



Calculation number: 12C-10T-Jun27 **HOJ JOB# 92283-18**
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CRANE DATA

1 General

Crane typeCXTS10-TON x 44ft Hol:19.5ft
 Span44'-0"
 Crane load (SWL)20 000 lbs
 Number of hoists1 pc

Hoist 1

Trolley typeStandard
 Hoist load20 000 lbs
 Hoisting height19'-5 15/16" [max 29'-6 5/16"]
 Hoist typeCXT50410100P55FDLOF
 Hoist groupFEM M5 (2m)
 Hoisting speed20/3.3 ft/min 2 - speed
 Trolley traversing speed66/16 ft/min 2 - speed
 Weight of one hoist and trolley.....1 350 lbs

Trolley rail gaugeN/A
 Crane useIndoor
 Crane groupCMAA C
 Bridge traveling groupFEM M5 (2m)
 Bridge traveling speed105/26 ft/min 2 - speed

Dynamic coefficient for load1.15
 Dynamic coefficient dead load1.10
 Crane acceleration time4.7 s

Weight of crane (with hoists)10 650 lbs
 Weight of crane bridge (without hoists)9 300 lbs
 Weight of one end carriage1 000 lbs
 Weight of one crane traveling machinery30 lbs
 Weight of bridge panel70 lbs
 Weight of one main girder6 520 lbs
 Weight of crane service platformN/A

Main girder type (Profile)W27x146-MatA572
 Service platform typeN/A
 Surface preparation / painting typeStandard / Alert Orange

2 Electrical

Main voltage460 V /60 Hz
 Control voltage115 V
 Nominal power of crane16.9 hp
 Main fuse size at bridge panel30 A
 Maximum current of crane*)85.6 A
 Nominal current of crane*)25.6 A
 Power factor at starting current0.75

Note! The maximum current of crane includes the starting current of hoisting motor(s) and nominal current of trolley and bridge traveling motors. The nominal current of crane includes the nominal current of hoisting, trolley and bridge motors. Maximum or nominal currents of crane do not include the currents of additional accessories, such as lamps, magnets etc.



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Power factor at nominal current0.91

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END CARRIAGE AND TRAVELING MACHINERY DATA

1 General

Crane type CXTS10-TON x 44ft HoI:19.5ft
 Span 44'-0"
 Crane load (SWL) 20 000 lbs

2 End carriage

End carriage type ECN25-2559-H40000B0000-N
 Bridge traveling group FEM M5 (2m)
 Maximum static wheel load 12.6 kips
 Maximum dynamic wheel load 14.3 kips
 Maximum wheel load along rail 0.9 kips
 CMAA Equivalent durability wheel load - Pe 10 215 lbs
 CMAA Guide for max. durability wheel load - P 13 938 lbs > Pe
 Wheel Hardness 280.0 BHN
 Runway rail type ASCE30
 Minimum allowed wheel diameter 7 15/16"
 Calculated bearing life time 128 640 h
 Bending stress of end carriage 16.3 ksi
 Deflection of end carriage 1/16"
 Wheel groove 2 5/16"
 Joint type P-TOP-H_STD-S
 Buffer type D2240
 Buffer length 2 5/8"
 Buffer diameter 3 1/8"
 Buffer center from top of crane rail 5 7/8"

3 Traveling machinery

Machinery type GES490PS2BOF06MA200-6460N
 Number of traveling machinery 2 pc
 Nominal power of motor (High / Low Speed) 0.5 hp
 Synchronized speed of motor (High / Low Speed) 3 600 / 900 r/min
 Nominal speed of motor (High / Low Speed) 3 430 / r/min
 Nominal torque of motor (High Speed) 0.8 lbf-ft
 Gear ratio 89.0
 Nominal bridge speed (High / Low Speed) 105/26 ft/min 2 - speed
 Practical bridge speed (High Speed) 101.0 ft/min
 Acceleration time 5.7 s (< 4.7 s)
 Electrical braking distance 5'-7 15/16"
 Mechanical braking distance 1'-10 11/16"
 Thermal loading per motor 0.48 hp
 Number of starts per hour N/A

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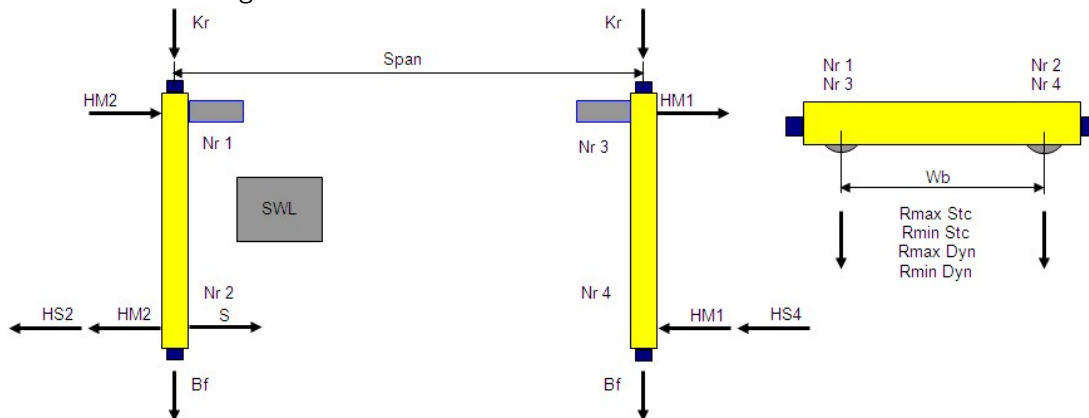
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Torque margin1.18 (≥ 1)
 Power margin1.04 (≥ 1)

CRANE WHEEL LOAD DATA

1 Wheel load drawing



2 Crane information

Crane type	CXTS10-TON x 44ft Hol:19.5ft	Buffer type	D2240
Span (Spa)	44'-0"	Wheel base (Wb)	8'-2 7/16"
Load (SWL)	20 000 lbs	Crane rail in calculation	ASCE30
Crane group	CMAA C	Wheel groove	2 5/16"
Crane speed	105/26 ft/min		
Crane weight	10 650 lbs	Crane travel limit switch	1-step

3 Hoist information

Hoist	Hoist type	Hoist group	Hoisting speed
Hoist 1 Main	CXT50410100P5	FEM M5 (2m)	20/3.3 ft/min
Hoist 1 Aux			

4 Vertical wheel loads

Wheel	NR1	NR2	NR3	NR4
Rmax Stc	12.6 kips	12.1 kips	-	-
Rmin Stc	-	-	3.1 kips	2.9 kips
Rmax Dyn	14.3 kips	13.7 kips	-	-
Rmin Dyn	-	-	3.4 kips	3.3 kips

5 Horizontal wheel loads (according to DIN 4132 + 15018 and FEM)

5.1 Inertia forces (from driving mechanisms)	HM1 = 0.4 kips	HM2 = 1.5 kips
5.2 Max. Wheel loads along each crane runway		Kr = 0.9 kips

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5.3 Buffer force for dimensioning the crane runway end stop	Bf = 7 kips
5.4 Forces coming from skewing	
5.4.1 Guiding (contact) force (S= HS2 + HS4)	S = 4.3 kips
5.4.2 Friction forces due to oblique travel	HS2 = 3.5 kips HS4 = 0.8 kips

ELECTRICAL COMPONENT DATA

1 General

Crane typeCXTS10-TON x 44ft HoI:19.5ft
 Crane main / control voltage460 V /60 Hz / Control 115 V
 Nominal power of crane16.9 hp
 Maximum / nominal current of crane*)85.6 A / 25.6 A
 Power factor at starting / nominal current0.75 / 0.91

2 Bridge panel

Bridge panel typeCRANELP5-1QQ400-76J0
 Bridge panel length / weight (preliminary)2'-11" / 70 lbs
 Main fuse size at bridge panel30 A

3 Hoist speed control

Hoist 1

Type MAIN2 – speed
 Control method / Location2SP / Trolley panel

4 Trolley speed control

Hoist 1

TypeDYNADRIIVE022FXXTNS, 2 - speed
 Control method / LocationMS2 / Trolley panel
 Adjusted acceleration time3.6 s
 Nominal current margin1.5
 Maximum current margin2.1

5 Bridge speed control

TypeDYNADRIIVE022FXXTNS, 2 - speed
 Voltage460 V
 Control method / LocationMS2 / Bridge panel
 Adjusted acceleration time5.7 s
 Nominal current margin2.2
 Maximum current margin2.0

6 Trolley power supply [festoon]

Hoist 1

TypeQQSMS13L7BP576134-
 Hoist main power cable typeFC1004 FLAT
 Distance between cable trolleys6'-0"

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Cable trolley type.....KC-023571
 Free cable length at bridge panel end18'-1"
 Free cable length at hoist panel end11'-6"
 Voltage drop of trolley power supply<= 3.0 %

7 Crane control

Pendant typePENDAX08-2221NC00-059P0
 Pendant cable length.....19'-2"
 Remote control type.....N/A
 Radio frequencyN/A
 Control methodPENDAX - 2 step push-button

8 Crane power supply

Type
 Runway length.....0"
 Voltage drop of crane (conductor) power supply % <= 4.0 %
 Power feeding cable typeNot Included
 Power feeding cable length65'-7 3/8"
 Main switch typeNot Included

MOTOR DATA**1 General**

Crane typeCXTS10-TON x 44ft HoI:19.5ft
 Span44'-0"
 Crane load (SWL)20 000 lbs
 Crane voltage.....460 V

2 Hoisting motor**Hoist 1**

Motor codeP5
 Motor type1 x MF11X-106
 Synchronized speed3 600 / 600 r/min
 Duty groupFEM M5 (2m)
 Nominal power14.8/2.1 hp
 Duty factor60 % ED
 Starting torque (High Speed)46.5 lbf-ft
 Starting current (High Speed)80.0 A
 Nominal current (High Speed)20.0 A
 Power factor at starting current0.75
 Power factor at nominal current0.91

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3 Trolley traversing motor

Hoist 1

Motor type.....	MF06LA200
Motor voltage.....	364 V
Number of motors.....	2 ps
Synchronized speed.....	3 000 / 750 r/min
Nominal speed.....	2 690 / r/min
Duty group.....	FEM M5 (2m)
Nominal power.....	0.6 hp
Duty factor.....	40 % ED
Starting torque (High Speed).....	5.2 lbf-ft
Starting current (High Speed).....	1.8 A
Nominal current (High Speed).....	1.7 A

4 Bridge traveling motor

Motor type.....	MF06MA200
Motor voltage.....	460 V
Number of motors.....	2 ps
Synchronized speed.....	3 600 / 900 r/min
Nominal speed.....	3 430 / r/min
Duty group.....	FEM M5 (2m)
Nominal power.....	0.5 hp
Duty factor.....	40 % ED
Starting torque (High Speed).....	2.1 lbf-ft
Starting current (High Speed).....	1.9 A
Nominal current (High Speed).....	1.1 A

MAIN GIRDER DATA

1 Main girder data

Crane type.....	CXTS10-TON x 44ft HoI:19.5ft
Main girder type code (Profile).....	W27x146-MatA572
Flange width (B_).....	1'-1 15/16"
Girder height (H_).....	2'-3 3/8"
Thickness of web (T1_).....	19/32" (Material: 50.0 ksi)
Thickness of bottom flange (T2_).....	31/32" (Material: 50.0 ksi)
Thickness of top flange (T4_).....	31/32" (Material: 50.0 ksi)
Actual web height at girder end (JoiMinWebHgtT1_).....	2'-1 7/16"
Min. web height at girder end (MinWebHgt).....	3 13/16"
Trolley rail type (item 10).....	N/A
Trolley end stop distance from runway rail center.....	Panel s.: 1'-6 1/8" / Non panel s.: 1'-6 1/8"

2 Main girder dimensions

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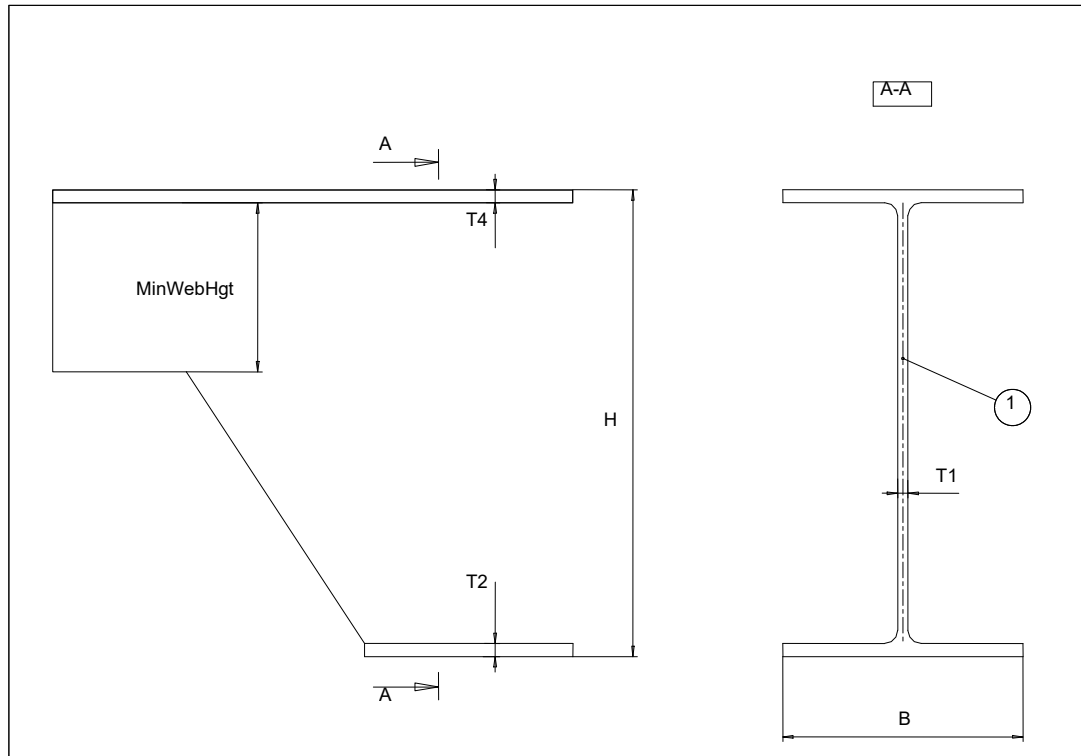


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Note! The shape of girder end is not to scale and not according to crane layout.

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3 Main girder welding

Main girder welding CSW00_2B1 – modular crane welding
 Trolley rail welding Step weld - Indoor use

4 Main girder (and service platform) weights and area

Number of main girders 1 ps
 Weight of one main girder / length unit 146 lbs/ft
 Weight of one main girder 6 520 lbs
 Weight of crane service platform N/A
 Service platform type N/A

Surface area of main girder 450 ft²
 Surface area of crane service platform N/A

5 Calculated values

Vertical deflection (load and trolley) 3/8" < 7/8"
 Vertical deflection (overall) 15/32" < 7/8"
 Horizontal deflection 3/16" < 1 1/16"

Vertical frequency without load 10.90 > 2.00 Hz
 Vertical frequency with load 4.81 > 2.44 Hz
 Horizontal frequency 4.3 > 1.80 Hz

Max allowed buffer force 14.8 kips

Lateral buckling factor 0.65 ≤ 1

Distance of neutral axis from bottom plate 1'-1 3/16"
 Moment of inertia IXX 5 630 in⁴
 Moment of inertia IYY 443 in⁴
 Warping constant IW 77 246.41 in⁶
 Torsion constant IT 11 in⁴

TROLLEY WHEEL LOAD DATA

Hoist 1

1 General

Hoist load (SWL) 20 000 lbs
 Hoisting height 19'-5 15/16" [max 29'-6 5/16"]
 Hoist type CXT50410100P55FDLOF
 Hoist group FEM M5 (2m)
 Trolley traversing duty group FEM M5 (2m)
 Hoisting speed 20/3.3 ft/min 2-speed

Note! The maximum current of crane includes the starting current of hoisting motor(s) and nominal current of trolley and bridge traveling motors. The nominal current of crane includes the nominal current of hoisting, trolley and bridge motors. Maximum or nominal currents of crane do not include the currents of additional accessories, such as lamps, magnets etc.

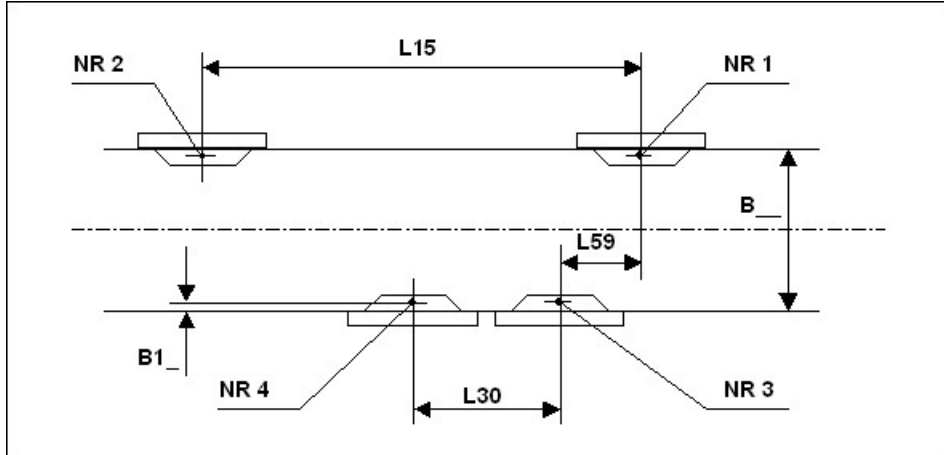


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Trolley traversing speed 66/16 ft/min 2-speed
 Weight of hoist and trolley 1 350 lbs

2 Wheel load drawing



3 Wheel load data

Distance between trolley wheels (L15)	2'-3 7/8"	
Distance between trolley wheels (L30)	2'-3 7/8"	
Distance between trolley wheels (L59)	0"	
Girder flange width (B)	1'-1 15/16"	
Trolley wheel contact point from flange edge (B1)	3/8"	
Static Wheel load (load+trolley /trolley only) (NR1)	6 262 lbs	/ 697 lbs
Static Wheel load (load+trolley /trolley only) (NR2)	4 982 lbs	/ 547 lbs
Static Wheel load (load+trolley /trolley only) (NR3)	5 627 lbs	/ 62 lbs
Static Wheel load (load+trolley /trolley only) (NR4)	4 484 lbs	/ 49 lbs
Dynamic Wheel load (load and trolley wgt.) (NR1)	7.2 kips	
Dynamic Wheel load (load and trolley wgt.) (NR2)	5.7 kips	
Dynamic Wheel load (load and trolley wgt.) (NR3)	6.5 kips	
Dynamic Wheel load (load and trolley wgt.) (NR4)	5.2 kips	

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