\frac{1}{8}$					(1) $+\frac{1}{16}$		(1) $+\frac{1}{8}$ C	(2) $+\frac{1}{8}$ C $-\frac{1}{8}$ C				
1596	(1) $+\frac{1}{2}$		(1) -3										
12676								(2) $+\frac{3}{16}$ $+\frac{1}{8}$					

PREPARED BY JOHN M BURCHHOFER CHECKED BY JOHN M. BURCHHOFER 9/9/86 RECHECKED by TOMMY D. GRISWOLD 9/11/86

60#61

CTH NO.	DIMENSIONS FROM 0' TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
2285								(1) $+\frac{1}{8}$					
1439													
2593					(1) $+\frac{1}{8}$	(2) $-\frac{1}{8}$ $-\frac{3}{16}$			(1) $-\frac{1}{8}$ C				
2149	(1) $+\frac{1}{8}$					(1) $+\frac{1}{16}$		(1) $+\frac{1}{8}$ C	(2) $+\frac{1}{8}$ C $-\frac{1}{8}$ C				
1596	(1) $+\frac{1}{2}$		(6) -3										
12676								(2) $+\frac{3}{16}$ $\pm\frac{1}{8}$					

PREPARED BY JOHN M. BUECHNER

CHECKED BY JOHN M. BUECHNER 9/21/92

APPROVED BY THOMAS D. GERVAIS 9/21/92

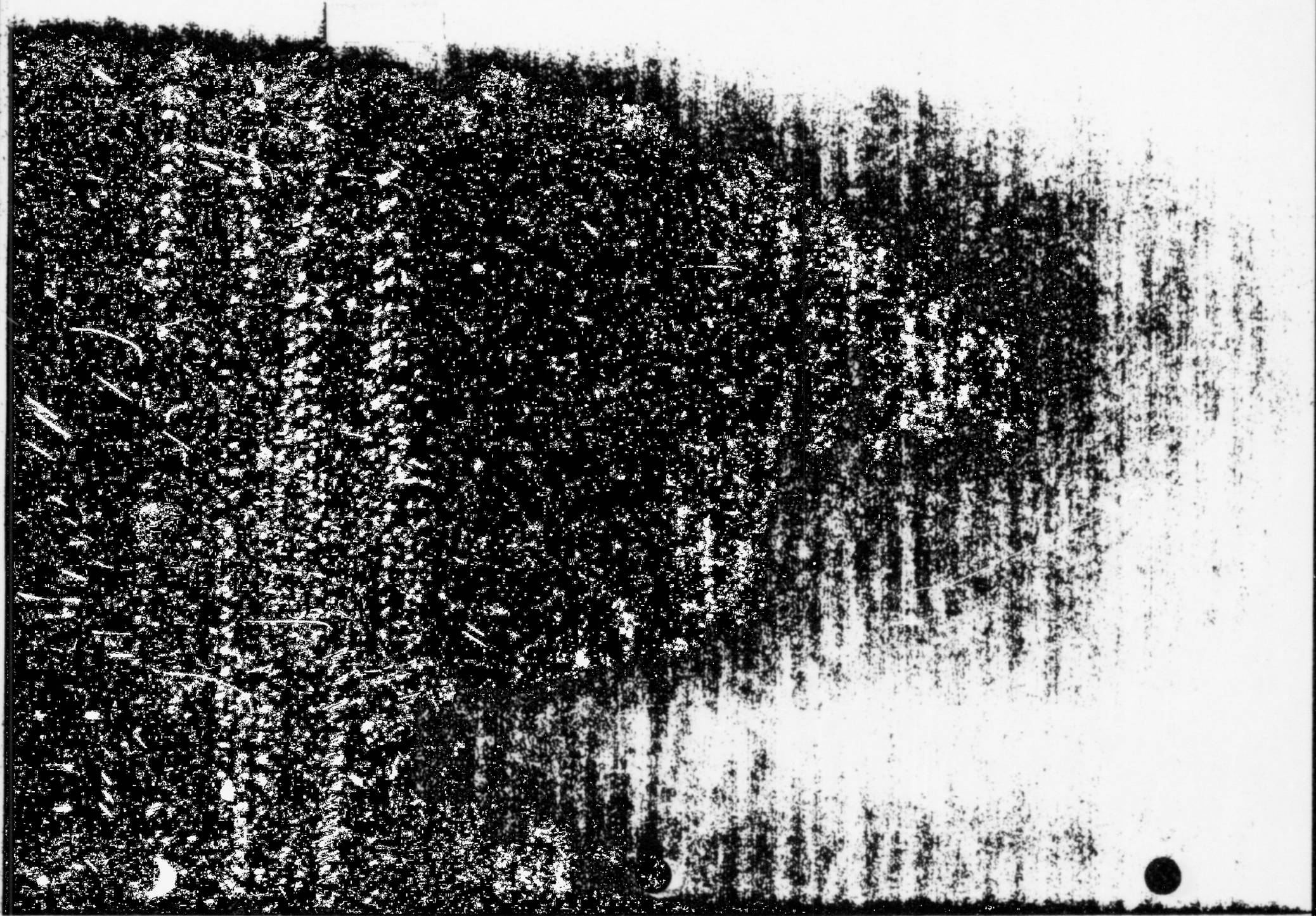
PREPARED BY LUIS O. MORA CHECKED BY JOHN H. BURKHOFER 9/9/96

CTH NO.	DIMENSIONS FROM 0 TO 5'-0	DIMENSIONS FROM > 5'-0 TO ≤ 10'-0	DIMENSIONS > 10'-0	MODIFIED STRUCTURAL SHAPES	WORK POINT	TRANSVERSE LOCATION OF CABLE TRAY	EDGE DISTANCE AND CTR. TO CTR. DIST BTWN CABLE TRAY BOLTS	END DISTANCE FROM CTRLINE OF HOLE TO END OF MEMBER	GAGE DISTANCE FROM CTRLINE OF HOLE TO HEEL OF ANGLE	HILTI TO HILTI	HILTI TO RICHMOND SCREW ANCHOR	RICHMOND SCREW ANCHOR TO ANOTHER SCREW ANCHOR	PROJECTION OF EXPANSION ANCHOR
2755		(1) ±1/8											
2523					(1) ±7/16								(3) -1/16 -1/16 +3/8

SHT 59 OF 59

61 of 61

SECCIÓN II



EBASCO SERVICES INCORPORATED

CALCULATION COVER SHEET

CLIENT: TUGCO — EBS NO.:

PROJECT: COMANCHE PEAK - UNITS 1 AND 2 — DEPT NO.: 550

SUBJECT: OUT-OF-PLUMBNESS OF L-SHAPED CABLE TRAY HANGERS

CALCULATION NO.: VOL. I, BOOK 16, SECTION II — NUMBER OF SHEETS: 31

PROBLEM

To consider and quantify the increase in direct and bending stresses due to dead load and seismic loads from a cable tray supported on the horizontal leg of an L-Shaped hanger installed 2° out-of-plumb.

Of all the different CTH configurations, the L-Shaped type is the most critical section when out-of-plumb --- See Page 2 of 3 for explanation.

For the most critical of the L-Shaped CTH, Hanger # 2834, the increase in bending stresses is calculated to be 5.24% for SSE and 4.78% for OBE. For most of the other L-Shaped CTH's, the increase in bending stresses due to 2° out-of-plumbness is subtantially less.

CONTAINS ASSUMPTIONS WHICH REQUIRE CONFIRMATION YES _____ NO X

ASSUMPTIONS CONFIRMED ON _____ BY _____

REV. NO.	SHEET NOS.	CALCULATION BY: NAME	DATE	CHECKED BY: NAME	DATE	OPTIONAL: NAME	DATE
0	1-30	E R Sion	7/19/84	Ostendorff Harrison	7/19/84		

REVIEWED OR APPROVED BY

PRELIMINARY ☐ FINAL ☑ SUPERSEDES CALC NO. _____

BY E R SION DATE 7/9/86 SHEET 1 OF 30

CHKD. BY L Hanson DATE 7/16/86 OFS NO. DEPT. NO.

CLIENT TUGCO

PROJECT COMANCHE PEAK — UNITS 1 & 2

SUBJECT OUT-OF-PLUMBNESS OF L-SHAPED CABLE TRAY HANGERS

1.0 PROCEDURE

Inspected the Hanger Shape Listings, dated July 1 and 2, 1986, sh. 4 thru 30 for all the L-shaped hangers for units 1 & 2 and selected hanger no. 2834 L, whose loading and geometry produce the most severe bending stresses — that is, it has the greatest value of V/H in combination with the greatest value of ℓ/b, where

V = vertical seismic load — "g" value obtained from the design criteria at that particular building and elevation.

H = horizontal seismic load — "g" value obtained from the design criteria at that particular building and elevation.

ℓ = vertical length of the L-shaped hanger

b = horizontal length of the L-shaped hanger measured from the center of the vertical leg to the center line of the cable tray

L-shaped hangers are more vulnerable than the other types of CTH's utilized in this project since they are supported at one end only and the outstanding leg is cantilevered out to support the cable tray.

Since H, the horizontal seismic load, is taken as unity, the largest value of V, in conjunction with H, causes the maximum bending moment in the L-shaped CTH.

Also, out-of-plumbness of 2° becomes more and more significant with the increase of "ℓ". The shorter the "b", the higher the percentage increase in length of "b" due to additional $\ell \sin 2°$ [since new $b = b + \ell \sin 2°$]

Therefore, a combination of V/H and ℓ/b causes max. percentage increase in bending.

Calculations were first made on the assumption that the hanger is installed plumb. Then calculations were made for the L-shaped hanger 2° out-of-plumb. The increase in stresses (SRSS) due to the out-of-plumbness was calculated for both the SSE and OBE conditions.

2.0 CONCLUSION

The increase in stresses for the SSE and OBE was found to be 5.24% and 4.78% respectively. Most of the other L-shaped hangers have considerably less of an increase due to a 2° out-of-plumbness because of their combined V/H and l/b ratios.

In conclusion, it is considered that the increase in stresses for a 2° out-of-plumb L-shaped hanger is within acceptable limits.

3.0 CALCULATIONS

CONSIDER ECB, HANGER 2834, EL. 778·0', FROM HANGER SHAPE LISTING COMPUTER OUTPUT, THIS IS THE MOST SEVERE LOADING ON L-SHAPED HANGERS.

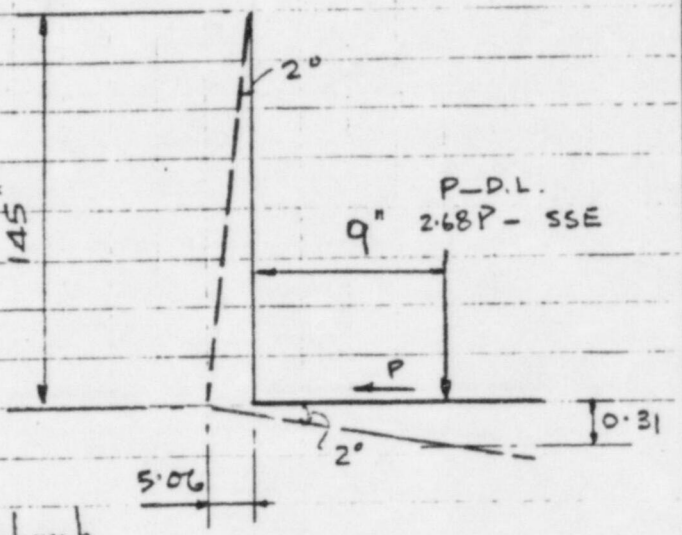
SSE $\frac{V}{H} = \frac{1107}{0.63} = 2.68$

145 Sin 2° = 5·06"

9 Cos 2° = 0·31"

$\therefore L' = 145 + 5.06 = 150.06"$

$b' = 9 + 0.31 = 9.31"$



When CTH is plumb

$M = 9P + \sqrt{(9 \times 2.68P)^2 + (145P)^2}$

$= 9P + 147P$

$= 156P$ "#

When CTH is 2° out-of-plumb

$M = 14.06P + \sqrt{(14.06 \times 2.68P)^2 + (145.31P)^2}$

$= 14.06P + 150.12P$

$= 164.18P$

$\therefore$ % ge increase in bending stresses due to 2° out-of-plumb.

$= \frac{164.18 - 156}{156} = 5.24\%$. SSE

FOR OBE CONDITIONS,

$M = 14.06P + \sqrt{(14.06 \cdot 2.47P)^2 + (145.31P)^2}$

$= 163.46P$

% ge increase in bending stresses $= \frac{163.46 - 156}{156} = 4.78\%$.

4.0 [redacted] SHAPE LISTING.

[redacted]

(4)

[redacted] .. 198[redacted]

HANGER	GEOMET	NOTH SUPP	GROUPING	BLDG	ROOM	RL	ELEV	TYPE	HGHT	WDTH	TRANSV TRAY WT.	LONG TR WT.	THERMO LOAD	FILE REF#	REMARKS
197	L	0		AUX	175		790	T	1.5	3.2	0.0	0.0	0.0	526	
364	L	0	SPEC	AUX	175		790	T	2.6	3.0	0.0	0.0	0.0	350	
470	L	0	SPEC	AUX	174		790	T	6.7	2.1	0.0	0.0	0.0	561	
479	L	0	SPEC	AUX	175		790	T		3.1	0.0	0.0	0.0	507	
520	L	0	SPEC	ECB	119		792	T		2.7	0.0	0.0	0.0	521	
547	L	0		ECB	129		792	T	2.3	2.0	0.0	0.0	0.0	561	
1315	L	0	SPEC	AUX	207		810	T	1.8	3.5	0.0	0.0	0.0	395	
1677	L	1	L-310	ECB	133		807	T	2.1	2.6	126.0	0.0	0.0	305	
1679	L	0	SPEC	ECB	133		807	M	1.9	2.3	0.0	0.0	0.0	433	
1680	L	0	L-310	ECB	133		807	T	2.1	2.8	91.0	0.0	0.0	305	
1691	L	0	SPEC	AUX	207		810	T	2.6	3.6	0.0	0.0	0.0	507	
1708	L	0	SPEC	FHB	249	B	810	T	2.8	2.4	0.0	0.0	0.0	332	
1803	L	0	SPEC	AUX	207		810	T	2.0	3.0	0.0	0.0	0.0	244	
1806	L	1	L-312	AUX	207		810	T	1.6	3.5	609.0	0.0	0.0	218	
1812	L	0	SPEC	AUX	207		810	T	2.8	0.0	0.0	0.0	0.0	218	
1843	L	0		FHB	255		810	T	2.8	2.1	0.0	0.0	0.0	526	
1871	L	0	SPEC	FHB	249	B	810	T	2.2	2.5	0.0	0.0	0.0	535	
1872	L	0		FHB	247	A	802	T	2.0	3.0	0.0	0.0	0.0	605	
1969	L	0	SPEC	FHB	255		810	T	1.1	5.8	0.0	0.0	0.0	526	
2387	L	0	SPEC	ECB	115	A	778	T	0.8	2.8	0.0	0.0	0.0	356	
2393	L	0	SPEC	ECB	115	A	778	T	3.8	2.5	0.0	0.0	0.0	207	
2821	L	0	SPEC	ECB	113		778	T	4.3	2.6	0.0	0.0	0.0	305	
2822	L	0	SPEC	ECB	113		778	T	5.7	2.6	0.0	0.0	0.0	281	
2834	L	0	SPEC	ECB	113		778	T	12.1	1.3	0.0	0.0	0.0	207	V/H = 2.47 DBE, 2.68 SSE.
2874	L	0	SPEC	ECB	113		778	T	6.9	7.1	0.0	0.0	0.0	549	
2954	L	0		AUX	175		790	T	2.8	2.8	0.0	0.0	0.0	526	
2955	L	0		AUX	175		790	T	3.6	2.3	0.0	0.0	0.0	0	
2979	L	0		AUX	241		852	T	5.1	2.2	0.0	0.0	0.0	426	
2981	L	0		AUX	241		852	T	6.1	3.8	0.0	0.0	0.0	588	
2990	L	0	SPEC	AUX	180		790	T	5.3	2.0	0.0	0.0	0.0	285	
3116	L	0	SPEC	AUX	180		790	T	5.6	1.5	0.0	0.0	0.0	496	
3117	L	0	SPEC	AUX	180		790	T	4.5	1.5	0.0	0.0	0.0	207	
3121	L	0	SPEC	AUX	180		790	T	5.6	2.5	0.0	0.0	0.0	218	
3250	L	0	SPEC	ECB	133		807	T	3.2	1.5	0.0	0.0	0.0	332	
3259	L	0	SPEC	AUX	180		790	T	3.7	4.0	0.0	0.0	0.0	597	
3648	L	1	L-313	ECB	133		807	T	3.4	3.0	301.0	0.0	0.0	310	
3649	L	0	L-313	ECB	133		807	T	2.0	2.9	378.0	0.0	0.0	310	
3899	L	0	SPEC	AUX	207		810	T	4.8	1.5	0.0	0.0	0.0	218	
3904	L	0	SPEC	AUX	207		810	T	5.0	2.3	0.0	0.0	0.0	218	
3907	L	0	SPEC	AUX	207		810	T	2.6	1.8	0.0	0.0	0.0	218	
3915	L	0	SPEC	AUX	207		810	T	6.1	3.4	0.0	0.0	0.0	218	
3920	L	0	SPEC	AUX	207		810	T	3.1	1.8	0.0	0.0	0.0	218	
3921	L	0	SPEC	AUX	207		810	T	3.2	2.3	0.0	0.0	0.0	218	
3922	L	0	SPEC	AUX	207		810	T	8.1	2.4	0.0	0.0	0.0	218	
3923	L	0	SPEC	ECB	207		810	T	7.2	2.2	0.0	0.0	0.0	218	
3942	L	0	SPEC	ECB	151		854	T	6.8	6.4	0.0	0.0	0.0	588	

HANGER	GEOMET	MOTH SUPP	GROUPING	BLDG	ROOM	RL	ELEV	TYPE	HGHT	WDTH	TRANSV TRAY WT.	LONG TR WT.	THERMO LOAD	FILE REF#	REMARKS
3943	L	0	SPEC	ECB	151		854	T	8.0	6.5	0.0	0.0	0.0	597	
3951	L	0	SPEC	AUX	241		852	T	5.5	3.6	0.0	0.0	0.0	395	
3958	L	0	SPEC	AUX	241		852	T	5.6	4.3	0.0	0.0	0.0	285	
4056	L	0	SPEC	ECB	133		807	T	4.7	3.5	0.0	0.0	0.0	378	
4413	L	0	SPEC	ECB	133		807	T	2.1	4.0	352.0	0.0	0.0	218	
4440	L	0	SPEC	ECB	133		807	T	4.8	2.7	0.0	0.0	0.0	218	
4497	L	0	SPEC	ECB	133		807	T	4.6	2.0	0.0	0.0	0.0	218	
5024	L	0	SPEC	ECB	150		854	T	3.3	3.1	0.0	0.0	0.0	218	
5035	L	0	SPEC	ECB	150		854	T	3.2	2.8	0.0	0.0	0.0	426	
5046	L	0	SPEC	ECB	150		854	T	8.3	1.8	0.0	0.0	0.0	426	
5074	L	0	SPEC	AUX	241		852	T	8.8	3.7	0.0	0.0	0.0	378	
5327	L	0	SPEC	AUX	207		810	T	3.7	1.6	0.0	0.0	0.0	285	
5329	L	0	SPEC	AUX	207		810	T	3.3	1.5	0.0	0.0	0.0	281	
5405	L	0	SPEC	AUX	226		831	T	2.7	2.6	0.0	0.0	0.0	244	
5604	L	0	SPEC	AUX	175		790	T	4.0	3.0	0.0	0.0	0.0	281	
5634	L	0	SPEC	ECB	115	A	778	T	4.8	2.8	0.0	0.0	0.0	356	
5655	L	0	SPEC	ECB	129		792	T	3.0	2.3	0.0	0.0	0.0	541	
5682	L	0	L-315	AUX	230		842	T	1.8	1.8	134.0	0.0	0.0	378	
5684	L	1	L-315	AUX	230		842	T	1.8	1.8	225.0	0.0	0.0	281	
5685	L	0	SPEC	AUX	230		842	T	1.9	3.1	0.0	0.0	0.0	223	
5687	L	0	SPEC	AUX	230		842	T	1.8	3.7	0.0	0.0	0.0	332	
5688	L	0	SPEC	AUX	230		842	T	1.8	1.8	0.0	0.0	0.0	378	
5690	L	0	SPEC	AUX	230		842	T	1.8	1.8	0.0	0.0	0.0	588	
5705	L	0	SPEC	AUX	230		842	T	1.8	3.8	0.0	0.0	0.0	521	
6097	L	0	SPEC	AUX	244		873	T	1.5	2.9	0.0	0.0	0.0	298	
6099	L	0	SPEC	AUX	244		873	T	2.2	2.3	0.0	0.0	0.0	549	
6102	L	0	SPEC	AUX	244		873	T	1.4	2.1	0.0	0.0	0.0	298	
6251	L	1	L-317	AUX	241		852	T	3.1	2.5	287.0	0.0	0.0	257	
6252	L	0	SPEC	AUX	241		852	T	3.1	2.5	0.0	0.0	0.0	257	
6318	L	0	SPEC	AUX	241		852	T	4.3	3.0	0.0	0.0	0.0	405	
6356	L	0	SPEC	AUX	235		852	T	2.6	2.9	0.0	0.0	0.0	588	
6379	L	0	SPEC	AUX	241		852	T	1.7	2.9	0.0	0.0	0.0	298	
6381	L	0	SPEC	AUX	241		852	T		2.9	0.0	0.0	0.0	526	
6392	L	0	SPEC	AUX	241		852	T	8.3	2.5	0.0	0.0	0.0	244	
6393	L	0	L-316	AUX	241		852	T	11.4	2.2	137.0	0.0	0.0	244	
6395	L	1	L-316	AUX	241		852	T	11.4	1.5	204.0	0.0	0.0	281	
6435	L	0	SPEC	AUX	241		852	T	3.8	3.3	0.0	0.0	0.0	266	
6437	L	0	SPEC	AUX	241		852	T	3.2	3.5	0.0	0.0	0.0	266	
6439	L	0	SPEC	AUX	241		852	T	1.4	4.2	0.0	0.0	0.0	266	
6442	L	0	L-317	AUX	241		852	T	3.0	2.5	266.0	0.0	0.0	378	
6443	L	0	SPEC	AUX	241		852	T	3.7	2.5	0.0	0.0	0.0	356	
6444	L	0	SPEC	AUX	241		852	T	1.9	3.1	0.0	0.0	0.0	304	
6445	L	0		AUX	241		852	T		3.1	0.0	0.0	0.0	507	
6458	L	0	SPEC	AUX	241		852	M	1.7	3.4	0.0	0.0	0.0	597	
6467	L	0		FHB	255		810	T	2.1	3.0	0.0	0.0	0.0	426	
6669	L	0	SPEC	AUX	241		852	M		3.7	0.0	0.0	0.0	507	

FANCER	GEOMET	MOTH SUPP	GROUPING	BLDG	ROOM	RL	ELEV	TYPE	HGHT	WDTH	TRANSV TRAY WT.	LONG TR WT.	THERMO LOAD	FILE REF#	REMARKS
6900	L	0	L-314	AUX	246		886	T	2.3	1.1	65.0	0.0	0.0	341	
6901	L	1	L-314	AUX	246		886	T	2.3	1.2	90.0	0.0	0.0	350	
6903	L	1	L-311	AUX	245		873	T	1.9	3.6	52.0	0.0	0.0	356	
6904	L	0	L-311	AUX	245		873	T	2.0	3.7	45.0	0.0	0.0	356	
6905	L	0	SPEC	AUX	245		873	T	1.7	3.7	0.0	0.0	0.0	356	
6906	L	0	L-311	AUX	245		873	T	1.7	3.7	43.0	0.0	0.0	356	
6911	L	0	SPEC	AUX	245		873	T	3.7	1.0	0.0	0.0	0.0	526	
6947	L	0	SPEC	FHB	268		841	T	7.5	3.0	0.0	0.0	0.0	560	
6953	L	0		FHB	270		841	T	4.6	3.5	0.0	0.0	0.0	526	
6960	L	0		FHB	270		841	T	4.6	3.0	0.0	0.0	0.0	605	
6961	L	0	SPEC	FHB	270		841	T	3.4	1.6	0.0	0.0	0.0	581	
6963	L	0	SPEC	FHB	270		841	T	2.4	1.5	0.0	0.0	0.0	581	
6964	L	0	SPEC	FHB	270		841	T	3.0	3.0	0.0	0.0	0.0	581	
6965	L	0		FHB	270		841	T	4.6	3.0	0.0	0.0	0.0	581	
7065	L	0	SPEC	FHB	272		860	M	3.5	3.0	0.0	0.0	0.0	545	
7073	L	0	SPEC	FHB	272		860	T	2.3	3.3	0.0	0.0	0.0	545	
7074	L	0	SPEC	FHB	272		860	T	14.2	1.6	0.0	0.0	0.0	489	
7075	L	0	SPEC	FHB	259		860	T	14.2	3.1	0.0	0.0	0.0	0	≠ 4/14 = .825
7076	L	0	SPEC	FHB	259		860	T	14.0	4.3	0.0	0.0	0.0	0	
7084	L	0	SPEC	FHB	272		860	T	12.8	1.2	0.0	0.0	0.0	588	
7114	L	0	SPEC	ECB	133		807	T	2.4	3.3	0.0	0.0	0.0	496	
12079	L	0		AUX	175		790	T	3.5	2.3	0.0	0.0	0.0	549	
12263	L	0	SPEC	AUX	207		810	T	4.1	2.1	0.0	0.0	0.0	507	
12276	L	0		AUX	175		790	T	1.3	2.5	0.0	0.0	0.0	535	
12287	L	0	SPEC	AUX	207		810	T		2.8	0.0	0.0	0.0	507	
12359	L	0	SPEC	ECB	133		807	M	1.9	4.7	0.0	0.0	0.0	588	
12446	L	0	SPEC	AUX	241		852	M	9.3	3.2	414.0	0.0	0.0	549	
12469	L	0		AUX	180		790	T	2.7	2.5	0.0	0.0	0.0	507	
12600	L	0	SPEC	ECB	119		792	T	5.7	3.0	0.0	0.0	0.0	507	
12620	L	0	SPEC	AUX	241		792	T	2.3	1.5	0.0	0.0	0.0	521	
12638	L	0	SPEC	AUX	175		790	M	4.5	2.3	0.0	0.0	0.0	549	
12683	L	0		FHB	249	B	810	T	4.3	3.4	0.0	0.0	0.0	526	
12684	L	0		FHB	249	B	810	T	4.3	4.0	0.0	0.0	0.0	526	
12693	L	0	SPEC	AUX	239		852	T	4.2	2.2	0.0	0.0	0.0	504	
12696	L	0	SPEC	AUX	241		852	T	3.9	2.6	0.0	0.0	0.0	489	
13008	L	0	SPEC	AUX	241		852	T	4.9	2.9	0.0	0.0	0.0	588	
13021	L	0	SPEC	AUX	226		831	T	5.7	3.1	0.0	0.0	0.0	535	
13041	L	0	SPEC	AUX	226		831	M	6.0	3.5	0.0	0.0	0.0	549	
13042	L	0	SPEC	AUX	226		831	T	0.0	2.0	0.0	0.0	0.0	521	
13142	L	0		AUX	245		873	T	1.4	3.0	0.0	0.0	0.0	507	
13182	L	0		AUX	174		790	L	1.5	1.8	0.0	0.0	0.0	521	
13190	L	0	SPEC	AUX	207		810	T		1.8	0.0	0.0	0.0	507	
13194	L	0	SPEC	AUX	207		810	T	2.7	1.5	0.0	0.0	0.0	507	
13228	L	0	SPEC	ECB	113		778	T	1.0	0.5	0.0	0.0	0.0	581	
1614	L2	0	SPEC	AUX	219		831	T	5.7	2.5	0.0	0.0	0.0	561	
1958	L2	0	SPEC	FHB	249	B	810	T	3.1	1.6	0.0	0.0	0.0	636	

HANGER	GEOMET	MOTH SUPP	GROUPING	BLDG	ROOM	RL	ELEV	TYPE	HGHT	WDTH	TRANSV TRAY WT.	LONG TR WT.	THERMO LOAD	FILE REFS	REMARKS
3903	L2	0	SPEC	AUX	207		810	T	2.8	3.9	0.0	0.0	0.0	218	
3906	L2	0	SPEC	AUX	207		810	T	4.9	1.8	0.0	0.0	0.0	285	
3956	L2	0	SPEC	AUX	241		852	T	5.6	4.7	0.0	0.0	0.0	244	
3976	L2	0		FHB	272		860	T	5.3	1.5	0.0	0.0	0.0	541	
3977	L2	0		FHB	272		860	T	5.3	1.5	0.0	0.0	0.0	541	
3979	L2	0		FHB	272		860	T	4.6	1.5	0.0	0.0	0.0	541	
3981	L2	0		FHB	272		860	T	4.6	1.5	0.0	0.0	0.0	541	
3982	L2	0		FHB	272		860	T	4.6	1.6	0.0	0.0	0.0	541	
3984	L2	0		FHB	272		860	T	4.6	1.5	0.0	0.0	0.0	541	
3985	L2	0		FHB	272		860	T	5.1	1.5	0.0	0.0	0.0	545	
3987	L2	0	SPEC	AUX	180		790	T	5.3	3.2	0.0	0.0	0.0	298	
4723	L2	0	SPEC	ECB	133		807	M	6.1	4.3	0.0	0.0	0.0	350	
5027	L2	0	SPEC	ECB	150		854	T	9.6	3.3	0.0	0.0	0.0	496	
5051	L2	0	SPEC	ECB	150		854	T	11.0	2.9	0.0	0.0	0.0	597	
5197	L2	0	SPEC	AUX	241		852	T	7.8	3.7	0.0	0.0	0.0	218	
6380	L2	0	SPEC	AUX	241		852	M	6.5	2.9	0.0	0.0	0.0	298	
6430	L2	0	SPEC	AUX	241		852	T	11.2	3.8	0.0	0.0	0.0	298	
6447	L2	0	SPEC	AUX	241		852	T	7.8	1.8	0.0	0.0	0.0	504	
6457	L2	0	SPEC	AUX	241		852	T	9.3	3.8	0.0	0.0	0.0	612	
7012	L2	0	SPEC	FHB	272		860	T	7.3	2.7	0.0	0.0	0.0	605	
7015	L2	0	SPEC	FHB	272		860	T	7.3	2.3	0.0	0.0	0.0	605	
7072	L2	0		FHB	272		860	T	5.2	3.0	0.0	0.0	0.0	541	
12427	L2	0	SPEC	ECB	150		854	T	8.5	3.0	0.0	0.0	0.0	605	
13127	L2	0	SPEC	AUX	175		790	T	4.9	1.8	0.0	0.0	0.0	521	
13195	L2	0	SPEC	AUX	241		852	T	8.9	4.8	0.0	0.0	0.0	526	
124	L2W	0	SPEC	AUX	179		790	T	9.8	5.3	0.0	0.0	0.0	418	
393	L2W	0	SPEC	AUX	185		790	T	5.0	3.6	0.0	0.0	0.0	526	
561	L2W	0	SPEC	ECB	121		792	T	2.6	3.0	0.0	0.0	0.0	450	
565	L2W	0	SPEC	ECB	121		792	T	5.7	3.0	0.0	0.0	0.0	541	
1010	L2W	0		AUX	207		810	T	8.0	5.8	0.0	0.0	0.0	378	
2838	L2W	0	SPEC	ECB	115	A	778	T	12.1	6.8	0.0	0.0	0.0	207	
2843	L2W	0	SPEC	ECB	115	A	778	T	11.3	7.5	0.0	0.0	0.0	207	
2845	L2W	0		ECB	115	A	778	T	11.3	6.8	0.0	0.0	0.0	405	
2849	L2W	0		ECB	115	A	778	T	7.5	3.2	0.0	0.0	0.0	207	
2852	L2W	0	SPEC	ECB	115	A	778	T	4.1	3.3	0.0	0.0	0.0	207	
2856	L2W	0	SPEC	ECB	115	A	778	T	7.5	3.9	0.0	0.0	0.0	378	
2858	L2W	0		ECB	115	A	778	T	7.5	3.9	0.0	0.0	0.0	418	
2860	L2W	0	SPEC	ECB	115	A	778	T	6.1	3.2	0.0	0.0	0.0	395	
2865	L2W	0	SPEC	ECB	115	A	778	T	11.3	8.0	0.0	0.0	0.0	504	
2867	L2W	0	SPEC	ECB	115	A	778	M	11.3	8.3	0.0	0.0	0.0	433	- 4.3%
2869	L2W	0	SPEC	ECB	115	A	790	T	11.3	8.0	0.0	0.0	0.0	549	
2873	L2W	0	SPEC	ECB	115	A	778	T	11.4	6.8	0.0	0.0	0.0	285	
2880	L2W	0	SPEC	ECB	113		778	T	6.4	4.0	0.0	0.0	0.0	400	
2881	L2W	0	SPEC	ECB	113		778	T	6.4	4.0	0.0	0.0	0.0	400	
2883	L2W	0	SPEC	ECB	113		778	M	10.4	3.5	0.0	0.0	0.0	400	
2885	L2W	0	SPEC	ECB	113		778	T	14.5	3.5	0.0	0.0	0.0	395	6.5%

BARGER	GEOMET	MOTH SUPP	GROUPING	BLDG	ROOM	RL	ELEV	TYPE	HGHT	WDTH	TRANSV TRAY WT.	LONG TR WT.	THERMO LOAD	FILE REF	REMARKS
2887	L2W	0	SPEC	ECR	113		778	T	14.4	3.5	0.0	0.0	0.0	395	
2915	L2W	0	SPEC	ECR	113		778	M	11.8	2.4	0.0	0.0	0.0	466	
3144	L2W	0		ECR	115	A	790	T	11.3	6.0	0.0	0.0	0.0	207	
3966	L2W	0	SPEC	FHR	247	A	810	T	6.1	5.5	0.0	0.0	0.0	285	
4917	L2W	0	SPEC	ECR	150		854	T	8.7	6.6	0.0	0.0	0.0	561	
4944	L2W	0	SPEC	ECR	150	A	854	T	13.7	6.6	0.0	0.0	0.0	223	
4961	L2W	0	L2W-301	ECR	150	A	854	T	8.8	7.0	245.0	0.0	0.0	218	
4962	L2W	1	L2W-301	ECR	150	A	854	T	8.8	7.0	470.0	0.0	0.0	218	
4986	L2W	0	SPEC	ECR	150	A	854	T	8.8	7.0	0.0	0.0	0.0	433	
5291	L2W	0	SPEC	AUX	179		790	T	4.9	3.6	0.0	0.0	0.0	466	
6180	L2W	0	SPEC	AUX	245		873	T	11.5	8.3	0.0	0.0	0.0	350	
6399	L2W	0	SPEC	AUX	241		852	M	6.4	6.5	0.0	0.0	0.0	489	
6482	L2W	0		AUX	207		810	T	10.4	4.4	0.0	0.0	0.0		
6483	L2W	0	SPEC	AUX	207		810	T	8.5	3.2	0.0	0.0	0.0	560	
6485	L2W	0		AUX	207		810	T	10.2	4.2	0.0	0.0	0.0	507	
12580	L2W	0	SPEC	ECR	121		792	T	5.7	3.0	0.0	0.0	0.0	560	
127	L3W	1	SPEC	AUX	179		790	T	10.3	5.2	0.0	0.0	0.0	507	
129	L3W	0	SPEC	AUX	179		790	T	9.3	5.3	0.0	0.0	0.0	489	
1888	L3W	0	SPEC	AUX	226		831	T	9.8	5.2	0.0	0.0	0.0	426	
1889	L3W	0	SPEC	AUX	226		831	T	12.5	3.7	0.0	0.0	0.0	588	
2229	L3W	0	SPEC	DGR	84		810	T	4.1	5.0	0.0	0.0	0.0	157	
2811	L3W	0	SPEC	ECR	115		788	T	9.2	3.4	0.0	0.0	0.0	285	
2819	L3W	0	SPEC	ECR	113		778	T	12.2	5.5	0.0	0.0	0.0	405	
3286	L3W	0	SPEC	AUX	207		810	T	9.7	10.3	0.0	0.0	0.0	285	
5109	L3W	0		AUX	241		852	L	11.9	7.3	0.0	0.0	0.0	405	
5149	L3W	0	SPEC	AUX	241		852	T	8.8	8.3	0.0	0.0	0.0	457	
5215	L3W	0	SPEC	AUX	241		852	T	8.9	8.3	0.0	0.0	0.0	581	
5245	L3W	0	SPEC	AUX	174		790	T	6.2	4.4	0.0	0.0	0.0	489	
5606	L3W	0		AUX	245		873	L	14.0	4.3	0.0	0.0	0.0	541	
6369	L3W	0	SPEC	AUX	241		852	T	11.5	8.0	0.0	0.0	0.0	489	
1886	L4W	0	SPEC	AUX	226		831	T	9.8	4.0	0.0	0.0	0.0	457	
2816	L4W	0	SPEC	ECR	115		788	T	12.3	5.3	0.0	0.0	0.0	218	
3180	L4W	0	SPEC	ECR	115	A	778	T	9.2	4.5	0.0	0.0	0.0	418	
6367	L4W	0	SPEC	AUX	241		852	T	13.0	6.5	0.0	0.0	0.0	489	
5417	L6W	0	SPEC	AUX	226		831	T	10.1	6.8	0.0	0.0	0.0	450	
5418	L6W	0		AUX	226		830	L	9.7	8.0	0.0	0.0	0.0	504	
5419	L6W	0	SPEC	AUX	226		831	T	11.2	8.3	0.0	0.0	0.0	489	
43	LW	0		AUX	174		790	T	7.0	4.5	0.0	0.0	0.0	561	
123	LW	0	SPEC	AUX	176		790	T	4.1	3.2	0.0	0.0	0.0	526	
151	LW	0	SPEC	ECR	113		778	T	16.0	11.3	0.0	0.0	0.0	426	
300	LW	0	SPEC	AUX	175		790	T	2.6	5.5	0.0	0.0	0.0	350	
301	LW	0	SPEC	AUX	175		790	T	2.6	5.5	0.0	0.0	0.0	378	
302	LW	0	SPEC	AUX	175		790	T	3.5	6.5	0.0	0.0	0.0	378	
303	LW	0	SPEC	AUX	175		790	T	3.0	9.5	0.0	0.0	0.0	378	
439	LW	0	SPEC	AUX	176		790	M	2.5	4.4	0.0	0.0	0.0	378	
452	LW	0		AUX	174		790	T	7.0	5.5	0.0	0.0	0.0	588	

HANCER	GEOMET	MOTH SUPP	GROUPING	BLDG	ROOM	RL	ELEV	TYPE	HGHT	WDTH	TRANSV TRAY WT.	LONG TR WT.	THERMO LOAD	FILE REF#	REMARKS
464	LW	0	SPEC	AUX	174		790	T	5.0	4.1	0.0	0.0	0.0	581	
498	LW	0	SPEC	ECB	129		792	T	1.2	2.0	0.0	0.0	0.0	549	
536	LW	0	SPEC	ECB	121		790	T	4.3	2.5	0.0	0.0	0.0	526	
538	LW	0	SPEC	ECB	121		790	T	4.3	2.5	0.0	0.0	0.0	526	
542	LW	0	SPEC	ECB	119		792	T	1.5	2.2	0.0	0.0	0.0	507	
552	LW	0	SPEC	ECB	119		792	T	5.2	2.7	0.0	0.0	0.0	521	
553	LW	0	SPEC	ECB	119		792	T	5.2	2.7	0.0	0.0	0.0	521	
560	LW	0	SPEC	ECB	119		792	T	2.0	2.7	0.0	0.0	0.0	507	
562	LW	0		ECB	129		792	T	5.5	1.7	0.0	0.0	0.0	496	6.40%
1233	LW	0	SPEC	AUX	207		810	T	9.7	4.0	0.0	0.0	0.0	356	
1251	LW	0	SPEC	AUX	207		810	T	3.8	3.3	0.0	0.0	0.0	350	
1252	LW	0	SPEC	AUX	207		810	T	3.8	3.3	0.0	0.0	0.0	378	
1253	LW	0	SPEC	AUX	207		810	T	7.7	4.0	0.0	0.0	0.0	507	
1325	LW	0	SPEC	AUX	207		810	T	1.8	8.0	0.0	0.0	0.0	395	
1339	LW	0		AUX	207		807	T	8.4	6.7	0.0	0.0	0.0	0	
1669	LW	0	SPEC	ECB	133		807	T	12.2	6.9	0.0	0.0	0.0	507	
1825	LW	0		FHB	255		810	T	1.3	4.8	0.0	0.0	0.0	541	
1826	LW	0		FHB	255		810	T	1.3	4.8	0.0	0.0	0.0	541	
1828	LW	0		FHB	255		810	T	1.3	4.3	0.0	0.0	0.0	0	
1829	LW	0		FHB	255		810	T	1.3	4.3	0.0	0.0	0.0	0	
1830	LW	0		FHB	255		810	T	1.3	4.3	0.0	0.0	0.0	0	
1883	LW	0		AUX	174		790	T	7.1	5.0	0.0	0.0	0.0	588	
1905	LW	0	SPEC	AUX	226		831	T	0.9	6.1	0.0	0.0	0.0	244	
1906	LW	0	SPEC	AUX	226		831	T	1.0	5.8	0.0	0.0	0.0	285	
1913	LW	0		AUX	226		831	T	8.6	8.8	0.0	0.0	0.0	549	
1918	LW	0	SPEC	AUX	226		831	T	6.6	7.9	0.0	0.0	0.0	285	
2802	LW	0	SPEC	ECB	115		788	T	5.3	5.9	0.0	0.0	0.0	195	
2812	LW	0	SPEC	ECB	115		788	T	9.2	8.3	0.0	0.0	0.0	285	
2823	LW	0	SPEC	ECB	113		778	T	12.2	5.4	0.0	0.0	0.0	281	
2861	LW	0	SPEC	AUX	179		790	T	4.0	11.2	0.0	0.0	0.0	496	
2862	LW	0	SPEC	ECB	115	A	778	T	8.2	6.5	0.0	0.0	0.0	418	
2872	LW	0	SPEC	ECB	115	A	778	T	4.1	4.3	0.0	0.0	0.0	400	
2875	LW	0	SPEC	ECB	113		778	T	1.2	7.8	0.0	0.0	0.0	341	
2890	LW	0	SPEC	ECB	113		778	T	14.3	3.5	0.0	0.0	0.0	496	6.48%
3025	LW	0	SPEC	AUX	180		790	T	4.4	11.3	0.0	0.0	0.0	507	
3028	LW	0	SPEC	AUX	180		790	T	4.4	11.4	0.0	0.0	0.0	507	
3031	LW	0	SPEC	AUX	180		790	T	4.3	8.0	0.0	0.0	0.0	223	
4694	LW	0	SPEC	ECB	129		792	T	2.0	3.6	0.0	0.0	0.0	597	
4895	LW	0	SPEC	ECB	129		792		1.6	3.6	0.0	0.0	0.0	504	
4942	LW	0	SPEC	ECB	150	A	854	L	7.8	6.6	0.0	0.0	0.0	305	
4943	LW	0	SPEC	ECB	150	A	854	M	9.9	6.6	0.0	0.0	0.0	207	
4974	LW	0	SPEC	ECB	150	A	854	T	8.3	8.1	0.0	0.0	0.0	450	
5145	LW	0	SPEC	AUX	241		852	T	1.3	6.1	0.0	0.0	0.0	281	
5147	LW	0	SPEC	AUX	241		852	T	2.9	7.8	0.0	0.0	0.0	405	
5231	LW	0	SPEC	AUX	207		810	T	2.1	3.6	0.0	0.0	0.0	218	
5552	LW	0	SPEC	ECB	115	A	778	T	8.1	7.4	0.0	0.0	0.0	549	

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HANGER	GEOMET	MOTH SUPP	GROUPING	BLDG	ROOM	RL	ELEV	TYPE	HGHT	WDTH	TRANSV TRAY WT.	LONG TR WT.	THERMO LOAD	FILE REF#	REMARKS
6432	LW	0	SPEC	AUX	241		852	T	2.2	8.5	0.0	0.0	0.0	612	
6478	LW	0	SPEC	AUX	207		810	T	5.0	4.3	0.0	0.0	0.0		
12058	LW	0	SPEC	AUX	207		810	T	5.0	4.5	0.0	0.0	0.0	521	
2390	U1	0	SPEC	ECB	115	A	778	T	0.8	3.0	0.0	0.0	0.0	356	

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HANGER	GEOMET	MOTH SUPP	GROUPING	BLDG	ROOM	RL	ELEV	TYPE	HGHT	WDTH	TRANSV TRAY WT.	LONG TR WT.	THERMO LOAD	FILE REF#	REMARKS
519	L	0	-- -	AUX	118		792		4.1	2.7	0.0	0.0	0.0	0	
1881	L	0		AUX	219		831	T	1.8	2.2	0.0	0.0	0.0	0	
2787	L	0	-- -	AUX	126		792		3.2	1.8	0.0	0.0	0.0	0	W, UNMOD
2934	L	0		AUX	180		790		10.2	1.7	0.0	0.0	0.0	0	
3143	L	0		AUX	113		778		3.9	3.8	0.0	0.0	0.0	0	
3256	L	0		AUX	180		790		2.3	2.9	0.0	0.0	0.0	0	W, UNMOD
3265	L	0		AUX	180		790		3.5	2.6	0.0	0.0	0.0	0	
3370	L	0		AUX	113		790		3.2	5.7	0.0	0.0	0.0	0	
3521	L	0		AUX	180		790		5.1	3.0	0.0	0.0	0.0	0	
4913	L	0		AUX	150		852		6.7	2.7	0.0	0.0	0.0	0	W
5221	L	0		AUX	180		790		1.7	10.7	0.0	0.0	0.0	0	
5223	L	0		AUX	180		790		3.2	10.6	0.0	0.0	0.0	0	UNMOD
5701	L	0		AUX	212		831		3.8	2.5	0.0	0.0	0.0	0	
6217	L	0		AUX	235		852		8.8	1.7	0.0	0.0	0.0	0	W
6257	L	0		AUX	241		852		1.8	3.5	1093.0	0.0	0.0	0	UNMOD
6265	L	0		AUX	241		852	T	1.7	3.9	0.0	0.0	0.0	0	
6724	L	0	L-16	AUX	226		831		5.7	4.0	165.0	0.0	0.0	0	
6726	L	1	L-16	AUX	226		831		5.7	2.2	187.0	0.0	0.0	0	
6989	L	0	CANT-28	AUX	230		842		1.2	1.7	274.0	0.0	0.0	0	
6990	L	1	CANT-28	AUX	230		842		1.2	1.7	279.0	0.0	0.0	0	
7250	L	0	--	SFG	54		773		1.0	1.5	0.0	0.0	0.0	0	
7255	L	0	L-23__	SFG	56	N	773		3.3	1.7	101.0	0.0	0.0	0	
7256	L	0	L-2	SFG	56	N	773		3.3	1.5	169.0	0.0	0.0	0	
7261	L	1	L-23__	SFG	56	S	773		3.2	2.0	134.0	0.0	0.0	0	
7262	L	0	L-8	SFG	51		773		3.3	1.5	70.0	0.0	0.0	0	
7269	L	0	L-2	SFG	51		773		1.0	1.2	109.0	0.0	0.0	0	
7270	L	0	L-2	SFG	51		773		0.9	1.3	219.0	0.0	0.0	0	
7271	L	1	L-29	SFG	51		807		1.8	2.1	108.0	0.0	0.0	0	
7273	L	0	L-29	SFG	51		773		1.0	2.1	73.0	0.0	0.0	0	
7293	L	0	--	AUX	207		810		2.3	4.2	0.0	0.0	0.0	0	
7304	L	0	--	AUX	207		807		9.5	3.9	0.0	0.0	0.0	0	
7306	L	0		AUX	207		810		4.5	3.6	0.0	0.0	0.0	0	
7343	L	0	--	AUX	207		810		5.2	2.5	0.0	0.0	0.0	0	
7362	L	0	--	AUX	207		810		9.2	3.7	0.0	0.0	0.0	0	
7363	L	0	--	AUX	207		807		9.2	4.0	0.0	0.0	0.0	0	
7485	L	0	--	SFG	70		790	T	2.0	2.0	129.0	0.0	0.0	0	
7494	L	0	--	SFG	70		790	T	2.0	2.5	307.0	0.0	0.0	0	HOLD
7499	L	0	--	SFG	70		790	T	2.0	2.3	356.0	0.0	0.0	0	
7503	L	0	--	SFG	70		790	T	1.0	3.3	532.0	0.0	0.0	0	
7567	L	0	--	SFG	71		790		3.0	2.2	0.0	0.0	0.0	0	
7575	L	0	--	SFG	67		790		2.2	2.5	0.0	0.0	0.0	0	
7585	L	0	L-11__	SFG	65		790		4.0	1.8	401.0	0.0	0.0	0	
7645	L	0	--	SFG	66		790		0.9	2.6	0.0	0.0	0.0	0	
7716	L	0	-- -	AUX	134		807		4.1	3.7	0.0	0.0	0.0	0	UNMOD
7796	L	0	--	AUX	134		807		1.8	4.0	0.0	0.0	0.0	0	
8107	L	0	SPEC	AUX	134		807		5.8	3.0	536.0	0.0	0.0	0	UNMOD

$\frac{W}{H} = \frac{1.84}{0.53} = 2.53$ → $\frac{1.84}{1.66} = 2.71$ → 7.2%

HANGER	GEOMET	MOTH SUPP	GROUPING	BLDG	ROOM	RL ELEV	TYPE	HEIGHT	WIDTH	TRANSV TRAY WT.	LONG TR WT.	THERMO LOAD	FILE REF#	REMARKS
8108	L	0	-- -	AUX	134	807	_	2.0	3.4	0.0	0.0	0.0	0	UNMOD
8111	L	0	-- -	AUX	134	807	_	3.9	3.3	0.0	0.0	0.0	0	
8306	L	0	-- -	AUX	134	807	_	1.5	4.8	0.0	0.0	0.0	0	
8563	L	0		AUX	134	807	_	4.1	3.0	0.0	0.0	0.0	0	UNMOD
8569	L	0	-- -	AUX	134	807	_	3.2	3.5	0.0	0.0	0.0	0	
8612	L	0	--	AUX	207	810	_	2.5	3.5	0.0	0.0	0.0	0	UNMOD
8616	L	0	SPEC	AUX	207	810	_	5.6	5.1	0.0	0.0	0.0	0	
8629	L	0	--	AUX	207	810	_	2.0	5.3	0.0	0.0	0.0	0	
8653	L	0	-- -	AUX	134	807	_	2.6	4.5	0.0	0.0	0.0	0	
8656	L	0	SPEC	AUX	134	807	_	4.0	1.7	151.0	0.0	0.0	0	
8658	L	0	-- -	AUX	134	807	_	2.8	2.7	0.0	0.0	0.0	0	
8695	L	0	-- -	AUX	134	807	_	5.8	1.8	0.0	0.0	0.0	0	
8696	L	1	L-27__	AUX	134	807	_	2.9	2.6	50.0	0.0	0.0	0	
8697	L	0	L-27__	AUX	134	807	_	2.8	1.5	118.0	0.0	0.0	0	
8771	L	0	-- -	AUX	134	807	_	1.8	2.9	0.0	0.0	0.0	0	
8776	L	0	L-26__	AUX	134	807	_	3.1	2.9	210.0	0.0	0.0	0	
8811	L	0	-- -	AUX	134	807	_	1.8	5.2	0.0	0.0	0.0	0	
9212	L	0	L-14__	AUX	134	807	_	4.3	3.6	456.0	0.0	0.0	0	UNMOD
9219	L	1	L-14__	AUX	134	807	_	4.3	3.5	466.0	0.0	0.0	0	UNMOD
9247	L	1	L-26	AUX	134	807	_	3.8	3.1	231.0	0.0	0.0	0	
9330	L	1	L-22__	AUX	134	807	_	4.6	3.6	344.0	0.0	0.0	0	UNMOD
9333	L	0	-- -	AUX	134	807	_	3.7	3.2	0.0	0.0	0.0	0	UNMOD
9352	L	0	-- -	AUX	134	807	_	3.0	2.4	0.0	0.0	0.0	0	
9453	L	0	-- -	AUX	134	807	_	1.9	4.0	0.0	0.0	0.0	0	UNMOD
9461	L	0	-- -	AUX	134	807	_	0.7	1.0	0.0	0.0	0.0	0	
9564	L	0	L-22__	AUX	134	807	_	4.7	2.4	22.0	0.0	0.0	0	UNMOD
9621	L	0	SP-18__	AUX	134	807	_	3.0	2.0	86.0	86.0	0.0	0	
9622	L	1	SP-18__	AUX	134	807	_	3.0	2.0	86.0	86.0	0.0	0	
9656	L	0	-- -	AUX	134	807	_	4.5	2.0	0.0	0.0	0.0	0	
9696	L	0	-- -	AUX	134	807	_	1.0	3.2	0.0	0.0	0.0	0	
9697	L	0	-- -	AUX	134	807	_	1.8	3.1	0.0	0.0	0.0	0	
9724	L	0	--	RB	3	808	T	3.0	2.5	380.0	0.0	0.0	0	
9997	L	0	L-20__	RB	9	832	T	1.9	2.1	181.0	0.0	0.0	0	
10000	L	0	--	RB	9	832	T	3.2	1.8	200.0	0.0	0.0	0	
10003	L	0	--	RB	9	832	T	4.5	2.5	193.0	0.0	0.0	0	
10004	L	1	L-12__	RB	9	832	T	3.0	3.8	165.0	0.0	0.0	0	
10005	L	0	L-12__	RB	9	832	T	2.0	3.8	155.0	0.0	0.0	0	
10007	L	0		RB	9	832	T	3.0	6.0	225.0	0.0	0.0	999	STE
10015	L	0	--	RB	9	832	T	5.3	2.3	197.0	0.0	0.0	0	
10016	L	0	L-20__	RB	9	832	T	1.4	1.8	184.0	0.0	0.0	0	
10026	L	0	--	RB	9	832	T	4.0	2.8	450.0	0.0	0.0	0	
10031	L	0	--	RB	9	832	_	3.9	2.7	0.0	0.0	0.0	999	STE,
10040	L	0	--	RB	9	832	_	6.5	1.8	298.0	0.0	0.0	0	
10050	L	0	--	RB	9	832	T	3.1	1.8	175.0	0.0	0.0	0	
10079	L	0	--	RB	9	832	T	1.8	3.4	451.0	0.0	0.0	0	
10095	L	1	L-20__	RB	12	832	T	1.9	2.1	158.0	0.0	0.0	0	

HANGER	GEOMET	MOTH SUPP	GROUPING	BLDG	ROOM	RL	ELEV	TYPE	HGHT	WDTH	TRANSV TRAY WT.	LONG TR WT.	THERMO LOAD	FILE REF#		REMARKS
10098	L	0	--	RB	12		832	T	1.9	2.1	300.0	0.0	0.0	0		
10106	L	0	--	RB	17		849		1.2	5.7	0.0	0.0	0.0	0		
10136	L	0	--	RB	15		842	T	1.0	2.3	274.0	0.0	0.0	0		
10158	L	0	--	SFG	83		810	T	5.6	3.2	286.0	0.0	0.0	0		
10194	L	0	L-15__	SFG	83		810		5.6	2.7	266.0	0.0	0.0	0		
10198	L	1	L-18__	SFG	83		810	T	3.0	3.0	368.0	0.0	0.0	0		
10206	L	0	--	SFG	83		810		2.9	3.8	0.0	0.0	0.0	0	W	
10209	L	0	L-18__	SFG	83		810	T	1.6	3.8	280.0	0.0	0.0	0		
10230	L	0	--	SFG	83		810	T	4.3	2.6	36.0	0.0	0.0	0		
10266	L	0	--	SFG	83		810		3.7	3.5	0.0	0.0	0.0	0		
10308	L	0	41	SFG	83		810	T	6.5	3.3	315.0	0.0	0.0	0		
10319	L	0	42	SFG	83		810	T	11.1	4.8	385.0	0.0	0.0	0		
10328	L	0	51	SFG	83		810		4.3	3.2	0.0	0.0	0.0	0		
10347	L	0	L-18	SFG	83		810	T	3.1	2.5	386.0	0.0	0.0	0		
10349	L	0	--	SFG	83		810	T	1.0	2.3	314.0	0.0	0.0	0		
10350	L	0	49	SFG	83		810	T	5.2	3.3	440.0	0.0	0.0	0		
10357	L	0		SFG	83		810		4.8	1.8	0.0	0.0	0.0	0		
10361	L	0	L-7	SFG	83		810		3.3	2.5	0.0	0.0	0.0	0		
10382	L	0	--	SFG	83		810		1.6	2.5	0.0	0.0	0.0	0		
10383	L	0	--	SFG	83		810		3.0	2.0	0.0	0.0	0.0	0		
10386	L	0		SFG	83		810	T	1.1	2.5	141.0	0.0	0.0	0		
10454	L	0	--	SFG	82		810		4.1	3.0	0.0	0.0	0.0	0		
10455	L	0	--	SFG	82		810		6.0	3.2	0.0	0.0	0.0	0		
10457	L	0	--	SFG	82		810		4.8	3.8	0.0	0.0	0.0	0	W	
10462	L	0	L-9	SFG	82		810		4.8	2.3	189.0	0.0	0.0	0		
10463	L	0		SFG	82		810		4.8	1.8	0.0	0.0	0.0	0		
10464	L	0	L-17__	SFG	82		810		4.3	2.8	628.0	0.0	0.0	0		
10466	L	0	L-9	SFG	82		810		4.8	2.0	322.0	0.0	0.0	0	W	
10467	L	0	--	SFG	82		810		1.3	2.8	0.0	0.0	0.0	0		
10470	L	0	L-9	SFG	82		810		4.3	3.3	536.0	0.0	0.0	0		
10471	L	1	L-17__	SFG	82		810		4.3	2.8	720.0	0.0	0.0	0		
10482	L	0	L-9	SFG	82		810		4.8	2.0	232.0	0.0	0.0	0		
10484	L	1	L-9	SFG	82		810		4.3	3.2	767.0	0.0	0.0	0		
10485	L	0	L-9	SFG	82		810		5.3	2.0	226.0	0.0	0.0	0		
10487	L	1	L-5	SFG	82		810		1.3	3.2	858.0	0.0	0.0	0		
10488	L	0		SFG	82		810		4.8	2.0	0.0	0.0	0.0	0		
10489	L	0	--	SFG	82		810		5.8	4.3	0.0	0.0	0.0	0		
10490	L	0	L-24	SFG	82		810		5.1	2.1	89.0	0.0	0.0	0		
10495	L	0	L-17__	SFG	82		810		4.4	2.8	404.0	0.0	0.0	0		
10496	L	0	L-17__	SFG	82		810		4.3	2.8	556.0	0.0	0.0	0		
10514	L	0	--	SFG	82		810		5.0	1.8	0.0	0.0	0.0	0		
10515	L	0	--	SFG	82		810		5.7	1.7	0.0	0.0	0.0	0		
10517	L	0	L-5	SFG	82		810		2.0	3.3	739.0	0.0	0.0	0		
10520	L	0	--	SFG	82		810		3.5	1.6	0.0	0.0	0.0	0		
10524	L	0	--	SFG	82		810		3.5	1.3	0.0	0.0	0.0	0		
10525	L	0	SPEC	SFG	82		810		1.3	2.0	0.0	0.0	0.0	0		

HANGER	GEOMET	MOTH SUPP	GROUPING	BLDG	ROOM	RL	ELEV	TYPE	HGHT	WDTH	TRANSV TRAY WT.	LONG TR WT.	THERMO LOAD	FILE REF#	REMARKS
10526	L	0	--	SFG	82		810	_	1.4	3.4	0.0	0.0	0.0	0	
10527	L	0	--	SFG	82		810	_	0.8	2.0	0.0	0.0	0.0	0	
10535	L	0	--	SFG	82		810	_	3.3	2.8	0.0	0.0	0.0	0	
10537	L	0	SPEC	SFG	82		810	_	2.8	1.7	0.0	0.0	0.0	0	
10685	L	0		SFG	82		810		1.3	3.2	0.0	0.0	0.0	0	
10688	L	1	L-6	SFG	82		810	_	0.8	3.5	0.0	0.0	0.0	0	
10689	L	0		SFG	82		810		2.2	0.8	0.0	0.0	0.0	0	
10701	L	0	L-13__	SFG	77		810	_	4.4	3.4	563.0	0.0	0.0	0	
10702	L	1	L-13__	SFG	77		810	_	4.4	3.4	630.0	0.0	0.0	0	
10704	L	0	--	SFG	77		810	_	4.4	5.4	0.0	0.0	0.0	0	
10718	L	0	--	SFG	77		810	_	4.6	4.1	0.0	0.0	0.0	0	
10722	L	0	--	SFG	77		810	_	3.6	3.3	0.0	0.0	0.0	0	
10727	L	0	--	SFG	77		810	_	0.0	0.0	0.0	0.0	0.0	0	
10741	L	0	--	SFG	77		810	_	1.7	1.5	0.0	0.0	0.0	0	
10743	L	0	--	SFG	77		810	_	5.1	2.5	0.0	0.0	0.0	0	
10841	L	0	L-1	SFG	88		831	_	1.0	3.0	108.0	0.0	0.0	0	
10842	L	0	SPEC	SFG	88		831	_	1.0	2.2	287.0	0.0	0.0	0	
10849	L	0	L-3	SFG	88		831		0.8	2.0	332.0	0.0	0.0	0	
10850	L	0	L-3	SFG	88		831		0.9	2.0	332.0	0.0	0.0	0	
10851	L	0		SFG	88		831		1.9	2.2	0.0	0.0	0.0	0	
10891	L	0	--	SFG	96		831	_	6.2	3.0	0.0	0.0	0.0	0	
10900	L	0		SFG	96		831		6.3	4.0	0.0	0.0	0.0	0	
10901	L	0	--	SFG	96		831	_	5.5	2.8	0.0	0.0	0.0	0	
10905	L	0	--	SFG	96		831	_	6.3	2.5	0.0	0.0	0.0	0	
10999	L	0	--	SFG	96		831	_	4.4	2.7	0.0	0.0	0.0	0	W
11020	L	0	--	SFG	96		831	_	6.3	4.1	0.0	0.0	0.0	0	
11038	L	0	L-1	SFG	96		831		2.5	1.7	259.0	0.0	0.0	0	
11047	L	0	--	SFG	96		831	_	8.9	2.0	0.0	0.0	0.0	0	
11048	L	1	L-24	SFG	96		831	_	5.0	2.4	241.0	0.0	0.0	0	
11050	L	0	--	SFG	96		831	_	5.5	2.4	0.0	0.0	0.0	0	
11057	L	0	--	SFG	94		831	_	5.1	1.5	0.0	0.0	0.0	0	
11129	L	1	L-30	SFG	103		852	_	8.0	2.7	0.0	0.0	0.0	0	
11130	L	0	L-30	SFG	103		852	_	8.0	2.7	0.0	0.0	0.0	1945	STE,
11228	L	0	--	SFG	103		852	T	5.0	3.0	164.0	0.0	0.0	0	
11231	L	1	L-8	SFG	103		852	T	2.9	3.6	308.0	0.0	0.0	0	
11248	L	0	15	SFG	103		852	T	9.9	2.9	455.0	0.0	0.0	0	
11255	L	0	--	SFG	103		852	_	9.8	3.0	0.0	0.0	0.0	0	
11259	L	0	--	SFG	103		852	_	10.1	3.9	0.0	0.0	0.0	0	W
11266	L	0	8	SFG	103		852	_	2.9	3.7	0.0	0.0	0.0	0	
11287	L	0	--	SFG	103		852	_	11.6	2.6	0.0	0.0	0.0	0	
11328	L	0	--	SFG	103		852	T	6.5	2.8	190.0	0.0	0.0	0	
11395	L	0	--	SFG	100		852	_	1.5	2.1	0.0	0.0	0.0	0	
11435	L	0	--	SFG	100		852	_	4.8	2.6	0.0	0.0	0.0	0	
11436	L	0	--	SFG	100		852	_	10.2	3.0	0.0	0.0	0.0	0	W
11438	L	0	--	SFG	100		852	_	3.9	2.3	0.0	0.0	0.0	0	
11498	L	0	--	RB	10		832	_	2.1	2.1	0.0	0.0	0.0	0	

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HANGER	GEOMET	MOTH SUPP	GROUPING	BLDG	ROOM	RL	ELEV	TYPE	HGHT	WDTH	TRANSV TRAY WT.	LONG TR WT.	THERMO LOAD	FILE REF#	REMARKS
11502	L	0	--	RB	10		832	T	1.6	1.5	298.0	0.0	0.0	0	
11635	L	0	--	RB	21		860	_	4.0	3.5	0.0	0.0	0.0	999	STE.
11685	L	0	--	RB	21		860	_	10.3	2.2	0.0	0.0	0.0	0	
11686	L	0	--	RB	21		860	_	0.0	0.0	0.0	0.0	0.0	0	
11703	L	0	--	RB	21		860	_	3.9	3.1	0.0	0.0	0.0	0	
11705	L	1	L-25__	RB	21		860	_	24.0	2.9	560.0	0.0	0.0	0	← 1.34/1.72 ——— 2.8%.
11708	L	0	--	RB	21		860	T	3.5	2.6	298.0	0.0	0.0	0	
11709	L	0		RB	21		860	_	2.3	3.2	560.0	0.0	0.0	0	
11725	L	0	--	RB	21		860	_	9.2	2.5	0.0	0.0	0.0	0	
11813	L	0	--	RB	19		860	T	3.4	3.0	218.0	0.0	0.0	0	
11891	L	0	--	RB	2		808	_	6.7	2.4	0.0	0.0	0.0	0	
11932	L	0	--	RB	2		808	_	2.8	3.5	0.0	0.0	0.0	0	
11937	L	0	--	RB	2		808	_	6.8	3.0	0.0	0.0	0.0	0	
11940	L	0	--	RB	2		808	_	3.5	4.4	0.0	0.0	0.0	0	
11950	L	0	--	RB	2		808	T	6.4	3.2	0.0	0.0	0.0	0	
11951	L	0	--	RB	2		808	T	4.1	2.8	595.0	0.0	0.0	0	
11952	L	0	--	RB	2		808	T	4.1	2.6	595.0	0.0	0.0	0	
11953	L	0	--	RB	2		808	T	4.1	2.5	595.0	0.0	0.0	0	
11954	L	1	L-2__	RB	2		808	_	3.5	1.8	298.0	0.0	0.0	0	
11957	L	0	--	RB	2		808	_	2.8	2.2	0.0	0.0	0.0	0	
11962	L	0	--	RB	2		808	_	2.8	2.2	0.0	0.0	0.0	0	
11963	L	0	--	RB	2		809	_	3.0	1.8	0.0	0.0	0.0	0	
11964	L	0	--	RB	2		808	_	4.0	1.8	0.0	0.0	0.0	0	
11971	L	0	--	RB	5		808	T	5.0	3.0	595.0	0.0	0.0	0	
11972	L	0	--	RB	5		808	T	3.7	3.5	298.0	0.0	0.0	0	
11981	L	0	--	RB	5		808	_	1.5	4.3	0.0	0.0	0.0	0	
11987	L	0	--	RB	5		808	_	3.0	3.3	0.0	0.0	0.0	0	
12163	L	1	L-1	SFG	83		810	T	2.2	3.0	280.0	0.0	0.0	0	
12165	L	0	L-9	SFG	83		810	_	4.3	2.9	682.0	0.0	0.0	0	
12169	L	0	--	SFG	83		810	_	5.9	4.5	0.0	0.0	0.0	0	
12171	L	0	L-17__	SFG	82		810	_	4.0	3.8	536.0	0.0	0.0	0	
12172	L	0	--	SFG	82		810	_	4.9	5.0	0.0	0.0	0.0	0	
12173	L	0	--	SFG	83		810	_	0.9	2.5	0.0	0.0	0.0	0	
12202	L	0	--	SFG	67		790	_	0.8	2.2	0.0	0.0	0.0	0	
12203	L	0	--	SFG	77		810	_	5.5	5.1	0.0	0.0	0.0	0	
12204	L	0	--	SFG	77		810	_	5.0	2.0	0.0	0.0	0.0	0	
12205	L	0	--	SFG	77		810	_	5.0	4.6	0.0	0.0	0.0	0	
12206	L	0	--	SFG	67		790	_	0.8	1.6	0.0	0.0	0.0	0	
12451	L	0		AUX	207		810		0.7	1.9	0.0	0.0	0.0	0	
12601	L	0	-- -	AUX	118		792	_	5.5	1.5	0.0	0.0	0.0	0	
12611	L	0		AUX	113		778		0.0	2.9	0.0	0.0	0.0	0	
12635	L	0		AUX	219		831		1.7	2.9	0.0	0.0	0.0	0	
12645	L	0		AUX	207		810		1.6	2.2	0.0	0.0	0.0	0	
12663	L	0		AUX	113		778		2.8	2.5	0.0	0.0	0.0	0	
12677	L	0		AUX	113		778		7.2	1.5	0.0	0.0	0.0	0	
12774	L	0	-- -	AUX	134		807	_	1.1	2.0	0.0	0.0	0.0	0	

HANGER	GEOMET	MOTH SUPP	GROUPING	BLDG	ROOM	RL	ELEV	TYPE	HGHT	WDTH	TRANSV TRAY WT.	LONG TR WT.	THERMO LOAD	FILE REF#	REMARKS
12775	L	0	L-28	AUX	134		807	_	1.0	2.0	70.0	0.0	0.0	0	
12836	L	0	-- -	AUX	134		807	_	2.6	1.0	0.0	0.0	0.0	0	
12868	L	0	--	SFG	103		852	_	0.0	0.0	0.0	0.0	0.0	0	HOLD
12891	L	0	--	SFG	83		810	T	0.0	2.2	127.0	0.0	0.0	0	
12886	L	1	L-28__	AUX	134		807	_	4.3	1.7	133.0	0.0	0.0	0	
12896	L	0	L-4	AUX	207		810	_	1.6	2.6	217.0	0.0	0.0	0	
12897	L	1	L-4	AUX	207		0	_	0.0	0.0	217.0	0.0	0.0	0	
12898	L	0	--	SFG	100		852	_	2.2	3.5	0.0	0.0	0.0	0	
12901	L	0	--	SFG	77		810	_	1.5	2.3	0.0	0.0	0.0	0	
12927	L	0	--	SFG	82		810	_	2.4	1.6	0.0	0.0	0.0	0	
12964	L	0	--	SFG	83		810	_	11.0	4.5	0.0	0.0	0.0	0	
13132	L	0		AUX	113		778		9.4	3.3	0.0	0.0	0.0	0	
13147	L	0		AUX	180		792		3.2	2.8	0.0	0.0	0.0	0	
13502	L	1	L-7	SFG	83		810	_	3.4	2.9	0.0	0.0	0.0	0	
13539	L	0	--	SFG	83		810	_	1.9	3.4	0.0	0.0	0.0	0	
13541	L	1	L-15__	SFG	83		810	_	8.2	2.9	320.0	0.0	0.0	0	
13544	L	0	--	SFG	88		831	_	1.9	1.9	0.0	0.0	0.0	0	
13550	L	0		SFG	63		790	_	6.9	2.5	0.0	0.0	0.0	0	
13577	L	0		SFG	65		790	_	4.0	1.7	0.0	0.0	0.0	0	
13580	L	0	--	SFG	96		831	_	3.9	2.4	0.0	0.0	0.0	0	
13581	L	0	--	SFG	96		831	_	1.0	2.8	0.0	0.0	0.0	0	
13585	L	0	--	SFG	103		852	_	7.5	3.3	0.0	0.0	0.0	0	
13603	L	0	--	SFG	100		852	_	0.0	4.1	0.0	0.0	0.0	0	
3266	L1	0		AUX	180		790		5.5	3.2	0.0	0.0	0.0	0	
6215	L1	0		AUX	239		852		6.9	1.7	0.0	0.0	0.0	0	UNMOD
6256	L1	0		AUX	241		852		2.0	3.9	0.0	0.0	0.0	0	
6264	L1	0		AUX	241		852		1.7	3.5	875.0	0.0	0.0	0	
6266	L1	0		AUX	241		852		2.0	4.1	0.0	0.0	0.0	0	
6270	L1	0		AUX	241		852		6.8	3.8	0.0	0.0	0.0	0	
6271	L1	0		AUX	241		852		3.5	3.8	0.0	0.0	0.0	0	W
6732	L1	0		AUX	226		830		3.7	2.8	0.0	0.0	0.0	0	
6741	L1	0		AUX	226		831		2.5	2.8	0.0	0.0	0.0	0	
6767	L1	0		AUX	226		831		4.2	3.2	0.0	0.0	0.0	0	
6987	L1	0		AUX	230		842		1.2	1.3	0.0	0.0	0.0	0	W
6988	L1	1	L-21	AUX	230		842		1.2	1.7	250.0	0.0	0.0	0	
6991	L1	0	L-21	AUX	230		842		1.2	1.7	196.0	0.0	0.0	0	
6992	L1	0	L-21	AUX	230		842		1.2	1.7	140.0	0.0	0.0	0	
12284	L1	0		AUX	115	R	790		1.0	2.3	0.0	0.0	0.0	0	
13125	L1	0		AUX	174		790		2.3	1.5	0.0	0.0	0.0	0	
3052	L1BL	0		AUX	113		778		4.5	4.5	0.0	0.0	0.0	0	
167	L1W	0		AUX	113		778		15.3	8.7	0.0	0.0	0.0	2096	STE,
432	L1W	0		AUX	175		790		1.3	1.5	0.0	0.0	0.0	0	
1036	L1W	0		AUX	207		810		1.6	7.0	0.0	0.0	0.0	0	W
2929	L1W	0		AUX	180		792		8.2	7.9	0.0	0.0	0.0	0	UNMOD
2983	L1W	0		AUX	180		790		4.1	5.7	0.0	0.0	0.0	0	
2985	L1W	0		AUX	180		790		4.1	5.7	0.0	0.0	0.0	0	

HANGER	GEOMET	MOTH SUPP	GROUPING	BLDG	ROOM	RL	ELEV	TYPE	HGHT	WDTH	TRANSV TRAY WT.	LONG TR WT.	THERMO LOAD	FILE REF#	REMARKS
3092	L1W	0		AUX	113		778		1.8	3.2	0.0	0.0	0.0	0	
3225	L1W	0		AUX	180		790		1.2	10.6	1415.0	0.0	0.0	0	
5222	L1W	1	LW-3	AUX	180		790		2.9	10.6	1584.0	0.0	0.0	0	
6742	L1W	0		AUX	226		831		3.2	2.2	0.0	0.0	0.0	0	
12630	L1W	0		AUX	241		852		6.8	1.6	0.0	0.0	0.0	0	
12643	L1W	0		AUX	241		852		9.9	1.5	0.0	0.0	0.0	0	
13667	L1W	0		AUX	207		810		7.7	0.9	0.0	0.0	0.0	0	
12681	L1W	0		AUX	180		790		2.0	6.9	0.0	0.0	0.0	0	
13222	L1W	0		AUX	180		0		6.2	2.2	0.0	0.0	0.0	0	
1037	L1W	0		AUX	207		810		1.3	7.0	0.0	0.0	0.0	0	
1041	L1W	0	LW-2	AUX	207		810		1.3	6.0	323.0	0.0	0.0	0	
1042	L1W	0	LW-2	AUX	207		810		1.3	6.0	285.0	0.0	0.0	0	
1043	L1W	1	LW-2	AUX	207		810		1.4	6.0	287.0	0.0	0.0	0	
1044	L1W	0		AUX	207		810		1.4	5.7	0.0	0.0	0.0	0	
3238	L1W	0		AUX	180		790		7.7	7.2	0.0	0.0	0.0	0	
3269	L1W	0		AUX	113		778		1.0	3.2	0.0	0.0	0.0	0	
3513	L1W	0		AUX	180		790		10.7	5.7	0.0	0.0	0.0	0	
3515	L1W	0		AUX	180		790		8.3	7.1	0.0	0.0	0.0	0	
3518	L1W	0		AUX	180		790		8.2	7.2	0.0	0.0	0.0	0	
3530	L1W	0		AUX	180		790		0.8	8.3	0.0	0.0	0.0	0	UNMOD
4912	L2	0		AUX	150		852		4.9	3.0	0.0	0.0	0.0	0	W
6258	L2	0		AUX	241		852		7.0	5.7	0.0	0.0	0.0	0	
12642	L2	0		AUX	174		790		8.8	2.0	0.0	0.0	0.0	0	
3037	L2	0		AUX	113		778		9.7	5.5	0.0	0.0	0.0	0	
3100	L2	0		AUX	113		778		4.1	3.2	0.0	0.0	0.0	0	
4910	L2	0	-- -	AUX	151	B	854	_	4.9	3.0	0.0	0.0	0.0	0	
4911	L2	0	-- -	AUX	151	B	854	_	4.9	3.0	0.0	0.0	0.0	0	
7365	L2	0	--	AUX	207		810	_	3.9	2.6	0.0	0.0	0.0	0	
7463	L2	0	--	SFG	70		790	T	8.7	3.5	559.0	0.0	0.0	0	
7482	L2	0	--	SFG	70		790	_	9.0	3.5	0.0	0.0	0.0	0	W
7512	L2	0	--	SFG	70		790	T	2.0	2.0	228.0	0.0	0.0	0	
7515	L2	0	--	SFG	70		790	T	2.0	2.0	334.0	0.0	0.0	0	
7586	L2	0	--	SFG	65		790	_	8.8	4.1	0.0	0.0	0.0	0	
7697	L2	0	-- -	AUX	134		807	_	6.6	3.7	0.0	0.0	0.0	0	UNMOD
8505	L2	0		AUX	134		807	_	5.0	4.6	0.0	0.0	0.0	0	UNMOD
8641	L2	0	--	AUX	207		807	_	9.5	1.5	0.0	0.0	0.0	0	
9481	L2	0	-- -	AUX	134		807	_	5.0	3.3	0.0	0.0	0.0	0	W,UNMOD
9738	L2	0	--	RB	3		808	_	5.9	4.4	0.0	0.0	0.0	0	STE,
10043	L2	0	--	RB	9		832	T	3.9	2.8	271.0	0.0	0.0	0	
10135	L2	1	L2-1__	RB	15		842	T	2.4	2.3	632.0	0.0	0.0	0	
10137	L2	0	L2-1__	RB	15		842	T	2.4	2.3	598.0	0.0	0.0	0	
10181	L2	0	--	SFG	83		810	_	0.0	0.0	0.0	0.0	0.0	0	
10223	L2	0	--	SFG	83		810	_	6.8	3.8	0.0	0.0	0.0	0	W,C
10359	L2	0	--	SFG	83		810	_	9.2	3.0	0.0	0.0	0.0	0	C
10363	L2	0	--	SFG	83		810	_	9.1	2.8	0.0	0.0	0.0	0	
10618	L2	0	--	SFG	82		810	_	2.8	3.0	0.0	0.0	0.0	0	

HANGER	GEOMET	MOTH SUPP	GROUPING	BLDG	ROOM	RL	ELEV	TYPE	HGHT	WDTH	TRANSV TRAY WT.	LONG TR WT.	THERMO LOAD	FILE REF#	REMARKS
10619	L2	0	--	SFG	82		810	-	2.8	3.0	0.0	0.0	0.0	0	W
10693	L2	0		SFG	82		810		4.3	2.5	0.0	0.0	0.0	0	
10938	L2	0	--	SFG	96		831	-	2.3	2.5	0.0	0.0	0.0	0	
10939	L2	0	--	SFG	96		831	-	2.3	2.5	0.0	0.0	0.0	0	W
10940	L2	0	L2-3__	SFG	96		831	-	5.2	2.5	688.0	0.0	0.0	0	
10941	L2	0		SFG	96		831		2.3	2.5	0.0	0.0	0.0	0	
10942	L2	0	--	SFG	96		831	-	6.2	2.5	0.0	0.0	0.0	0	
10943	L2	0	--	SFG	96		831		6.2	2.2	0.0	0.0	0.0	0	
10954	L2	0	--	SFG	96		831	-	3.6	3.1	0.0	0.0	0.0	0	
10961	L2	1	L2-3__	SFG	96		831	-	5.2	2.5	720.0	0.0	0.0	0	
10963	L2	0	L2-2	SFG	96		831	-	4.8	2.5	856.0	0.0	0.0	0	
10982	L2	0	L2-6__	SFG	96		831	-	4.7	2.7	520.0	0.0	0.0	0	
10983	L2	1	L2-6__	SFG	96		831	-	4.9	2.7	580.0	0.0	0.0	0	
10985	L2	0	--	SFG	96		831	-	2.3	4.0	0.0	0.0	0.0	0	
10990	L2	0	--	SFG	96		831	-	8.7	5.0	0.0	0.0	0.0	0	
10991	L2	0	--	SFG	96		831	-	6.8	2.8	0.0	0.0	0.0	0	
10992	L2	0	--	SFG	96		831	-	6.6	2.8	0.0	0.0	0.0	0	
11000	L2	0		SFG	96		831		5.8	2.2	0.0	0.0	0.0	0	W
11014	L2	1	L2-2__	SFG	96		831	-	5.0	2.4	1128.0	0.0	0.0	0	
11015	L2	0	L2-2__	SFG	96		831	-	4.8	2.5	952.0	0.0	0.0	0	
11049	L2	0		SFG	96		831		8.2	2.1	0.0	0.0	0.0	0	
11059	L2	0	--	SFG	96		831	-	8.3	1.5	0.0	0.0	0.0	0	W
11117	L2	0	L2-5__	SFG	103		852	T	3.6	2.8	358.0	0.0	0.0	0	
11143	L2	1	L2-5__	SFG	103		852	T	4.1	3.5	456.0	0.0	0.0	0	
11174	L2	0	L2-4__	SFG	103		852	-	9.6	3.0	353.0	0.0	0.0	1850	STE,
11176	L2	1	L2-4__	SFG	103		852	-	9.6	3.0	473.0	0.0	0.0	1849	STE,
11366	L2	0		SFG	104		852	-	4.1	2.4	0.0	0.0	0.0	0	
11479	L2	0	--	RB	10		832	T	5.1	1.9	300.0	0.0	0.0	0	
11493	L2	0	--	RB	10		832	T	7.0	3.3	280.0	0.0	0.0	0	
11494	L2	0	--	RB	10		832	T	7.0	3.3	280.0	0.0	0.0	0	
11563	L2	0	--	RB	10		832	T	4.5	1.8	298.0	0.0	0.0	0	
11833	L2	0	--	RB	22		860	-	0.0	0.0	0.0	0.0	0.0	0	
11834	L2	0	--	RB	22		860	T	4.8	3.3	615.0	0.0	0.0	0	
11848	L2	0	--	RB	22		860	-	11.2	10.6	0.0	0.0	0.0	0	
11920	L2	0	--	RB	2		808	M	8.7	5.0	735.0	0.0	0.0	0	
12170	L2	0	50	SFG	83		810	-	5.7	7.8	0.0	0.0	0.0	0	
12201	L2	0	-- -	AUX	134		807	-	4.5	1.8	0.0	0.0	0.0	0	
13545	L2	0		SFG	70		790	T	11.4	3.0	336.0	0.0	0.0	0	
13583	L2	0		SFG	96		831	-	0.0	2.5	0.0	0.0	0.0	0	
7285	L2B	0	--	AUX	207		810	-	8.2	3.6	0.0	0.0	0.0	0	
7474	L2B1	0	--	SFG	70		790	-	9.0	3.5	0.0	0.0	0.0	0	
7483	L2B1	0	SPEC	SFG	70		790	-	9.0	3.5	0.0	0.0	0.0	0	
10988	L2B1	0	--	SFG	96		831	-	8.6	5.0	0.0	0.0	0.0	0	W
1934	L2W	0		AUX	219		831		6.6	5.5	0.0	0.0	0.0	0	UNMOD
1935	L2W	0		AUX	219		831	T	6.7	5.5	0.0	0.0	0.0	0	UNMOD
3263	L2W	0		AUX	180		790		5.2	3.1	0.0	0.0	0.0	0	

HANGER	GEOMET	MOTH SUPP	GROUPING	BLDG	ROOM	RL	ELEV	TYPE	HGHT	WDTH	TRANSV TRAY WT.	LONG TR WT.	THERMO LOAD	FILE REF#	REMARKS
6227	L2W	0		AUX	235		852		7.4	3.2	0.0	0.0	0.0	0	
564	L2W	0	-- -	AUX	120		792	-	2.3	2.6	0.0	0.0	0.0	0	
570	L2W	0	-- -	AUX	120		792	-	5.5	2.6	0.0	0.0	0.0	0	
3038	L2W	0		AUX	113		776		13.0	4.3	0.0	0.0	0.0	0	
3046	L2W	1	LW2-5	AUX	113		776		7.6	4.7	525.0	0.0	0.0	0	
3047	L2W	0	LW2-5	AUX	113		776		7.7	4.7	481.0	0.0	0.0	0	
3048	L2W	0		AUX	113		790		9.0	4.8	0.0	0.0	0.0	0	
3049	L2W	0		AUX	113		790		9.0	7.0	0.0	0.0	0.0	0	
3059	L2W	0		AUX	115	B	778	-	4.0	3.1	0.0	0.0	0.0	0	
3060	L2W	0	LW2-3 -	AUX	115	B	778	-	7.3	3.2	924.0	0.0	0.0	0	
3061	L2W	0	LW2-3 -	AUX	115	B	778	-	7.3	3.1	1096.0	0.0	0.0	0	
3062	L2W	0		AUX	115	B	778	-	7.3	3.2	0.0	0.0	0.0	0	
3063	L2W	1	LW2-3 -	AUX	115	B	778	-	7.3	3.1	1512.0	0.0	0.0	0	
3064	L2W	0		AUX	115	B	778	-	5.3	3.1	0.0	0.0	0.0	0	
3074	L2W	1	LW2-4 -	AUX	115	B	792	-	13.0	6.5	1422.0	0.0	0.0	0	W
3124	L2W	0		AUX	113		778		5.3	3.5	0.0	0.0	0.0	0	
3188	L2W	1	LW2-2 -	AUX	115	B	778	-	13.0	6.5	1396.0	0.0	0.0	0	
3190	L2W	0	LW2-2 -	AUX	115	B	778	-	12.9	6.5	936.0	0.0	0.0	0	
3191	L2W	0	LW2-4 -	AUX	115	B	778	-	13.0	6.3	1224.0	0.0	0.0	0	
3236	L2W	0		AUX	180		790		5.2	3.0	0.0	0.0	0.0	0	
3237	L2W	0		AUX	180		790		2.2	3.0	0.0	0.0	0.0	0	
5228	L2W	0	LW2-2 -	AUX	115	B	792	-	12.9	6.5	1098.0	0.0	0.0	1924	STE,
10410	L2W	0	--	SFG	83		810	-	0.0	0.0	0.0	0.0	0.0	0	
10533	L2W	0	--	SFG	82		810	-	8.5	5.6	0.0	0.0	0.0	0	W
11566	L2W	0	--	RB	10		832	-	6.5	6.4	0.0	0.0	0.0	0	
11567	L2W	0	--	RB	10		832	-	6.5	6.0	0.0	0.0	0.0	0	
11684	L2W	0	--	RB	21		860	-	12.8	7.0	0.0	0.0	0.0	999	STE,
12602	L2W	0	-- -	AUX	120		792	-	5.4	2.6	0.0	0.0	0.0	0	
3056	L2WRL	0	-- -	AUX	115	B	778	-	12.9	4.2	0.0	0.0	0.0	0	
10069	L3	0	--	RB	9		832	T	4.3	2.5	298.0	0.0	0.0	0	
11806	L3	0	--	RB	22		860	-	9.1	1.9	0.0	0.0	0.0	0	
11807	L3	0	--	RB	22		860	T	9.2	1.8	473.0	0.0	0.0	0	
3131	L3W	0		AUX	113		778		6.6	4.5	0.0	0.0	0.0	0	
3132	L3W	0		AUX	113		778		7.9	4.5	0.0	0.0	0.0	0	UNMOD
3195	L3W	1	LW3-2 -	AUX	115	B	778	-	7.9	6.0	0.0	0.0	0.0	0	
3198	L3W	0	LW3-2 -	AUX	115	B	778	-	7.9	5.9	0.0	0.0	0.0	1828	STE,
9860	L3W	0	LW3-1	SFG	84		810	T	4.0	4.5	528.0	0.0	0.0	0	
9863	L3W	1	LW3-1	SFG	84		810	T	4.0	4.4	748.0	0.0	0.0	0	HOLD
9961	L3W	0	LW3-1	SFG	85		810	T	3.4	4.5	577.0	0.0	0.0	0	
9962	L3W	0	LW3-1	SFG	85		810	T	3.4	4.5	525.0	0.0	0.0	0	
9964	L3W	0	LW3-1__	SFG	85		810	T	4.0	4.5	661.0	0.0	0.0	0	
10753	L3W	0		SFG	94		831		4.2	8.1	0.0	0.0	0.0	0	
10754	L3W	0		SFG	94		831		9.7	8.1	0.0	0.0	0.0	0	W
10759	L4W	0	SPEC	SFG	94		831		8.9	8.2	0.0	0.0	0.0	0	
11109	LB	0	--	SFG	103		852	M	3.0	2.8	226.0	0.0	0.0	0	
11114	LB	0	--	SFG	103		852	-	2.3	4.3	0.0	0.0	0.0	0	

HANGER	GEOMET	MOTH SUPP	GROUPING	BLDG	ROOM	RL	ELEV	TYPE	HGHT	WDTH	TRANSV TRAY WT.	LONG TR WT.	THERMO LOAD	FILE REF#	REMARKS
1040	LW	0		AUX	207		810		1.5	6.0	0.0	0.0	0.0	0	
532	LW	0		AUX	126		792	_	1.0	2.0	0.0	0.0	0.0	0	
533	LW	1	LW-1 _	AUX	120		792	_	4.1	2.1	334.0	0.0	0.0	0	
535	LW	0	LW-1 _	AUX	120		792	_	4.1	2.2	252.0	0.0	0.0	0	
541	LW	0	-- _	AUX	118		792	_	1.3	2.2	0.0	0.0	0.0	0	
546	LW	0	-- _	AUX	126		792	_	2.0	2.5	0.0	0.0	0.0	0	
550	LW	0	-- _	AUX	118		792	_	5.0	2.6	0.0	0.0	0.0	0	
551	LW	0		AUX	118		792	_	5.0	2.7	0.0	0.0	0.0	0	UNMOD
559	LW	0	-- _	AUX	118		792	_	1.7	2.7	0.0	0.0	0.0	0	
563	LW	0		AUX	126		792	_	5.2	1.3	0.0	0.0	0.0	0	
3054	LW	0	__ _	AUX	115	B	778	_	3.9	5.4	0.0	0.0	0.0	0	W
5569	LW	0	LW-4__	AUX	126		792	_	1.8	3.6	198.0	0.0	0.0	0	
5570	LW	1	LW-4__	AUX	126		792	_	1.8	3.9	327.0	0.0	0.0	0	
7507	LW	0	--	SFG	70		790	T	1.0	7.3	365.0	0.0	0.0	0	
9732	LW	0	--	RB	3		808	_	3.0	4.5	596.0	0.0	0.0	0	
9733	LW	0	--	RB	3		808	L	4.5	4.5	596.0	0.0	0.0	0	
10329	LW	0	--	SFG	83		810	T	3.1	4.9	440.0	0.0	0.0	0	
10534	LW	0	--	SFG	82		810	_	8.4	5.6	0.0	0.0	0.0	0	
11298	LW	0	--	SFG	103		852	_	1.9	5.4	0.0	0.0	0.0	0	
11299	LW	0	--	SFG	103		852	_	2.0	5.5	0.0	0.0	0.0	0	
11578	LW	0	--	RB	11		832	_	13.3	6.5	0.0	0.0	0.0	0	
11664	LW	0	--	RB	24		860	T	2.3	5.0	893.0	0.0	0.0	0	
11718	LW	0	--	RB	19		860	_	0.0	0.0	0.0	0.0	0.0	0	
11909	LW	0	--	RB	2		808	_	0.5	8.1	0.0	0.0	0.0	0	

HANGER	GEOMET	MOTH SUPP	GROUPING	BLDG	ROOM	RL	ELEV	TYPE	HGHT	WDTH	TRANSV TRAY WT.	LONG TR WT.	THERMO LOAD	FILE REF#	REMARKS
519	L	0	-- -	AUX	118		792	_	4.1	2.7	0.0	0.0	0.0	0	
1881	L	0		AUX	219		831	T	1.8	2.2	0.0	0.0	0.0	0	
2787	L	0	-- -	AUX	126		792	_	3.2	1.8	0.0	0.0	0.0	0	W,UNMOD
2934	L	0		AUX	180		790		10.2	1.7	0.0	0.0	0.0	0	
3143	L	0		AUX	113		778		3.9	3.8	0.0	0.0	0.0	0	
3256	L	0		AUX	180		790		2.3	2.9	0.0	0.0	0.0	0	W,UNMOD
3265	L	0		AUX	180		790		3.5	2.6	0.0	0.0	0.0	0	
3370	L	0		AUX	113		790		3.2	5.7	0.0	0.0	0.0	0	
3521	L	0		AUX	180		790		5.1	3.0	0.0	0.0	0.0	0	
4913	L	0		AUX	150		852		6.7	2.7	0.0	0.0	0.0	0	W
5221	L	0		AUX	180		790		1.7	10.7	0.0	0.0	0.0	0	
5223	L	0		AUX	180		790		3.2	10.6	0.0	0.0	0.0	0	UNMOD
5701	L	0		AUX	212		831		3.8	2.5	0.0	0.0	0.0	0	
6217	L	0		AUX	235		852		8.8	1.7	0.0	0.0	0.0	0	W
6257	L	0		AUX	241		852		1.8	3.5	1093.0	0.0	0.0	0	UNMOD
6265	L	0		AUX	241		852	T	1.7	3.9	0.0	0.0	0.0	0	
6724	L	0	L-16	AUX	226		831		5.7	4.0	165.0	0.0	0.0	0	
6726	L	1	L-16	AUX	226		831		5.7	2.2	187.0	0.0	0.0	0	
6989	L	0	CANT-28	AUX	230		842		1.2	1.7	274.0	0.0	0.0	0	
6990	L	1	CANT-28	AUX	230		842		1.2	1.7	279.0	0.0	0.0	0	
7250	L	0	__	SFG	54		773	_	1.0	1.5	0.0	0.0	0.0	0	
7255	L	0	L-23__	SFG	56	N	773	_	3.3	1.7	101.0	0.0	0.0	0	
7256	L	0	L-2	SFG	56	N	773	_	3.3	1.5	169.0	0.0	0.0	0	
7261	L	1	L-23__	SFG	56	S	773	_	3.2	2.0	134.0	0.0	0.0	0	
7262	L	0	L-8	SFG	51		773	_	3.3	1.5	70.0	0.0	0.0	0	
7269	L	0	L-2	SFG	51		773	_	1.0	1.2	109.0	0.0	0.0	0	
7270	L	0	L-2	SFG	51		773	_	0.9	1.3	219.0	0.0	0.0	0	
7271	L	1	L-29	SFG	51		807	_	1.8	2.1	108.0	0.0	0.0	0	
7273	L	0	L-29	SFG	51		773	_	1.0	2.1	73.0	0.0	0.0	0	
7293	L	0	--	AUX	207		810	_	2.3	4.2	0.0	0.0	0.0	0	
7304	L	0	--	AUX	207		807	_	9.5	3.9	0.0	0.0	0.0	0	
7306	L	0		AUX	207		810	_	4.5	3.6	0.0	0.0	0.0	0	
7343	L	0	--	AUX	207		810	_	5.2	2.5	0.0	0.0	0.0	0	
7362	L	0	--	AUX	207		810	_	9.2	3.7	0.0	0.0	0.0	0	
7363	L	0	--	AUX	207		807	_	9.2	4.0	0.0	0.0	0.0	0	
7485	L	0	--	SFG	70		790	T	2.0	2.0	129.0	0.0	0.0	0	
7494	L	0	--	SFG	70		790	T	2.0	2.5	307.0	0.0	0.0	0	HOLD
7499	L	0	--	SFG	70		790	T	2.0	2.3	356.0	0.0	0.0	0	
7503	L	0	--	SFG	70		790	T	1.0	3.3	532.0	0.0	0.0	0	
7567	L	0	--	SFG	71		790	_	3.0	2.2	0.0	0.0	0.0	0	
7575	L	0	--	SFG	67		790	_	2.2	2.5	0.0	0.0	0.0	0	
7585	L	0	L-11__	SFG	65		790	_	4.0	1.8	401.0	0.0	0.0	0	
7645	L	0	--	SFG	66		790	_	0.9	2.6	0.0	0.0	0.0	0	
7716	L	0	-- -	AUX	134		807	_	4.1	3.7	0.0	0.0	0.0	0	UNMOD
7796	L	0	-- -	AUX	134		807	_	1.8	4.0	0.0	0.0	0.0	0	
8107	L	0	SPEC	AUX	134		807	_	5.8	3.0	536.0	0.0	0.0	0	UNMOD

HANGER	GEOMET	MOTH SUPP	GROUPING	BLDG	ROOM	RL	ELEV	TYPE	HGHT	WDTH	TRANSV TRAY WT.	LONG TR WT.	THERMO LOAD	FILE REF#	REMARKS
8108	L	0	-- -	AUX	134		807	_	2.0	3.4	0.0	0.0	0.0	0	UNMOD
8111	L	0	-- -	AUX	134		807	_	3.9	3.3	0.0	0.0	0.0	0	
8306	L	0	-- -	AUX	134		807	_	1.5	4.8	0.0	0.0	0.0	0	
8563	L	0		AUX	134		807	_	4.1	3.0	0.0	0.0	0.0	0	UNMOD
8569	L	0	-- -	AUX	134		807	_	3.2	3.5	0.0	0.0	0.0	0	
8612	L	0	--	AUX	207		810	_	2.5	3.5	0.0	0.0	0.0	0	UNMOD
8616	L	0	SPEC	AUX	207		810	_	5.6	5.1	0.0	0.0	0.0	0	
8629	L	0	--	AUX	207		810	_	2.0	3.3	0.0	0.0	0.0	0	
8653	L	0	-- -	AUX	134		807	_	2.6	4.5	0.0	0.0	0.0	0	
8656	L	0	SPEC	AUX	134		807	_	4.0	1.7	151.0	0.0	0.0	0	
8658	L	0	-- -	AUX	134		807	_	2.8	2.7	0.0	0.0	0.0	0	
8695	L	0	-- -	AUX	134		807	_	5.8	1.8	0.0	0.0	0.0	0	
8696	L	1	L-27__	AUX	134		807	_	2.9	2.6	50.0	0.0	0.0	0	
8697	L	0	L-27__	AUX	134		807	_	2.8	1.5	118.0	0.0	0.0	0	
8771	L	0	-- -	AUX	134		807	_	1.8	2.9	0.0	0.0	0.0	0	
8776	L	0	L-26__	AUX	134		807	_	3.1	2.9	210.0	0.0	0.0	0	
8811	L	0	-- -	AUX	134		807	_	1.8	5.2	0.0	0.0	0.0	0	
9212	L	0	L-14__	AUX	134		807	_	4.3	3.6	456.0	0.0	0.0	0	UNMOD
9219	L	1	L-14__	AUX	134		807	_	4.3	3.5	466.0	0.0	0.0	0	UNMOD
9247	L	1	L-26	AUX	134		807	_	3.8	3.1	231.0	0.0	0.0	0	
9330	L	1	L-22__	AUX	134		807	_	4.6	3.6	344.0	0.0	0.0	0	UNMOD
9333	L	0	-- -	AUX	134		807	_	3.7	3.2	0.0	0.0	0.0	0	UNMOD
9352	L	0	-- -	AUX	134		807	_	3.0	2.4	0.0	0.0	0.0	0	
9453	L	0	-- -	AUX	134		807	_	1.9	4.0	0.0	0.0	0.0	0	UNMOD
9461	L	0	-- -	AUX	134		807	_	0.7	1.0	0.0	0.0	0.0	0	
9564	L	0	L-22__	AUX	134		807	_	4.7	2.4	22.0	0.0	0.0	0	UNMOD
9621	L	0	SP-18__	AUX	134		807	_	3.0	2.0	86.0	86.0	0.0	0	
9622	L	1	SP-18__	AUX	134		807	_	3.0	2.0	86.0	86.0	0.0	0	
9656	L	0	-- -	AUX	134		807	_	4.5	2.0	0.0	0.0	0.0	0	
9696	L	0	-- -	AUX	134		807	_	1.0	3.2	0.0	0.0	0.0	0	
9697	L	0	-- -	AUX	134		807	_	1.8	3.1	0.0	0.0	0.0	0	
9724	L	0	--	RB	3		808	T	3.0	2.5	380.0	0.0	0.0	0	
9997	L	0	L-20__	RB	9		832	T	1.9	2.1	181.0	0.0	0.0	0	
10000	L	0	--	RB	9		832	T	3.2	1.8	200.0	0.0	0.0	0	
10003	L	0	--	RB	9		832	T	4.5	2.5	193.0	0.0	0.0	0	
10004	L	1	L-12__	RB	9		832	T	3.0	3.8	165.0	0.0	0.0	0	
10005	L	0	L-12__	RB	9		832	T	2.0	3.8	155.0	0.0	0.0	0	
10007	L	0		RB	9		832	T	3.0	6.0	225.0	0.0	0.0	999	STE
10015	L	0	--	RB	9		832	T	5.3	2.3	197.0	0.0	0.0	0	
10016	L	0	L-20__	RB	9		832	T	1.4	1.8	184.0	0.0	0.0	0	
10026	L	0	--	RB	9		832	T	4.0	2.8	450.0	0.0	0.0	0	
10031	L	0	--	RB	9		832	_	3.9	2.7	0.0	0.0	0.0	999	STE,
10040	L	0	--	RB	9		832	_	6.5	1.8	298.0	0.0	0.0	0	
10050	L	0	--	RB	9		832	T	3.1	1.8	175.0	0.0	0.0	0	
10079	L	0	--	RB	9		832	T	1.8	3.4	451.0	0.0	0.0	0	
10095	L	1	L-20__	RB	12		832	T	1.9	2.1	158.0	0.0	0.0	0	

HANGER	GEOMET	MOTH SUPP	GROUPING	BLDG	ROOM	RL ELEV	TYPE	HGHT	WDTH	TRANSV TRAY WT.	LONG TR WT.	THERMO LOAD	FILE REF#	REMARKS
10098	L	0	--	RB	12	832	T	1.9	2.1	300.0	0.0	0.0	0	
10106	L	0	--	RB	17	849		1.2	5.7	0.0	0.0	0.0	0	
10136	L	0	--	RB	15	842	T	1.0	2.3	274.0	0.0	0.0	0	
10158	L	0	--	SFG	83	810	T	5.6	3.2	286.0	0.0	0.0	0	
10194	L	0	L-15__	SFG	83	810		5.6	2.7	266.0	0.0	0.0	0	
10198	L	1	L-18__	SFG	83	810	T	3.0	3.0	368.0	0.0	0.0	0	
10206	L	0	--	SFG	83	810		2.9	3.8	0.0	0.0	0.0	0	W
10209	L	0	L-18__	SFG	83	810	T	1.6	3.8	280.0	0.0	0.0	0	
10230	L	0	--	SFG	83	810	T	4.3	2.6	36.0	0.0	0.0	0	
10266	L	0	--	SFG	83	810		3.7	3.5	0.0	0.0	0.0	0	
10308	L	0	41	SFG	83	810	T	6.5	3.3	315.0	0.0	0.0	0	
10319	L	0	42	SFG	83	810	T	11.1	4.8	385.0	0.0	0.0	0	
10328	L	0	51	SFG	83	810		4.3	3.2	0.0	0.0	0.0	0	
10347	L	0	L-18	SFG	83	810	T	3.1	2.5	386.0	0.0	0.0	0	
10349	L	0	--	SFG	83	810	T	1.0	2.3	314.0	0.0	0.0	0	
10350	L	0	49	SFG	83	810	T	5.2	3.3	440.0	0.0	0.0	0	
10357	L	0		SFG	83	810		4.8	1.8	0.0	0.0	0.0	0	
10361	L	0	L-7	SFG	83	810		3.3	2.5	0.0	0.0	0.0	0	
10382	L	0	--	SFG	83	810		1.6	2.5	0.0	0.0	0.0	0	
10383	L	0	--	SFG	83	810		3.0	2.0	0.0	0.0	0.0	0	
10386	L	0		SFG	83	810	T	1.1	2.5	141.0	0.0	0.0	0	
10454	L	0	--	SFG	82	810		4.1	3.0	0.0	0.0	0.0	0	
10455	L	0	--	SFG	82	810		6.0	3.2	0.0	0.0	0.0	0	
10457	L	0	--	SFG	82	810		4.8	3.8	0.0	0.0	0.0	0	W
10462	L	0	L-9	SFG	82	810		4.8	2.3	189.0	0.0	0.0	0	
10463	L	0		SFG	82	810		4.8	1.8	0.0	0.0	0.0	0	
10464	L	0	L-17__	SFG	82	810		4.3	2.8	628.0	0.0	0.0	0	
10466	L	0	L-9	SFG	82	810		4.8	2.0	322.0	0.0	0.0	0	W
10467	L	0	--	SFG	82	810		1.3	2.8	0.0	0.0	0.0	0	
10470	L	0	L-9	SFG	82	810		4.3	3.3	536.0	0.0	0.0	0	
10471	L	1	L-17__	SFG	82	810		4.3	2.8	720.0	0.0	0.0	0	
10482	L	0	L-9	SFG	82	810		4.8	2.0	232.0	0.0	0.0	0	
10484	L	1	L-9	SFG	82	810		4.3	3.2	767.0	0.0	0.0	0	
10485	L	0	L-9	SFG	82	810		5.3	2.0	226.0	0.0	0.0	0	
10487	L	1	L-5	SFG	82	810		1.3	3.2	858.0	0.0	0.0	0	
10488	L	0		SFG	82	810		4.8	2.0	0.0	0.0	0.0	0	
10489	L	0	--	SFG	82	810		5.8	4.3	0.0	0.0	0.0	0	
10490	L	0	L-24	SFG	82	810		5.1	2.1	89.0	0.0	0.0	0	
10495	L	0	L-17__	SFG	82	810		4.4	2.8	404.0	0.0	0.0	0	
10496	L	0	L-17__	SFG	82	810		4.3	2.8	556.0	0.0	0.0	0	
10514	L	0	--	SFG	82	810		5.0	1.8	0.0	0.0	0.0	0	
10515	L	0	--	SFG	82	810		5.7	1.7	0.0	0.0	0.0	0	
10517	L	0	L-5	SFG	82	810		2.0	3.3	739.0	0.0	0.0	0	
10520	L	0	--	SFG	82	810		3.5	1.6	0.0	0.0	0.0	0	
10524	L	0	--	SFG	82	810		3.5	1.3	0.0	0.0	0.0	0	
10525	L	0	SPEC	SFG	82	810		1.3	2.0	0.0	0.0	0.0	0	

HANGER	GEOMET	MOTH SUPP	GROUPING	BLDG	ROOM	RL	ELEV	TYPE	HGHT	WDTH	TRANSV TRAY WT.	LONG TR WT.	THERMO LOAD	FILE REF#	REMARKS
10526	L	0	--	SFG	82		810	_	1.4	3.4	0.0	0.0	0.0	0	
10527	L	0	--	SFG	82		810	_	0.8	2.0	0.0	0.0	0.0	0	
10535	L	0	--	SFG	82		810	_	3.3	2.8	0.0	0.0	0.0	0	
10537	L	0	SPEC	SFG	82		810	_	2.8	1.7	0.0	0.0	0.0	0	
10685	L	0		SFG	82		810		1.3	3.2	0.0	0.0	0.0	0	
10688	L	1	L-6	SFG	82		810	_	0.8	3.5	0.0	0.0	0.0	0	
10689	L	0		SFG	82		810		2.2	0.8	0.0	0.0	0.0	0	
10701	L	0	L-13__	SFG	77		810	_	4.4	3.4	563.0	0.0	0.0	0	
10702	L	1	L-13__	SFG	77		810	_	4.4	3.4	630.0	0.0	0.0	0	
10704	L	0		SFG	77		810	_	4.4	5.4	0.0	0.0	0.0	0	
10718	L	0	--	SFG	77		810	_	4.6	4.1	0.0	0.0	0.0	0	
10722	L	0	--	SFG	77		810	_	3.6	3.3	0.0	0.0	0.0	0	
10727	L	0	--	SFG	77		810	_	0.0	0.0	0.0	0.0	0.0	0	
10741	L	0	--	SFG	77		810	_	1.7	1.5	0.0	0.0	0.0	0	
10743	L	0	--	SFG	77		810	_	5.1	2.5	0.0	0.0	0.0	0	
10841	L	0	L-1	SFG	88		831	_	1.0	3.0	108.0	0.0	0.0	0	
10842	L	0	SPEC	SFG	88		831	_	1.0	2.2	287.0	0.0	0.0	0	
10849	L	0	L-3	SFG	88		831		0.8	2.0	332.0	0.0	0.0	0	
10850	L	0	L-3	SFG	88		831		0.9	2.0	332.0	0.0	0.0	0	
10851	L	0		SFG	88		831		1.9	2.2	0.0	0.0	0.0	0	
10891	L	0	--	SFG	96		831	_	6.2	3.0	0.0	0.0	0.0	0	
10900	L	0		SFG	96		831		6.3	4.0	0.0	0.0	0.0	0	
10901	L	0	--	SFG	96		831	_	5.5	2.8	0.0	0.0	0.0	0	
10905	L	0	--	SFG	96		831	_	6.3	2.5	0.0	0.0	0.0	0	
10999	L	0	--	SFG	96		831	_	4.4	2.7	0.0	0.0	0.0	0	W
11020	L	0	--	SFG	96		831	_	6.3	4.1	0.0	0.0	0.0	0	
11038	L	0	L-1	SFG	96		831		2.5	1.7	259.0	0.0	0.0	0	
11047	L	0	--	SFG	96		831	_	8.9	2.0	0.0	0.0	0.0	0	
11048	L	1	L-24	SFG	96		831	_	5.0	2.4	241.0	0.0	0.0	0	
11050	L	0	--	SFG	96		831	_	5.5	2.4	0.0	0.0	0.0	0	
11057	L	0	--	SFG	94		831	_	5.1	1.5	0.0	0.0	0.0	0	
11129	L	1	L-30	SFG	103		852	_	8.0	2.7	0.0	0.0	0.0	0	
11130	L	0	L-30	SFG	103		852	_	8.0	2.7	0.0	0.0	0.0	1945	STE,
11228	L	0	--	SFG	103		852	T	5.0	3.0	164.0	0.0	0.0	0	
11231	L	1	L-8	SFG	103		852	T	2.9	3.6	308.0	0.0	0.0	0	
11248	L	0	15	SFG	103		852	T	9.9	2.9	455.0	0.0	0.0	0	
11255	L	0	--	SFG	103		852	_	9.8	3.0	0.0	0.0	0.0	0	
11259	L	0	--	SFG	103		852	_	10.1	3.9	0.0	0.0	0.0	0	W
11266	L	0	8	SFG	103		852	_	2.9	3.7	0.0	0.0	0.0	0	
11287	L	0	--	SFG	103		852	_	11.6	2.6	0.0	0.0	0.0	0	
11328	L	0	--	SFG	103		852	T	6.5	2.8	190.0	0.0	0.0	0	
11395	L	0	--	SFG	100		852	_	1.5	2.1	0.0	0.0	0.0	0	
11435	L	0	--	SFG	100		852	_	4.8	2.6	0.0	0.0	0.0	0	
11436	L	0	--	SFG	100		852	_	10.2	3.0	0.0	0.0	0.0	0	W
11438	L	0	--	SFG	100		852	_	3.9	2.3	0.0	0.0	0.0	0	
11498	L	0	--	RB	10		832	_	2.1	2.1	0.0	0.0	0.0	0	

HANGER	GEOMET	MOTH SUPP	GROUPING	BLDG	ROOM	RL	ELEV	TYPE	HGHT	WDTH	TRANSV TRAY WT.	LONG TR WT.	THERMO LOAD	FILE REF#	REMARKS
11502	L	0	--	RB	10		832	T	1.6	1.5	298.0	0.0	0.0	0	
11635	L	0	--	RB	21		860	_	4.0	3.5	0.0	0.0	0.0	999	STE,
11685	L	0	--	RB	21		860	_	10.3	2.2	0.0	0.0	0.0	0	
11686	L	0	--	RB	21		860	_	0.0	0.0	0.0	0.0	0.0	0	
11703	L	0	--	RB	21		860	_	3.9	3.1	0.0	0.0	0.0	0	
11705	L	1	L-25__	RB	21		860	_	24.0	2.9	560.0	0.0	0.0	0	
11708	L	0	--	RB	21		860	T	3.5	2.6	298.0	0.0	0.0	0	
11709	L	0		RB	21		860	_	2.3	3.2	560.0	0.0	0.0	0	
11725	L	0	--	RB	21		860	_	9.2	2.5	0.0	0.0	0.0	0	
11813	L	0	--	RB	19		860	T	3.4	3.0	218.0	0.0	0.0	0	
11891	L	0	--	RB	2		808	_	6.7	2.4	0.0	0.0	0.0	0	
11932	L	0	--	RB	2		808	_	2.8	3.5	0.0	0.0	0.0	0	
11937	L	0	--	RB	2		808	_	6.8	3.0	0.0	0.0	0.0	0	
11940	L	0	--	RB	2		808	_	3.5	4.4	0.0	0.0	0.0	0	
11950	L	0	--	RB	2		808	T	6.4	3.2	0.0	0.0	0.0	0	
11951	L	0	--	RB	2		808	T	4.1	2.8	595.0	0.0	0.0	0	
11952	L	0	--	RB	2		808	T	4.1	2.6	595.0	0.0	0.0	0	
11953	L	0	--	RB	2		808	T	4.1	2.5	595.0	0.0	0.0	0	
11954	L	1	L-2__	RB	2		808	_	3.5	1.8	298.0	0.0	0.0	0	
11957	L	0	--	RB	2		808	_	2.8	2.2	0.0	0.0	0.0	0	
11962	L	0	--	RB	2		808	_	2.8	2.2	0.0	0.0	0.0	0	
11963	L	0	--	RB	2		808	_	3.0	1.8	0.0	0.0	0.0	0	
11964	L	0	--	RB	2		808	_	4.0	1.8	0.0	0.0	0.0	0	
11971	L	0	--	RB	5		808	T	5.0	3.0	595.0	0.0	0.0	0	
11972	L	0	--	RB	5		808	T	3.7	3.5	298.0	0.0	0.0	0	
11981	L	0	--	RB	5		808	_	1.5	4.3	0.0	0.0	0.0	0	
11987	L	0	--	RB	5		808	_	3.0	3.3	0.0	0.0	0.0	0	
12163	L	1	L-1	SFG	83		810	T	2.2	3.0	280.0	0.0	0.0	0	
12165	L	0	L-9	SFG	83		810	_	4.3	2.9	682.0	0.0	0.0	0	
12169	L	0	--	SFG	83		810	_	5.9	4.5	0.0	0.0	0.0	0	
12171	L	0	L-17__	SFG	82		810	_	4.0	3.8	536.0	0.0	0.0	0	
12172	L	0	--	SFG	82		810	_	4.9	5.0	0.0	0.0	0.0	0	
12173	L	0	--	SFG	83		810	_	0.9	2.5	0.0	0.0	0.0	0	
12202	L	0	--	SFG	67		790	_	0.8	2.2	0.0	0.0	0.0	0	
12203	L	0	--	SFG	77		810	_	5.5	5.1	0.0	0.0	0.0	0	
12204	L	0	--	SFG	77		810	_	5.0	2.0	0.0	0.0	0.0	0	
12205	L	0	--	SFG	77		810	_	5.0	4.6	0.0	0.0	0.0	0	
12206	L	0	--	SFG	67		790	_	0.8	1.6	0.0	0.0	0.0	0	
12451	L	0		AUX	207		810		0.7	1.9	0.0	0.0	0.0	0	
12601	L	0	-- _	AUX	118		792	_	5.5	1.5	0.0	0.0	0.0	0	
12611	L	0		AUX	113		778		0.0	2.9	0.0	0.0	0.0	0	
12635	L	0		AUX	219		831		1.7	2.9	0.0	0.0	0.0	0	
12645	L	0		AUX	207		810		1.6	2.2	0.0	0.0	0.0	0	
12663	L	0		AUX	113		778		2.8	2.5	0.0	0.0	0.0	0	
12677	L	0		AUX	113		778		7.2	1.5	0.0	0.0	0.0	0	
12774	L	0	-- _	AUX	134		807	_	1.1	2.0	0.0	0.0	0.0	0	

HANGER	GEOMET	MOTH SUPP	GROUPING	BLDG	ROOM	RL	ELEV	TYPE	HGHT	WDTH	TRANSV TRAY WT.	LONG TR WT.	THERMO LOAD	FILE REF#	REMARKS
12775	L	0	L-28	AUX	134		807	_	1.0	2.0	70.0	0.0	0.0	0	
12836	L	0	-- -	AUX	134		807	_	2.6	1.0	0.0	0.0	0.0	0	
12868	L	0	--	SFG	103		852	_	0.0	0.0	0.0	0.0	0.0	0	HOLD
12881	L	0	--	SFG	83		810	T	0.0	2.2	127.0	0.0	0.0	0	
12886	L	1	L-28__	AUX	134		807	_	4.3	1.7	133.0	0.0	0.0	0	
12896	L	0	L-4	AUX	207		810	_	1.6	2.6	217.0	0.0	0.0	0	
12897	L	1	L-4	AUX	207		0		0.0	0.0	217.0	0.0	0.0	0	
12898	L	0	--	SFG	100		852	_	2.2	3.5	0.0	0.0	0.0	0	
12901	L	0	--	SFG	77		810	_	1.5	2.3	0.0	0.0	0.0	0	
12927	L	0	--	SFG	82		810	_	2.4	1.6	0.0	0.0	0.0	0	
12964	L	0	--	SFG	83		810	_	11.0	4.5	0.0	0.0	0.0	0	
13132	L	0		AUX	113		778		9.4	3.3	0.0	0.0	0.0	0	
13147	L	0		AUX	180		792		3.2	2.8	0.0	0.0	0.0	0	
13502	L	1	L-7	SFG	83		810	_	3.4	2.9	0.0	0.0	0.0	0	
13539	L	0	--	SFG	83		810	_	1.9	3.4	0.0	0.0	0.0	0	
13541	L	1	L-15__	SFG	83		810	_	8.2	2.9	320.0	0.0	0.0	0	
13544	L	0	---	SFG	88		831	_	1.9	1.9	0.0	0.0	0.0	0	
13550	L	0		SFG	63		790	_	6.9	2.5	0.0	0.0	0.0	0	
13577	L	0		SFG	65		790	_	4.0	1.7	0.0	0.0	0.0	0	
13580	L	0	--	SFG	96		831	_	3.9	2.4	0.0	0.0	0.0	0	
13581	L	0	--	SFG	96		831	_	1.0	2.8	0.0	0.0	0.0	0	
13585	L	0	--	SFG	103		852	_	7.5	3.3	0.0	0.0	0.0	0	
13603	L	0	--	SFG	100		852	_	0.0	4.1	0.0	0.0	0.0	0	
3266	L1	0		AUX	180		790		5.5	3.2	0.0	0.0	0.0	0	
6215	L1	0		AUX	239		852		6.9	1.7	0.0	0.0	0.0	0	UNMOD
6256	L1	0		AUX	241		852		2.0	3.9	0.0	0.0	0.0	0	
6264	L1	0		AUX	241		852		1.7	3.5	875.0	0.0	0.0	0	
6266	L1	0		AUX	241		852		2.0	4.1	0.0	0.0	0.0	0	
6270	L1	0		AUX	241		852		6.8	3.8	0.0	0.0	0.0	0	
6271	L1	0		AUX	241		852		3.5	3.8	0.0	0.0	0.0	0	W
6732	L1	0		AUX	226		830		3.7	2.8	0.0	0.0	0.0	0	
6741	L1	0		AUX	226		831		2.5	2.3	0.0	0.0	0.0	0	
6767	L1	0		AUX	226		831		4.2	3.2	0.0	0.0	0.0	0	
6987	L1	0		AUX	230		842		1.2	1.3	0.0	0.0	0.0	0	W
6988	L1	1	L-21	AUX	230		842		1.2	1.7	250.0	0.0	0.0	0	
6991	L1	0	L-21	AUX	230		842		1.2	1.7	196.0	0.0	0.0	0	
6992	L1	0	L-21	AUX	230		842		1.2	1.7	140.0	0.0	0.0	0	
12284	L1	0		AUX	115	B	790		1.0	2.3	0.0	0.0	0.0	0	
13125	L1	0		AUX	174		790		2.3	1.5	0.0	0.0	0.0	0	
3052	L1BL	0		AUX	113		778		4.5	4.5	0.0	0.0	0.0	0	
167	L1W	0		AUX	113		778		15.3	8.7	0.0	0.0	0.0	2096	STE,
432	L1W	0		AUX	175		790		1.3	1.5	0.0	0.0	0.0	0	
1036	L1W	0		AUX	207		810		1.6	7.0	0.0	0.0	0.0	0	W
2929	L1W	0		AUX	180		792		8.2	7.9	0.0	0.0	0.0	0	UNMOD
2983	L1W	0		AUX	180		790		4.1	5.7	0.0	0.0	0.0	0	
2985	L1W	0		AUX	180		790		4.1	5.7	0.0	0.0	0.0	0	

HANGER	GEOMET	MOTH SUPP	GROUPING	BLDG	ROOM	RL	ELEV	TYPE	HGHT	WDTH	TRANSV TRAY WT.	LONG TR WT.	THERMO LOAD	FILE REF#	REMARKS
3092	L1W	0		AUX	113		778		1.8	3.2	0.0	0.0	0.0	0	
3225	L1W	0		AUX	180		790		1.2	10.6	1415.0	0.0	0.0	0	
5222	L1W	1	LW-3	AUX	180		790		2.9	10.6	1584.0	0.0	0.0	0	
6742	L1W	0		AUX	226		831		3.2	2.2	0.0	0.0	0.0	0	
12630	L1W	0		AUX	241		852		6.8	1.6	0.0	0.0	0.0	0	
12643	L1W	0		AUX	241		852		9.9	1.5	0.0	0.0	0.0	0	
12667	L1W	0		AUX	207		810		7.7	0.9	0.0	0.0	0.0	0	
12681	L1W	0		AUX	180		790		2.0	6.9	0.0	0.0	0.0	0	
13222	L1W	0		AUX	180		0		6.2	2.2	0.0	0.0	0.0	0	
1037	L1W	0		AUX	207		810		1.3	7.0	0.0	0.0	0.0	0	
1041	L1W	0	LW-2	AUX	207		810		1.3	6.0	323.0	0.0	0.0	0	
1042	L1W	0	LW-2	AUX	207		810		1.3	6.0	285.0	0.0	0.0	0	
1043	L1W	1	LW-2	AUX	207		810		1.4	6.0	287.0	0.0	0.0	0	
1044	L1W	0		AUX	207		810		1.4	5.7	0.0	0.0	0.0	0	
3238	L1W	0		AUX	180		790		7.7	7.2	0.0	0.0	0.0	0	
3269	L1W	0		AUX	113		778		1.0	3.2	0.0	0.0	0.0	0	
3513	L1W	0		AUX	180		790		10.7	5.7	0.0	0.0	0.0	0	
3515	L1W	0		AUX	180		790		8.3	7.1	0.0	0.0	0.0	0	
3518	L1W	0		AUX	180		790		8.2	7.2	0.0	0.0	0.0	0	
3530	L1W	0		AUX	180		790		0.8	8.3	0.0	0.0	0.0	0	UNMOD
4912	L2	0		AUX	150		852		4.9	3.0	0.0	0.0	0.0	0	W
6258	L2	0		AUX	241		852		7.0	5.7	0.0	0.0	0.0	0	
12642	L2	0		AUX	174		790		8.8	2.0	0.0	0.0	0.0	0	
3037	L2	0		AUX	113		778		9.7	5.5	0.0	0.0	0.0	0	
3100	L2	0		AUX	113		778		4.1	3.2	0.0	0.0	0.0	0	
4910	L2	0		AUX	151	B	854		4.9	3.0	0.0	0.0	0.0	0	
4911	L2	0	-- -	AUX	151	B	854	_	4.9	3.0	0.0	0.0	0.0	0	
7365	L2	0	--	AUX	207		810	_	3.9	2.6	0.0	0.0	0.0	0	
7463	L2	0	--	SFG	70		790	T	8.7	3.5	559.0	0.0	0.0	0	
7482	L2	0	--	SFG	70		790	_	9.0	3.5	0.0	0.0	0.0	0	W
7512	L2	0	--	SFG	70		790	T	2.0	2.0	228.0	0.0	0.0	0	
7515	L2	0	--	SFG	70		790	T	2.0	2.0	334.0	0.0	0.0	0	
7586	L2	0	--	SFG	65		790	_	8.8	4.1	0.0	0.0	0.0	0	
7697	L2	0	-- -	AUX	134		807	_	6.6	3.7	0.0	0.0	0.0	0	UNMOD
8505	L2	0		AUX	134		807	_	5.0	4.6	0.0	0.0	0.0	0	UNMOD
8641	L2	0	--	AUX	207		807	_	9.5	1.5	0.0	0.0	0.0	0	
9481	L2	0	-- -	AUX	134		807	_	5.0	3.3	0.0	0.0	0.0	0	W,UNMOD
9738	L2	0	--	RB	3		808	_	5.9	4.4	0.0	0.0	0.0	0	STE,
10043	L2	0	--	RB	9		832	T	3.9	2.8	271.0	0.0	0.0	0	
10135	L2	1	L2-1__	RB	15		842	T	2.4	2.3	632.0	0.0	0.0	0	
10137	L2	0	L2-1__	RB	15		842	T	2.4	2.3	598.0	0.0	0.0	0	
10181	L2	0	--	SFG	83		810	_	0.0	0.0	0.0	0.0	0.0	0	
10223	L2	0	--	SFG	83		810	_	6.8	3.8	0.0	0.0	0.0	0	W,C
10359	L2	0	--	SFG	83		810	_	9.2	3.0	0.0	0.0	0.0	0	C
10363	L2	0	--	SFG	83		810	_	9.1	2.8	0.0	0.0	0.0	0	
10618	L2	0	--	SFG	82		810	_	2.8	3.0	0.0	0.0	0.0	0	

HANGER	GEOMET	MOTH SUPP	GROUPING	BLDG	ROOM	RL	ELEV	TYPE	HGHT	WDTH	TRANSV TRAY WT.	LONG TR WT.	THERMO LOAD	FILE REF#	REMARKS
10619	L2	0	--	SFG	82		810	_	2.8	3.0	0.0	0.0	0.0	0	W
10693	L2	0		SFG	82		810		4.3	2.5	0.0	0.0	0.0	0	
10938	L2	0	--	SFG	96		831		2.3	2.5	0.0	0.0	0.0	0	
10939	L2	0	--	SFG	96		831	_	2.3	2.5	0.0	0.0	0.0	0	W
10940	L2	0	L2-3__	SFG	96		831	_	5.2	2.5	688.0	0.0	0.0	0	
10941	L2	0		SFG	96		831		2.3	2.5	0.0	0.0	0.0	0	
10942	L2	0	--	SFG	96		831	_	6.2	2.5	0.0	0.0	0.0	0	
10943	L2	0	--	SFG	96		831		6.2	2.2	0.0	0.0	0.0	0	
10954	L2	0	--	SFG	96		831	_	3.6	3.1	0.0	0.0	0.0	0	
10961	L2	1	L2-3__	SFG	96		831	_	5.2	2.5	720.0	0.0	0.0	0	
10963	L2	0	L2-2	SFG	96		831	_	4.8	2.5	856.0	0.0	0.0	0	
10982	L2	0	L2-6__	SFG	96		831	_	4.7	2.7	520.0	0.0	0.0	0	
10983	L2	1	L2-6__	SFG	96		831	_	4.9	2.7	580.0	0.0	0.0	0	
10985	L2	0	--	SFG	96		831	_	2.3	4.0	0.0	0.0	0.0	0	
10990	L2	0	--	SFG	96		831	_	8.7	5.0	0.0	0.0	0.0	0	
10991	L2	0	--	SFG	96		831	_	6.8	2.8	0.0	0.0	0.0	0	
10992	L2	0	--	SFG	96		831	_	6.6	2.8	0.0	0.0	0.0	0	
11000	L2	0		SFG	96		831		5.8	2.2	0.0	0.0	0.0	0	W
11014	L2	1	L2-2__	SFG	96		831	_	5.0	2.4	1128.0	0.0	0.0	0	
11015	L2	0	L2-2__	SFG	96		831	_	4.8	2.5	952.0	0.0	0.0	0	
11049	L2	0		SFG	96		831		8.2	2.1	0.0	0.0	0.0	0	
11059	L2	0	--	SFG	96		831	_	8.3	1.5	0.0	0.0	0.0	0	W
11117	L2	0	L2-5__	SFG	103		852	T	3.6	2.8	358.0	0.0	0.0	0	
11143	L2	1	L2-5__	SFG	103		852	T	4.1	3.5	456.0	0.0	0.0	0	
11174	L2	0	L2-4__	SFG	103		852	_	9.6	3.0	353.0	0.0	0.0	1850	STE,
11176	L2	1	L2-4__	SFG	103		852	_	9.6	3.0	473.0	0.0	0.0	1849	STE,
11366	L2	0	--	SFG	104		852	_	4.1	2.4	0.0	0.0	0.0	0	
11479	L2	0	--	RB	10		832	T	5.1	1.9	300.0	0.0	0.0	0	
11493	L2	0	--	RB	10		832	T	7.0	3.3	280.0	0.0	0.0	0	
11494	L2	0	--	RB	10		832	T	7.0	3.3	280.0	0.0	0.0	0	
11563	L2	0	--	RB	10		832	T	4.5	1.8	298.0	0.0	0.0	0	
11833	L2	0	--	RB	22		860	_	0.0	0.0	0.0	0.0	0.0	0	
11834	L2	0	--	RB	22		860	T	4.8	3.3	615.0	0.0	0.0	0	
11848	L2	0	--	RB	22		860	_	11.2	10.6	0.0	0.0	0.0	0	
11920	L2	0	--	RB	2		808	M	8.7	5.0	735.0	0.0	0.0	0	
12170	L2	0	50	SFG	83		810	_	5.7	7.8	0.0	0.0	0.0	0	
12201	L2	0	-- -	AUX	134		807	_	4.5	1.8	0.0	0.0	0.0	0	
13545	L2	0		SFG	70		790	T	11.4	3.0	336.0	0.0	0.0	0	
13583	L2	0	--	SFG	96		831	_	0.0	2.5	0.0	0.0	0.0	0	
7285	L2B	0	--	AUX	207		810	_	8.2	3.6	0.0	0.0	0.0	0	
7474	L2B1	0	--	SFG	70		790	_	9.0	3.5	0.0	0.0	0.0	0	
7483	L2B1	0	SPEC	SFG	70		790	_	9.0	3.5	0.0	0.0	0.0	0	
10988	L2B1	0	--	SFG	96		831	_	8.6	5.0	0.0	0.0	0.0	0	W
1934	L2W	0		AUX	219		831		6.6	5.5	0.0	0.0	0.0	0	UNMOD
1935	L2W	0		AUX	219		831	T	6.7	5.5	0.0	0.0	0.0	0	UNMOD
3263	L2W	0		AUX	180		790		5.2	3.1	0.0	0.0	0.0	0	

HANGER	GEOMET	MOTH SUPP	GROUPING	BLDG	ROOM	RL	ELEV	TYPE	HGHT	WDTH	TRANSV TRAY WT.	LONG TR WT.	THERMO LOAD	FILE REF#	REMARKS
6227	L2W	0		AUX	235		852		7.4	3.2	0.0	0.0	0.0	0	
564	L2W	0	-- -	AUX	120		792	-	2.3	2.6	0.0	0.0	0.0	0	
570	L2W	0	-- -	AUX	120		792	-	5.5	2.6	0.0	0.0	0.0	0	
3038	L2W	0		AUX	113		778		13.0	4.3	0.0	0.0	0.0	0	
3046	L2W	1	LW2-5	AUX	113		778		7.6	4.7	525.0	0.0	0.0	0	
3047	L2W	0	LW2-5	AUX	113		778		7.7	4.7	481.0	0.0	0.0	0	
3048	L2W	0		AUX	113		790		9.0	4.8	0.0	0.0	0.0	0	
3049	L2W	0		AUX	113		790		9.0	7.0	0.0	0.0	0.0	0	
3059	L2W	0	-- -	AUX	115	B	778		4.0	3.1	0.0	0.0	0.0	0	
3060	L2W	0	LW2-3 _	AUX	115	B	778	-	7.3	3.2	924.0	0.0	0.0	0	
3061	L2W	0	LW2-3 _	AUX	115	B	778	-	7.3	3.1	1096.0	0.0	0.0	0	
3062	L2W	0	-- -	AUX	115	B	778	-	7.3	3.2	0.0	0.0	0.0	0	
3063	L2W	1	LW2-3 _	AUX	115	B	778	-	7.3	3.1	1512.0	0.0	0.0	0	
3064	L2W	0	-- -	AUX	115	B	778	-	5.3	3.1	0.0	0.0	0.0	0	
3074	L2W	1	LW2-4 _	AUX	115	B	792	-	13.0	6.5	1422.0	0.0	0.0	0	W
3124	L2W	0		AUX	113		778		5.3	3.5	0.0	0.0	0.0	0	
3188	L2W	1	LW2-2 _	AUX	115	B	778	-	13.0	6.5	1396.0	0.0	0.0	0	
3190	L2W	0	LW2-2 _	AUX	115	B	778	-	12.9	6.5	936.0	0.0	0.0	0	
3191	L2W	0	LW2-4 _	AUX	115	B	778	-	13.0	6.3	1224.0	0.0	0.0	0	
3236	L2W	0		AUX	180		790		5.2	3.0	0.0	0.0	0.0	0	
3237	L2W	0		AUX	180		790		2.2	3.0	0.0	0.0	0.0	0	
5228	L2W	0	LW2-2 _	AUX	115	B	792	-	12.9	6.5	1098.0	0.0	0.0	1924	STE,
10410	L2W	0	--	SFG	83		810	-	0.0	0.0	0.0	0.0	0.0	0	
10533	L2W	0	--	SFG	82		810	-	8.5	5.6	0.0	0.0	0.0	0	W
11566	L2W	0	--	RB	10		832	-	6.5	6.4	0.0	0.0	0.0	0	
11567	L2W	0	--	RB	10		832	-	6.5	6.0	0.0	0.0	0.0	0	
11684	L2W	0	--	RB	21		860	-	12.8	7.0	0.0	0.0	0.0	999	STE,
12602	L2W	0	-- -	AUX	120		792	-	5.4	2.6	0.0	0.0	0.0	0	
3056	L2WBL	0	-- -	AUX	115	B	778	-	12.9	4.2	0.0	0.0	0.0	0	
10069	L3	0	--	RB	9		832	T	4.3	2.5	298.0	0.0	0.0	0	
11806	L3	0	--	RB	22		860	-	9.1	1.9	0.0	0.0	0.0	0	
11807	L3	0	--	RB	22		860	T	9.2	1.8	473.0	0.0	0.0	0	
3131	L3W	0		AUX	113		778		6.6	4.5	0.0	0.0	0.0	0	
3132	L3W	0		AUX	113		778		7.9	4.5	0.0	0.0	0.0	0	UNMOD
3195	L3W	1	LW3-2 _	AUX	115	B	778	-	7.9	6.0	0.0	0.0	0.0	0	
3198	L3W	0	LW3-2 _	AUX	115	B	778	-	7.9	5.9	0.0	0.0	0.0	1828	STE,
9860	L3W	0	LW3-1	SFG	84		810	T	4.0	4.5	528.0	0.0	0.0	0	
9863	L3W	1	LW3-1	SFG	84		810	T	4.0	4.4	748.0	0.0	0.0	0	HOLD
9961	L3W	0	LW3-1	SFG	85		810	T	3.4	4.5	577.0	0.0	0.0	0	
9962	L3W	0	LW3-1	SFG	85		810	T	3.4	4.5	525.0	0.0	0.0	0	
9964	L3W	0	LW3-1__	SFG	85		810	T	4.0	4.5	661.0	0.0	0.0	0	
10753	L3W	0		SFG	94		831		4.2	8.1	0.0	0.0	0.0	0	
10754	L3W	0		SFG	94		831		9.7	8.1	0.0	0.0	0.0	0	W
10759	L4W	0	SPEC	SFG	94		831		8.9	8.2	0.0	0.0	0.0	0	
11107	LB	0	--	SFG	103		852	M	3.0	2.8	226.0	0.0	0.0	0	
11114	LB	0	--	SFG	103		852	-	2.3	4.3	0.0	0.0	0.0	0	

HANGER	GEOMET	MOTH SUPP	GROUPING	BLDG	ROOM	RL	ELEV	TYPE	HGHT	WDTH	TRANSV TRAY WT.	LONG TR WT.	THERMO LOAD	FILE REF#	REMARKS
1040	LW	0		AUX	207		810		1.5	6.0	0.0	0.0	0.0	0	
532	LW	0		AUX	126		792		1.0	2.0	0.0	0.0	0.0	0	
533	LW	1	LW-1	AUX	120		792		4.1	2.1	334.0	0.0	0.0	0	
535	LW	0	LW-1	AUX	120		792		4.1	2.2	252.0	0.0	0.0	0	
541	LW	0		AUX	118		792		1.3	2.2	0.0	0.0	0.0	0	
546	LW	0		AUX	126		792		2.0	2.5	0.0	0.0	0.0	0	
550	LW	0		AUX	118		792		5.0	2.6	0.0	0.0	0.0	0	
551	LW	0		AUX	118		792		5.0	2.7	0.0	0.0	0.0	0	UNMOD
559	LW	0		AUX	118		792		1.7	2.7	0.0	0.0	0.0	0	
563	LW	0		AUX	126		792		5.2	1.3	0.0	0.0	0.0	0	
3054	LW	0		AUX	115	B	778		3.9	5.4	0.0	0.0	0.0	0	W
5569	LW	0	LW-4	AUX	126		792		1.8	3.6	198.0	0.0	0.0	0	
5570	LW	1	LW-4	AUX	126		792		1.8	3.9	327.0	0.0	0.0	0	
7507	LW	0		SFG	70		790	T	1.0	7.3	365.0	0.0	0.0	0	
9732	LW	0		RB	3		808		3.0	4.5	596.0	0.0	0.0	0	
9733	LW	0		RB	3		808	L	4.5	4.5	596.0	0.0	0.0	0	
10329	LW	0		SFG	83		810	T	3.1	4.9	440.0	0.0	0.0	0	
10534	LW	0		SFG	82		810		8.4	5.6	0.0	0.0	0.0	0	
11298	LW	0		SFG	103		852		1.9	5.4	0.0	0.0	0.0	0	
11299	LW	0		SFG	103		852		2.0	5.5	0.0	0.0	0.0	0	
11578	LW	0		RB	11		832		13.3	6.5	0.0	0.0	0.0	0	
11664	LW	0		RB	24		860	T	2.3	5.0	893.0	0.0	0.0	0	
11718	LW	0		RB	19		860		0.0	0.0	0.0	0.0	0.0	0	
11909	LW	0		RB	2		808		0.5	8.1	0.0	0.0	0.0	0	

SECTION III

EBASCO SERVICES INCORPORATED

CALCULATION COVER SHEET

CLIENT TUGCO

OFS NO. 3306.321

DEPT NO. 550

PROJECT COMANCHE PEAK SES UNITS #1 & 2

SUBJECT CTH DIMENSIONAL TOLERANCE EFFECTS ON INTERACTION RATIOS

CALCULATION NO. VOLUME I - BOOK 16 NUMBER OF SHEETS 8

PROBLEM DEVELOP INTERACTION RATIOS TO FACILITATE DESIGN VERIFICATION OF CABLE TRAY HANGERS WHEN CONSIDERING DIMENSIONAL TOLERANCE EFFECTS.

CONTAINS ASSUMPTIONS WHICH REQUIRE CONFIRMATION YES _____ NO ✓

ASSUMPTIONS CONFIRMED ON _____ BY _____

REV. NO.	SHEET NOS.	CALCULATION BY NAME	DATE	CHECKED BY NAME	DATE	OPTIONAL	REVIEWED OR APPROVED BY NAME	DATE
0	1-7	J. YANG	9/10/86	C. Pierce	9/11/86			

PRELIMINARY ☐ FINAL ☑ SUPERSEDES CALC NO. NONE

CLIENT TUGCO
PROJECT COMANCHE PEAK SES UNITS # 1 & 2
SUBJECT DIMENSION TOLERANCE - SUMMARY OF CRITICAL INTERACTION RATIOS

OPS NO. 3306.321 DEPT. NO. 550
BY P. HARRISON DATE 4/1/86
CHECKED BY [signature] DATE 8/29/86

TABLE I

DIMENSION TOLERANCE	CRITICAL INTERACTION RATIOS (SEE NOTE 1.)							
	CANTILEVER AND "L" SHAPED HANGERS				TRAPEZE AND FLOOR HANGERS			
	MEMBER		ANCHORAGE		MEMBER		ANCHORAGE	
	TIER	POST	ONE BOLT	TWO BOLTS	TIER	POST	ONE BOLT	TWO BOLTS
GENERAL DIMENSIONS (D)								
(a_1) · D ≤ 5'-0 Tolerance = ± 3/4"	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970
(a_2) · 5'-0 < D ≤ 10'-0 Tolerance = ± 1"	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984
(a_3) · D > 10'-0 Tolerance = ± 1 1/2	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988
MODIFIED STRUCTURAL SHAPE (a_4) TOLERANCE = ± 1/8"								
WORK POINT LOCATION (a_5) TOLERANCE = ± 1"								
CABLE TRAY HANGER ELEVATION (a_6) TOLERANCE = ± 2"								
TRANSVERSE LOCATION OF CABLE TRAY (a_7) TOLERANCE = ± 2'	0.909	0.909	0.909	0.909	0.975	0.975	0.975	0.975
(a_8) CTH CLAMP BOLTS EDGE DIST & c-c TOL ± 1/8"	SEE ATTACHMENT "T" OF GENERAL INSTRUCTIONS							
CABLE TRAY SPAN LENGTH (b) TOLERANCE = ± 6"	0.909	0.909	0.909	0.909	0.909	0.909	0.909	0.909
END DISTANCE FROM ℄ OF HOLE TO (c) END OF MEMBER. TOLERANCE = ± 1/2"			0.888				0.888	
GAGE DISTANCE FROM ℄ OF HOLE TO (d) END OF MEMBER TOLERANCE = ± 1/4" L = ± 1/8" L			0.910	0.910			0.910	0.910
	SEE ATTACHMENT "T" OF GENERAL INSTRUCTIONS							
DISTANCE BETWEEN ANCHOR BOLT / (e) SCREW ANCHOR. TOLERANCE = ± 1"			0.910	0.910			0.910	0.910

CLIENT TUGCO
PROJECT COMANCHE PEAK SES UNITS 1 & 2
SUBJECT DIMENSIONAL TOLERANCES - SUMMARY OF CRITICAL INTERACTION RATIOS

OPS NO. 3306.321 DEPT. NO. 550
BY P. HARRISON DATE 9/1/86
CHECKED BY [signature] DATE 8/29/86

TABLE I (CONT'D)

DIMENSION TOLERANCE	CRITICAL INTERACTION RATIOS							
	CANTILEVER AND "L" SHAPED HANGERS				TRAPEZE AND FLOOR HANGERS			
	MEMBER		ANCHORAGE		MEMBER		ANCHORAGE	
	TIER	POST	ONE BOLT	TWO BOLTS	TIER	POST	ONE BOLT	TWO BOLTS
(f) PROJECTION OF HILTI ANCHOR TOLERANCE = ±3/8"			0.967	0.967			0.967	0.967
PLUMBNESS (PER GENERAL NOTES: UNIT #1 NOTE # 23; UNIT #2 NOTE # 10) TOLERANCE ± 2°	"SEE VOL I, BOOK 16, SECTION II "OUT-OF-PLUMBNESS OF L-SHAPED CTH"							
SUMMARY OF MOST CRITICAL INTERACTION RATIOS								
• CONSIDERING ONE PARAMETER	0.909	0.909	0.888	0.909	0.909	0.909	0.888	0.909
• CONSIDERING TWO PARAMETERS	0.826	0.826	0.807	0.826	0.855	0.855	0.807	0.826

NOTES

1) LISTED VALUES ARE BASED ON WORST CONDITIONS (eg MEMBER WITH LEAST LENGTH DIMENSIONS)
2) BLANKS IN CHART REFER TO NOT APPLICIABLE TOLERANCES
3) FOR CALCULATIONS OF LISTED VALUES SEE ATTACHED CALCULATIONS
4) HIGHER VALUES WOULD RESULT BY USING ACTUAL HANGER DIMENSIONS

BY J. YANG DATE 12/23/85 SHEET 3 OF 7

CHKD. BY [signature] DATE 8/29/86 OFS NO. 3306.221 DEPT. NO. 549

CLIENT TUGCO

PROJECT COMANCHE PEAK #1 & #2

SUBJECT CTH DIMENSIONAL TOLERANCE EFFECTS ON INTERACTION RATIOS

INTRODUCTION: THE FOLLOWING ARE THE REDUCED INTERACTION RATIOS FOR DETERMINING WHETHER OR NOT THE MEASUREMENT TOLERANCES WILL HAVE AN IMPACT ON THE DESIGN VERIFICATION. THE ENGINEER SHOULD USE SUMMARY TABLE I (SHEETS 1 & 2 OF 7) FOR INTERACTION RATIOS APPLICABLE TO VARIOUS DIMENSIONAL TOLERANCES.

NOTE: THE INVESTIGATION IS BASED ON THE ASSUMPTIONS:

a) ITEM a-8 (ATTACHMENT R) IS COVERED BY ATTACHMENT "T" OF GENERAL INSTRUCTIONS.

b) COMPOUNDING OF DIMENSIONAL TOLERANCES IS NOT CONSIDERED. ONLY ONE (THE WORST ONE) TOLERANCE NEED BE CONSIDERED.

REFERENCE: CTH GENERAL INSTRUCTIONS, REV. 3, DT 8/8/86

ATTACHMENT 'R' AND ATTACHMENT 'T'

(VOLUME I - BOOK 1, SECTION I, ITEM NO. 3).

EBASCO SERVICES INCORPORATED

BY J. YANG DATE 12/23/85 SHEET 4 OF 7

CHKD. BY CD DATE 1/3/86 OFS NO. 3306.221 DEPT. NO. 349

CLIENT TU ELECTRIC

PROJECT COMANCHE PEAK #1 & #2

SUBJECT CTH DIMENSIONAL TOLERANCE EFFECTS ON INTERACTION RATIOS

MEASURMENT TOLERANCE AND DESIGN VERIFICATION

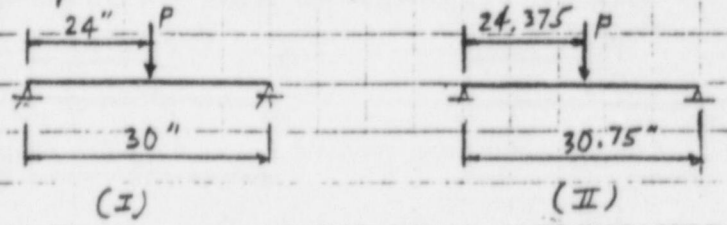
ITEM a1, a2 & a3 (OF ATTACHMENT 'R')

AFFECT TO CALC.

1) $\frac{kl}{r}$

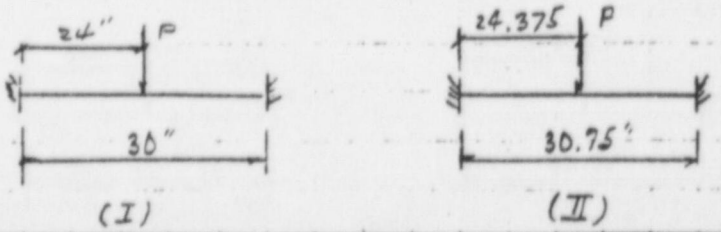
l	Δl	REDUCE $\frac{kl}{r}$ ALLOWABLE OF 200 TO $(1+\frac{-\Delta l}{l+\Delta l})\times 200$; WHERE Δl = TOLERANCE, l = LENGTH
2'-0	$\frac{3}{4}$"	OR 193.94 (.970)
3'-0	$\frac{3}{4}$	195.92
4'-0	$\frac{3}{4}$"	196.92
5'-0	1"	196.72 (.984)
5'-6	1"	197.01
7'-0	1"	197.65
8'-0	1"	197.94
9'-0	1"	198.17
10'-0	1.5"	197.53 (.988)
10'-6	1.5"	197.64
11'-0	1.5"	197.75
12'-0	1.5"	197.94.
13'-0	1.5"	198.10
14'-0	1.5"	198.23
15'-0	1.5"	198.35

2) REDUCE ALLOWABLE INTERACTION RATIO OF 1 BY MOMENT $\left[1-\frac{\Delta l}{l+\Delta l}\right]$ FOR EXAMPLE, A TIER OF A TRAPEZE-TYPE CTH:



(I) (II)

REDUCE TO 0.975



(I) (II)

REDUCE TO 0.975

SA1/A-A1

EBASCO SERVICES INCORPORATED

BY J. YANG DATE 12/23/85 SHEET 5 OF 7

CHKD. BY [illegible] DATE 1/3/86 OFS NO. 3306.221 DEPT. NO. 549

CLIENT TUGCO

PROJECT COMANCHE PEAK #1 & #2

SUBJECT CTH DIMENSIONAL TOLERANCE EFFECTS ON INTERACTION RATIOS

ITEM a. 4 (OF ATTACHMENT 'R')

CALC WILL NOT BE AFFECTED.

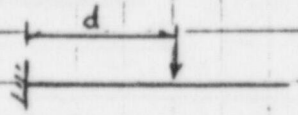
ITEM a. 5 (OF ATTACHMENT 'R')

NEGLIGIBLE IMPACT ON CALCULATION.

ITEM a. 6 (OF ATTACHMENT 'R')

CONSIDERED IN ITEMS a.1 THRU a.3.

ITEM a. 7 (OF ATTACHMENT 'R')



(CANTILEVER TYPE OF HANGER IS MOST CRITICAL)

d	INTERACTION RATIO LIMIT TO
20"	0.909
25"	0.926
30"	0.938
35"	0.946
40"	0.952
45"	0.957
50"	0.962
55"	0.964
60"	0.967

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BY J. YANG DATE 12/23/85 SHEET 6 OF 7

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CLIENT TUGCO

PROJECT COMANCHE PEAK #1 & #2

SUBJECT CTH DIMENSIONAL TOLERANCE EFFECTS ON INTERACTION RATIOS

ITEM b (OF ATTACHMENT 'R'):

INTERACTION RATIO = $1 - \frac{6}{60+6} = 0.909$ (ASSUMING A TRAY SPAN EQUAL TO 5'-0)

ITEM c (OF ATTACHMENT 'R')

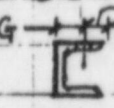
THE EFFECT WILL BE INSIGNIFICANT ON BOLT & MEMBER, EXCEPT FOR THE ONE BOLT ANCHORAGE

EXAMPLE: REDUCE ALLOWABLE BOLT & MEMBER LOAD OF 1 BY $\frac{e_1 - \Delta l}{e_1} = \frac{\frac{9}{2} - 0.5}{\frac{9}{2}} = 0.888$

ITEM d (OF ATTACHMENT 'R')

1) ± ⅛" TOLERANCE FOR CHANNELS WILL BE CONSIDERED CASE BY CASE, EDGE DISTANCE SHALL BE CHECKED PER ATT. "T" (REF. SH. 3)

2) ± ¼" FOR ANGLE



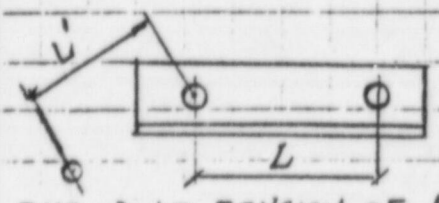
2a) EDGE DISTANCE SHALL BE CHECKED PER AISC SECT 1.16

2b) IMPACT TO PRYING ACTION ON BOLT, FOR EXAMPLE G=3

$\frac{1}{(c-G)} = \frac{1}{6-3} = \frac{1}{3}$; CONSIDER ¼" TOLERANCE $\frac{1}{c-G} = \frac{1}{6.25} = \frac{1}{2.75}$

THE EFFECT WILL BE 9%

ITEM e (OF ATTACHMENT 'R'): DISTANCE FROM HILTI TO ANOTHER HILTI, DUE TO 1" TOLERANCE



S.R. = $\frac{\text{SEPARATION PROVIDED}}{\text{MIN SEPARTION REQ'D}} = 1$; EXAMPLE;

FOR 1"φ HILT, WHEN L=11¼"; S.R. = $\frac{11.25-1}{11.25} = 0.91$.

THE BOLT TENSION OF 1 INDUCED BY MOMENT WILL INCREASE TO $\frac{11.25}{10.25} = 1.097$

FOR RICHMOND SCREW ANCHORAGE THE INCREASE FACTOR WILL HAVE 4/3 PRYING EFFECT INCLUDED AND COMPUTED IN A SIMILAR MANNER.

EBASCO SERVICES INCORPORATED

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CLIENT TUGCO

PROJECT COMANCHE PEAK #1 & #2

SUBJECT CTH DIMENSIONAL TOLERANCE EFFECTS ON INTERACTION RATIOS

ITEM f (OF ATTACHMENT 'R')

1) PROJECTION OF EXPANSION ANCHOR $\pm\frac{3}{8}$ IN

FOR EXAMPLE $1\frac{1}{4}$" ϕ S.K.B MARK "U" PROJ 3"

EMB LENGTH = 13 - 3 = 10

DUE TO TOLERANE EMB LENGTH = $13 - 3\frac{3}{8} = 9.625$

EMB LENGTH	TENSION	SHEAR
10	$8.540 + \frac{1.875}{2.5} \times 2.196$ $= 10.187^{K}$	8.295^{K}
9.625	$8.540 + \frac{1.5}{2.5} \times 2.196$ $= 9.858$	8.295

ALLOWABLE REDUCE TO 96.7 %

ITEM g (OF ATTACHMENT 'R'): TOLERANCE FOR LOCATION & ELEV.

LONGITUDINAL DIRECTION ±6" — SAME AS ITEM b

TRANSERSE DIRECTION ±2" — SAME AS ITEM a-7

ELEVATION ±2" — SAME AS ITEM a-6

881/8-81