DUFRESNE GROUP CONSULTING ENGINEERS

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WILMINGTON, VERMONT
June 20, 2014

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- Grove CMK5120B Dimensional cut sheet
- Crane lift worksheets (2)
- Schematic Plan with center pin locations
- Sling cut sheet and schematic

STATE OF VERMONT
NAOMI RUTH JOHNSON
NO. 0007302
CIVIL
LICENSED
PROFESSIONAL ENGINEER

6·20·14

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ERECTION AND EXCAVATION PLAN
WILMINGTON STP 013-1(14)
WILMINGTON, VERMONT
June 9, 2014

General

The Wilmington STP 013-1(14) box culvert project will occur while Route 100 is temporary closed. The culvert installation will be in accordance with the Contract Documents and ASTM C1675-11 *Standard Practice for Installation of Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains and Sewers*.

Excavation

The roadway and subsoil will be excavated as necessary for installation of the 18 ft wide (outside dimension) box culvert with 2 ft of granular backfill for structures on each side. The culvert excavation will extend 1 ft below the bottom of the culvert. If ledge or boulders are encountered within this depth, the material will be removed as required by the contract documents and the over-excavated materials will be backfilled with granular backfill for structures. Dewatering will be employed as necessary to keep water from the excavation area.

Based on the boring logs provided on Sheet 16 of 31, the soils are granular. The soils are Type C under the OSHA soils classification system and the excavation side slope is therefore a maximum of 1.5H:1V. The maximum excavation depth is 13 ft based on the design elevations, for a horizontal dimension of 19.5 ft for each side slope. The excavation width is 22 ft at the base or 11 ft from the center of the culvert. Therefore, the top of slope is 19.5 ft + 11 ft = 30.5 ft horizontally from the center of the culvert. The top of excavation width will decrease where the total excavation depth is below 13 ft.

The crane will be located on undisturbed, level, firm material. The center pin of the crane is specified by the crane company, Miller Construction, as 55 ft from the center of the culvert. Therefore, the center pin will be a minimum of 55 ft - 30.5 ft = 24.5 ft from the top of excavation with the outriggers located a minimum of 13.5 ft from the top of excavation. A cut sheet showing the outriggers' dimension from the crane center is attached.

Erection

Culvert sections will be placed by a 120 ton crane with 68,300 lb counter weights supplied by Miller Construction. The crane will be set at the south end of the box. The maximum working radii will be 55 ft for the culvert sections and 70 ft for the southern wing walls.

The crane capacity exceeds the requirements for the heaviest culvert sections. The heaviest box section is 38,280 lbs and the total weight with appurtenances such as jib and rigging is 40,900 lbs. The 120 ton crane has a capacity of 42,600 lb at a radius of

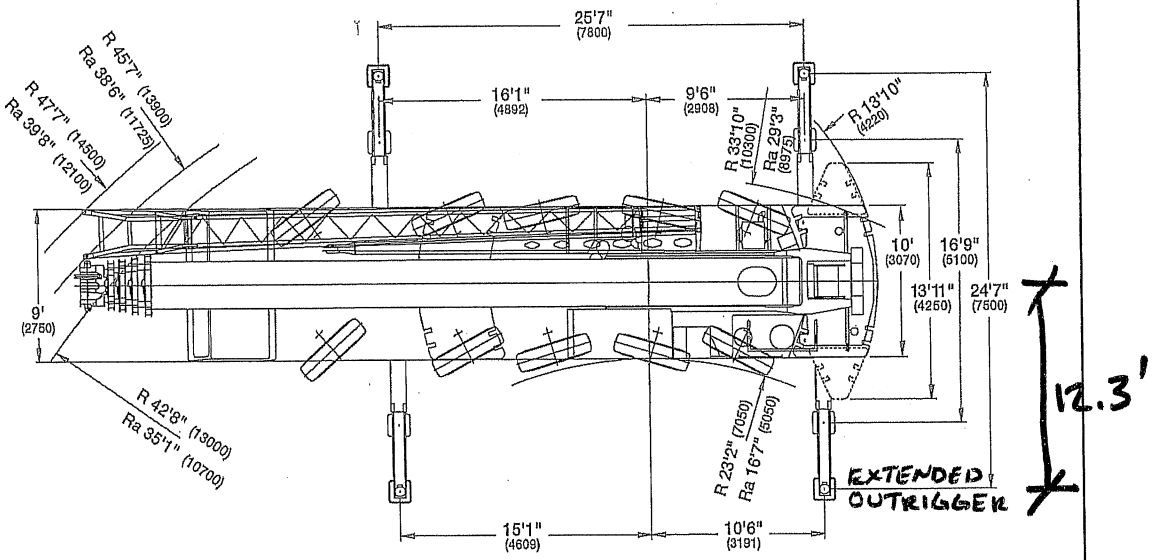
55 ft. The heaviest wingwall section is 24,760 lbs and the total weight of this section is 27,380 lbs. The crane capacity is 29,200 lbs at a radius of 70 ft. Calculation sheets and the crane schematic plan by Miller Construction are attached.

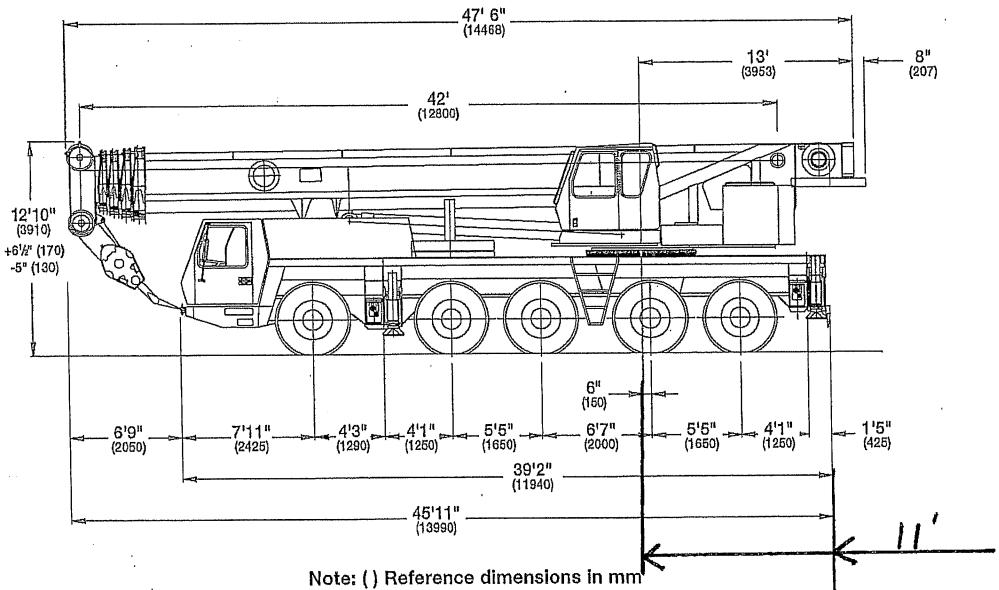
The minimum length slings are 25 ft long with a capacity of 25,000 lbs each, as shown on the attached cut sheet. Based on 14 ft between pick points on the precast units, the sling angle is 74 degrees. The capacity per sling is reduced to about 24,250 lb based on the angle. However, with 4 slings the capacity is sufficient for even the heaviest section.

ATTACHMENTS PROVIDED BY MILLER CONSTRUCTION:

- Grove CMK5120B Dimensional cut sheet
- Crane lift worksheets (2 pages)
- Schematic Plan with center pin locations
- Sling cut sheet and schematic (2 pages)

Dimensions





Note: ( ) Reference dimensions in mm

BASIC WEIGHTS (LBS.)	Axles 1- 3	Axles 4 & 5	Total
Mercedes Power, 20.5 tires, auxiliary hoist, 2nd oil cooler, outrigger pads, hydraulic offsettable swingaway with hydraulic reel, 10 x 8 x 10, 3MT counterweight bolted to superstructure.	72,367	48,621	120,988
Additions:			
Auxiliary boom nose	362	-207	155
20.5 Spare tire	-487	1,296	809
Driveline retarder	-64	716	652
*24,200 lbs. counterweight (15,400 lbs. on carrier)	14,660	970	15,630
REMOVAL:			
*Substitute IPO counterweight in lieu of auxiliary hoist	93	-46	47
Substitute manually offsettable swingaway in lieu of hydraulic swingaway (hose reel removed)	-686	296	-390
Remove 3MT bolted counterweight from superstructure	3,384	-9,777	-6,393
10 x 6 x 10 drive	-772	-22	-794
16.00 tires in lieu of standard 20.5	-556	-370	-926
14.00 tires in lieu of standard 20.5	-1,349	-899	-2,248

Reflects weight with superstructure facing forward.
* Auxiliary hoist is considered as part of the counterweight. Please see counterweight configuration sheet for build-up.

MILLER CONSTRUCTION, INC.
PO BOX 86
WINDSOR, VT 05089
(802) 674-5525
Fax (802) 674-5245

Crane lift worksheet **Crane #** 5

CUSTOMER M&M EXCAVATING

JOB Wilmington VT

Amount of equipment weight 38,280 Heaviest Box section

Weight of Ball _____

Weight of Block 700

Weight of Spreader _____

Weight of Rigging 500

Weight of Jib Erected _____

Weight of Jib Stowed 1320

Weight of Aux Head 100

Weight of Misc _____

TOTAL WEIGHT 40,900

43600 40' 24 200 c/w

CHART 42600 @ 55' 68300 c/w

WORK SITE RADIUS _____

MILLER CONSTRUCTION, INC.
PO BOX 86
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Fax (802) 674-5245

Crane lift worksheet **Crane #** 5

CUSTOMER MAM CONSTRUCTION

JOB WILMINGTON VT

Amount of equipment weight 24 760 HEAVIEST WW SECTION

Weight of Ball _____

Weight of Block 700

Weight of Spreader _____

Weight of Rigging 500

Weight of Jib Erected _____

Weight of Jib Stowed 1320

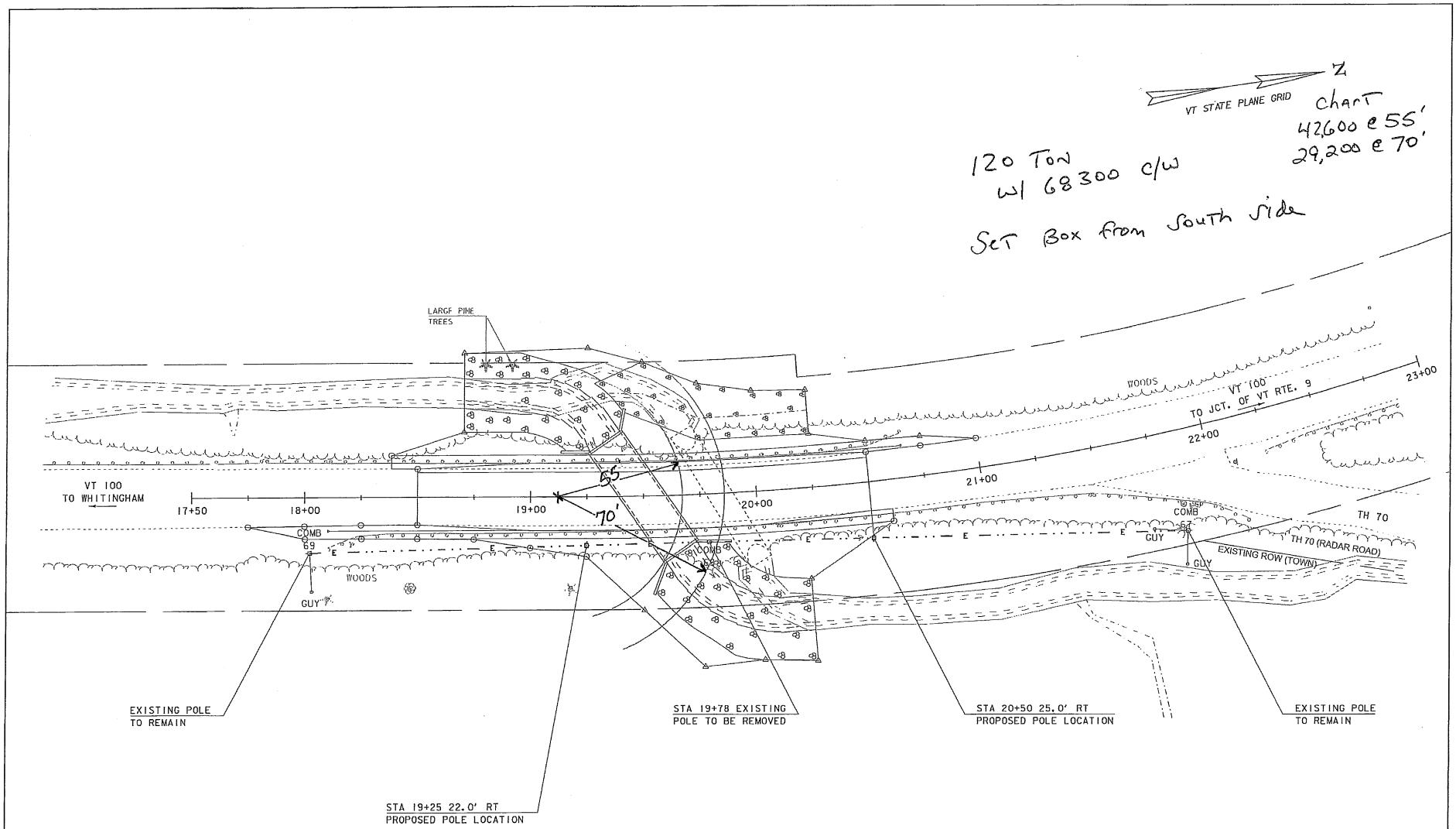
Weight of Aux Head 100

Weight of Misc _____

TOTAL WEIGHT 27,380

CHART 29 200 @ 70'

WORK SITE RADIUS 65'



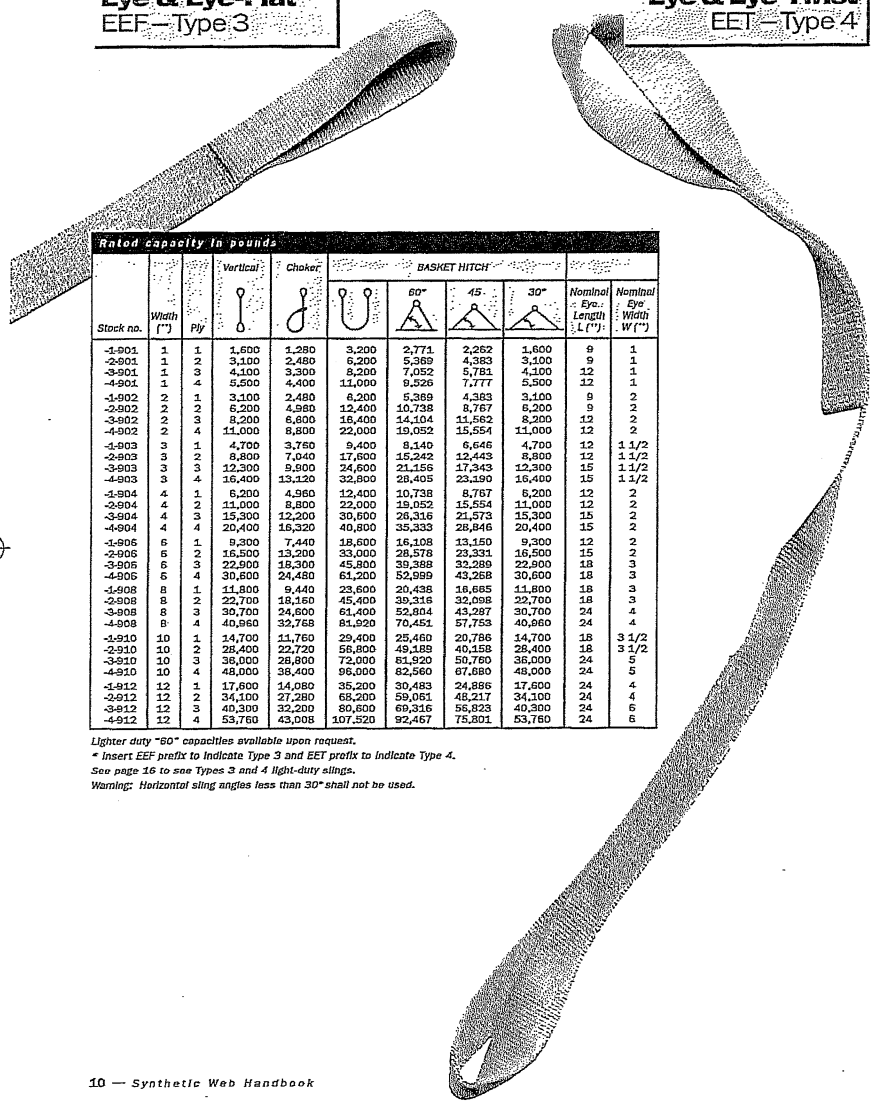
PROPOSED UTILITIES

SCALE 1" = 20'-0"
20 0 20

PROJECT NAME: WILMINGTON	
PROJECT NUMBER: STP 013-1(14)	
FILE NAME: s00b252ut1.dgn	PLOT DATE: 02-JAN-2014
PROJECT LEADER: K. HIGGINS	DRAWN BY: J. SALVATORI
DESIGNED BY: J. SALVATORI	CHECKED BY: G. LAROCHE
PROPOSED UTILITIES	SHEET 13 OF 31

Eye & Eye-Flat
EEF—Type 3

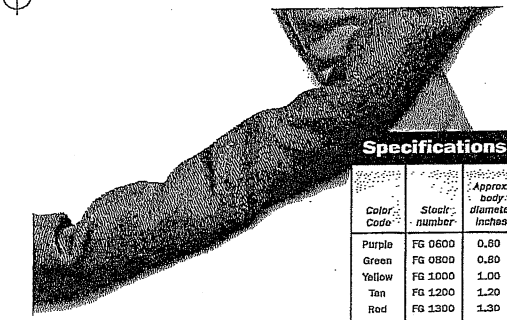
Eye & Eye-Twist
EET—Type 4



Rated capacity in pounds

Stock no.	Width (")	Ply	Vertical	Choker	Basket hitch	60°	45°	30°	Nominal Eye Length L (")	Nominal Eye Width W (")
-1-901	1	1	1,600	1,280	3,200	2,771	2,262	1,600	9	1
-2-901	1	2	3,100	2,480	6,200	5,369	4,383	3,100	9	1
-3-901	1	3	4,100	3,300	8,200	7,052	5,781	4,100	12	1
-4-901	1	4	5,500	4,400	11,000	9,526	7,777	5,500	12	1
-1-902	2	1	3,100	2,480	6,200	5,369	4,383	3,100	9	2
-2-902	2	2	6,200	4,960	12,400	10,738	8,767	6,200	9	2
-3-902	2	3	8,200	6,600	16,400	14,104	11,562	8,200	12	2
-4-902	2	4	11,000	8,800	22,000	19,052	15,554	11,000	12	2
-1-903	3	1	4,700	3,760	9,400	8,140	6,646	4,700	12	1 1/2
-2-903	3	2	8,800	7,040	17,600	15,242	12,443	8,800	12	1 1/2
-3-903	3	3	12,300	9,900	24,600	21,156	17,343	12,300	15	1 1/2
-4-903	3	4	16,400	13,120	32,800	28,405	23,190	16,400	15	1 1/2
-1-904	4	1	6,200	4,960	12,400	10,738	8,767	6,200	12	2
-2-904	4	2	11,000	8,800	22,000	19,052	15,554	11,000	12	2
-3-904	4	3	15,300	12,200	30,600	26,316	21,573	15,300	15	2
-4-904	4	4	20,400	16,320	40,800	35,333	28,846	20,400	15	2
-1-906	6	1	9,300	7,440	18,600	16,108	13,150	9,300	12	2
-2-906	6	2	16,500	13,200	33,000	28,578	23,331	16,500	15	2
-3-906	6	3	22,900	18,300	45,800	39,388	32,289	22,900	18	3
-4-906	6	4	30,600	24,480	61,200	52,999	43,268	30,600	18	3
-1-908	8	1	11,800	9,440	23,600	20,438	16,685	11,800	18	3
-2-908	8	2	22,700	18,160	45,400	39,316	32,098	22,700	18	3
-3-908	8	3	30,700	24,600	61,400	52,804	43,287	30,700	24	4
-4-908	8	4	40,960	32,768	81,920	70,451	57,753	40,960	24	4
-1-910	10	1	14,700	11,760	29,400	25,460	20,786	14,700	18	3 1/2
-2-910	10	2	28,400	22,720	56,800	49,188	40,158	28,400	18	3 1/2
-3-910	10	3	36,000	28,800	72,000	61,920	50,760	36,000	24	5
-4-910	10	4	48,000	38,400	96,000	82,560	67,680	48,000	24	5
-1-912	12	1	17,600	14,080	35,200	30,483	24,886	17,600	24	4
-2-912	12	2	34,100	27,280	68,200	59,061	48,217	34,100	24	4
-3-912	12	3	40,300	32,200	80,600	69,316	56,823	40,300	24	6
-4-912	12	4	53,760	43,008	107,520	92,467	75,801	53,760	24	6

Lighter duty "60" capacities available upon request.
** Insert EEF prefix to indicate Type 3 and EET prefix to indicate Type 4.*
See page 16 to see Types 3 and 4 light-duty slings.
Warning: Horizontal sling angles less than 30° shall not be used.



Specifications and rated capacity in pounds.

Color Code	Stock number	Approx. body diameter inches	Approx. body wt./ft. pounds	Vertical	Choker	Basket	60°	45°
Purple	FG 0600	0.60	0.30	2,600	2,100	5,200	4,500	3,700
Green	FG 0800	0.80	0.40	5,300	4,200	10,600	9,200	7,500
Yellow	FG 1000	1.00	0.50	8,400	6,700	16,800	14,500	11,900
Tan	FG 1200	1.20	0.80	10,600	8,500	21,200	18,400	15,000
Red	FG 1300	1.30	0.80	13,200	10,600	26,400	22,900	18,700
White	FG 1400	1.40	0.90	16,800	13,400	33,600	29,100	23,800
Blue	FG 1550	1.55	1.20	21,200	17,000	42,400	36,700	30,000
Orange	FG 1750	1.75	1.50	25,000	20,000	50,000	43,300	35,400
Orange	FG 1950	1.95	2.00	31,000	24,800	62,000	53,700	43,800
Black	FG 2350	2.35	2.80	40,000	32,000	80,000	69,300	56,600
Black	FG 3150	3.15	3.60	53,000	42,400	106,000	91,800	74,900
Black	FG 3950	3.95	4.60	66,000	52,800	132,000	114,300	93,300
Black	FG 4800	4.80	5.80	90,000	72,000	180,000	155,900	127,300

Rated capacities are based on current proposal for B30.9-6.
Warning: Horizontal sling angles less than 30° shall not be used.

X 25'
X 40'

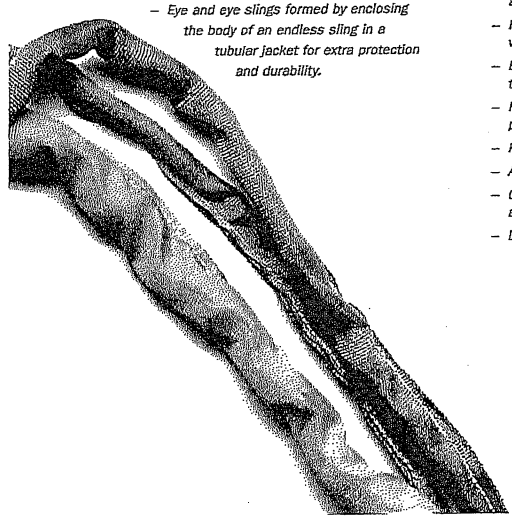
Match the color to your lifting needs.

The jackets of Flexi-grip slings are color-coded by rated capacity. Choose from nine different colors to fit the rated capacity you need for your lift (see chart). Each sling also features a durable identification tag to indicate its size, type and rated capacity for your convenience.

Flexi-grip options.

Flexi-grip slings are also available in three configurations:

- *Endless-type slings that double the lifting legs in every application.*
- *Multi-leg bridles.*
- *Eye and eye slings formed by enclosing the body of an endless sling in a tubular jacket for extra protection and durability.*



Moveable wear pads made with durable polyester buffer or leather are also available to help protect against lifting hooks and corners of loads.

Inspect your slings regularly.

Before each lift, visually inspect your Flexi-grip sling for any damage. Remove sling from service if you see:

- *Missing or illegible identification tag.*
- *Melting, charring or weld spatter on any part of the sling.*
- *Holes, tears, cuts, embedded particles, abrasive wear or snags that expose the sling's core yarns.*
- *Broken or worn stitching in the cover that exposes the core yarns.*
- *Fittings that are damaged, stretched, cracked, pitted or distorted in any way.*
- *Knotting in the sling.*
- *Acid or alkali burns.*
- *Other visible damage that causes doubt as to the sling's strength.*
- *Loading a sling beyond its rated capacity.*

How to order: Page 26

Miller Construction, Inc.
3103 US Route 5 South
P.O. Box 86
Windsor, Vermont 05089
802-674-5525 Fax: 802-674-5245

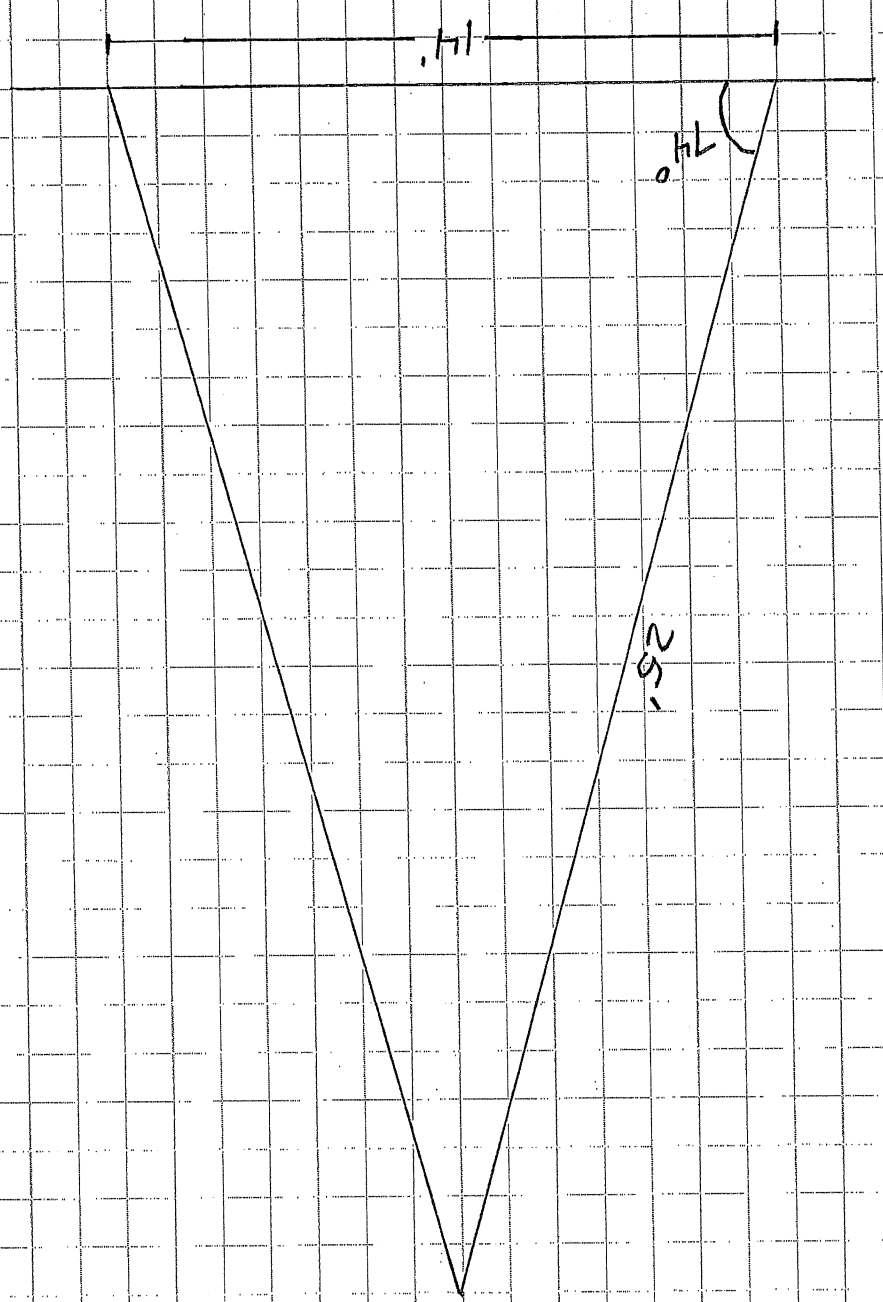
JOB _____

SHEET NO. _____ OF _____

CALCULATED BY _____ DATE _____

CHECKED BY _____ DATE _____

SCALE _____



Orange 25000 vertical

Black 66000 vertical