TrueMind
Design Future Solution

AMERICAN CONVENTIONAL STEEL DETAILING PROCESS

TrueMind Solution LLP.
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INDEX

1. IMPERIAL UNITS & CALCULATION

Generally, two types of unit systems are used in industry. All other types of unit systems come under these two. Mostly Imperial Unit System is used in USA & Canada but, it may vary depending on the Project & the Clients.
Imperial units (or) FPS – Feet Pound Second
Metric units (or) MKS – Meter Kilogram Second

FPS (Imperial units):

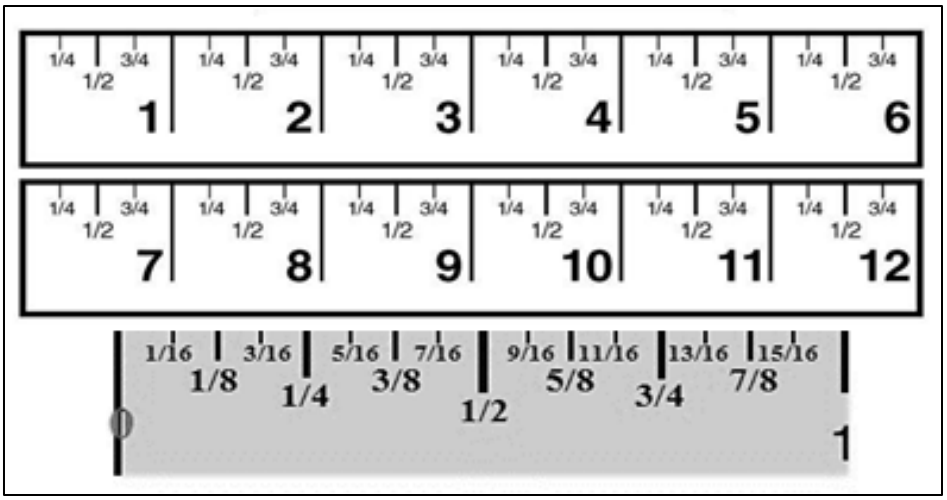
Dimension /Length is measured in foot / inch (ft / in)

Weight is measured in pound (lb)
Time is measured in Second (s)
Volume is measured in ft^3 – in^3
Density is measured in lbs/ in^3

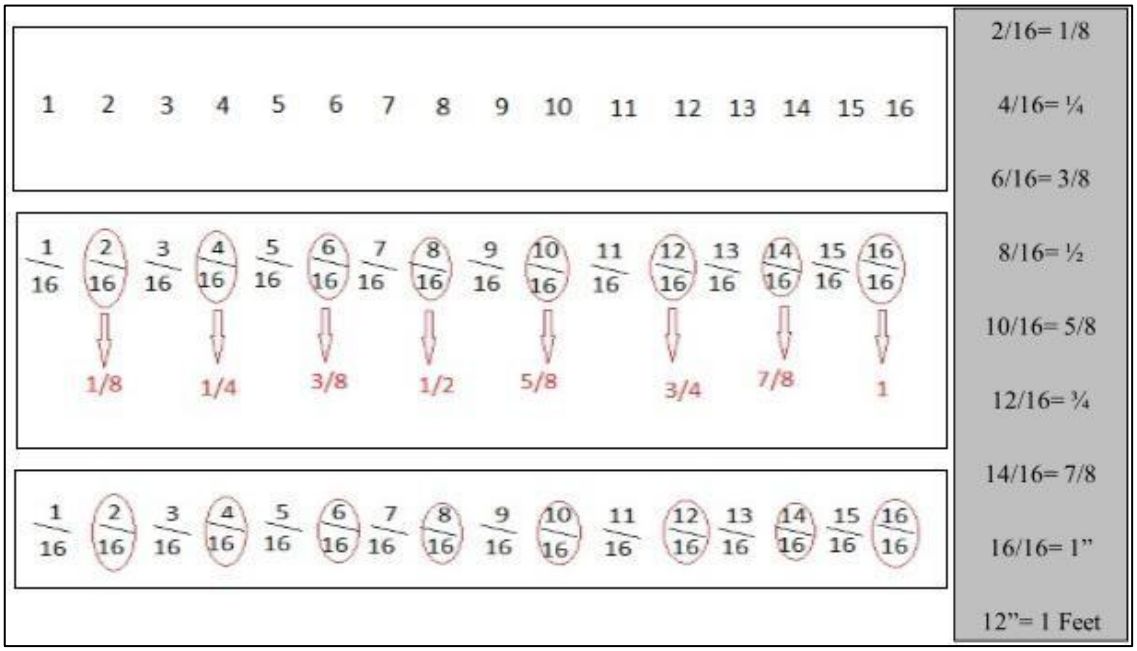
Imperial units' Measurement & Representation:

1foot =12 inches	1inch =1/12 foot.
1kip = 1000 lbs	1lb = 0.001 kip
1ft = 1'– 0	1 inch = 0 – 1" (or) 1"

Feet / inch measurement:



Division in inch:



Example of Addition in Imperial units:

$2' - 0 + 1' - 4\ ^{3}/_{4} + 3' - 4\ ^{5}/_{8}$

$= 2' - 0 + 1' - 4\ ^{12}/_{16} + 3' - 4\ ^{10}/_{16}$

$= 6' - 8\ ^{22}/_{16}$

$= 6' - 8\ [^{16}/_{16} + ^{6}/_{16}]$

$= 6' - 8\ [1'' + ^{6}/_{16}]$

$= 6' - 9\ ^{6}/_{16}$

$= 6' - 9\ ^{3}/_{8}$

$5' - 11\ ^{13}/_{16} + 14' - 10\ ^{7}/_{8} + 19' - 8\ ^{1}/_{8}$

$= 5' - 11\ ^{13}/_{16} + 14' - 10\ ^{14}/_{16} + 19 - 8\ ^{2}/_{16}$

$= 38' - 29\ ^{29}/_{16}$

$= 38' - 29\ [^{16}/_{16} + ^{13}/_{16}]$

$= 38' - 29\ [1 + ^{13}/_{16}]$

$= 38' - 30\ ^{13}/_{16}$

$= 38' - [12 + 12 + 6]\ ^{13}/_{16}$

$= 38' - [1' + 1' + 6]\ ^{13}/_{16}$

$= 40' - 6\ ^{13}/_{16}$

Example of Subtraction in Imperial units:

$6' - 0 - (1' - 4\ ^{3}/_{4}) - (3' - 4\ ^{5}/_{8})$

$= (6' - 0) - (1' - 4^{12}/_{16}) - (3' - 4\ ^{10}/_{16})$

$= (5' - 12) - (1' - 4^{12}/_{16}) - (3' - 4^{10}/_{16})$

$= (5' - 10^{32}/_{16}) - (1' - 4^{12}/_{16}) - (3' - 4^{10}/_{16})$

$= 1' - 2\ ^{10}/_{16}$

$= 1' - 2\ ^{5}/_{8}$

$16' - 11\ ^{13}/_{16} - (14' - 10\ ^{7}/_{8})) - (0' - 2\ ^{7}/_{8})$

$= 15' - (12+11)\ ^{13}/_{16} - (14' - 10^{14}/_{16}) - (0' - 2^{14}/_{16})$

$= 15' - 23\ ^{13}/_{16} - (14' - 10^{14}/_{16}) - (0' - 2^{14}/_{16})$

$= 15' - 22\ (^{16}/_{16} + 13/16) - (14' - 10^{14}/_{16}) - (0' - 2^{14}/_{16})$

$= 15' - 22\ ^{29}/_{16} - (14' - 10^{14}/_{16}) - (0' - 2^{14}/_{16})$

$= 1' - 10\ 1/16$

Example of Volume & Weight Calculation:

The weight of a steel plate whose length 2'– 0, width 2'– 0 and 1" thick.

Volume of plate = length x width x thickness = 24 x 24 x 1 in^3 = 576 in^3

Density / unit weight of steel = 0.2836 lbs./in^3

Weight of the plate = Volume x density of steel= 576 x 0.2836 = 163.35 lbs.

Practice Question:

1. 5'– 8 9/16 (+) 4'– 2 1/2 (+) 2'– 1 3/4 =
2. 2'– 8 3/16 (+) 11'– 9 1/16 (–) 2'– 1 3/4 =
3. 3'– 2 5/16 (+) 4'– 9 1/4 (+) 2'– 1 1/2 =
4. 2'– 4 3/8 (+) 4'– 6 5/16 (+) 6'– 3 1/4 =

5. 14’- 8 15/16 (–) 8’- 5 7/8 (–) 4’- 2 1/4 =
6. 8’- 4 13/16 (+) 4’- 9 3/8 (+) 7’- 3 1/2 (+) 3’- 8 3/16 (+) 5’- 2 1/16 =
7. 112’- 11 11/16 (+) 5’- 7 5/16 (+) 6’- 2 3/4 (+) 7’- 5 1/4 (+) 2’- 3 1/8 =
8. 92’- 0 (–) 9’- 2 7/16 (–) 6’- 3 1/8 (–) 8’- 0 3/16 (–) 9’- 4 1/4 =
9. 5’- 8 5/16 (-) 3’- 3 1/4 (+) 1’- 1 1/8 =
10. 111’- 4 5/8 (-) 4’- 2 1/16 (-) 5’-9 1/4 =
11. 11’- 7 15/16 (+) 5’- 3 7/8 (–) 2’- 8 1/8 =
12. 12’- 9 5/16 (-) 2’- 5 3/8 (+) 3’- 61/8 (-) 1’- 6 3/16 (+) 2’- 2 1/16 =
13. 11’- 9 1/16 (+) 2’- 7 5/16 (-) 11’- 9 3/4 (+) 7’- 5 1/4 (+) 2’- 5 1/8 =
14. 52’- 8 (–) 9’- 2 9/16 (–) 6’- 3 1/8 (–) 8’- 0 3/16 (+) 7’- 4 1/4 =
15. 5'-9 1/4 (+) 11'-10 3/8 (+) 19'-8 5/16 (+) 20’-10 1/2 =
16. 5'-11 13/16 (+) 14'-10 7/8 (+) 19'-8 1/8 =
17. 121’-11 5/16 (–) 21’-11 5/16 (–) 12’-11 5/16 (–) 2’-11 5/16 (-) 1’-11 5/16 =
18. 5'-9 1/4 (+) 11'-10 3/8 (+) 19'-8 5/16 (+) 20’-10 1/2 =
19. 11’-2 7/8 (–) 3’-2 1/16 (–) 4’-8 7/16 (+) 5’-0 =
20. 10’-1 1/16 (+) 2’-8 3/16 (–) 4’-9 15/16 =
21. Calculate volume of a steel plate whose length 1’- 0, width 1’- 0 and 2” thick.
22. Calculate volume of a steel plate whose length 2’- 6, width 1’- 3 and 2” thick.
23. Calculate volume of a steel plate whose length 2’- 6, width 1’- 3 and 1/2” thick.
24. Calculate weight of steel plate in Question 21, Density = 0.2836 lbs /in3
25. Calculate weight of steel plate in Question 22, Density = 0.2836 lbs /in3

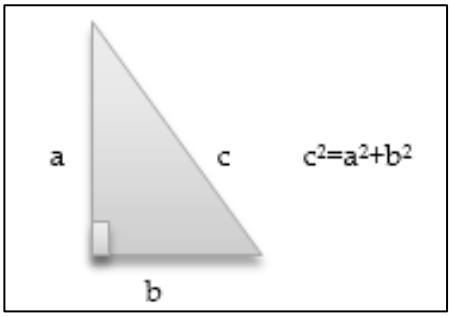
Inches to decimal conversion:

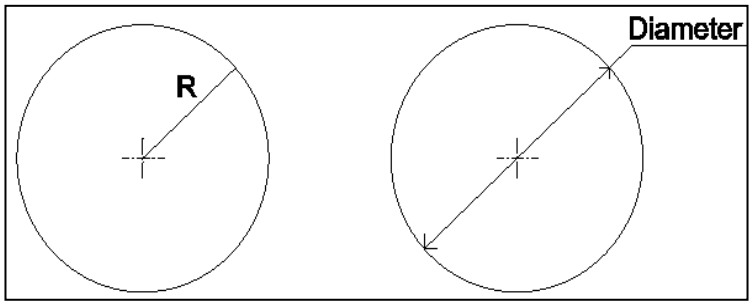
Eights	
1/8	0.125
1/4	0.250
3/8	0.375
1/2	0.500
5/8	0.625
3/4	0.750
7/8	0.875
Sixteenths	
1/16	0.0625
3/16	0.1875
5/16	0.3125
7/16	0.4375
9/16	0.5625
11/16	0.6875
13/16	0.8125
15/16	0.9375

2. GEOMETRY & FORMULA

Pythagorean Theorem:

This is the name of Pythagoras' most famous discovery. It only works with right-angled triangles. The longest side, which is always opposite to the right-angle, has a special name called 'hypotenuse'. The square on the longest side is equal in area to the sum of the squares on the other two sides.



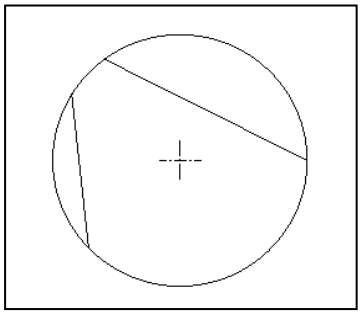


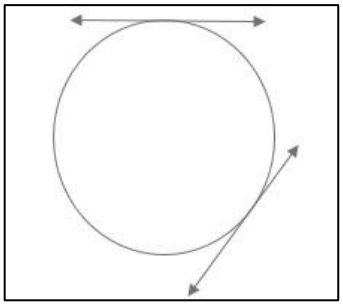
Circles & Arcs:

A set of all points in a plane at a given distance from a given point in the plane.

Chord:

It is a line segment whose endpoints lie on the circle. Diameter is also a chord which passes through the centre of the circle.



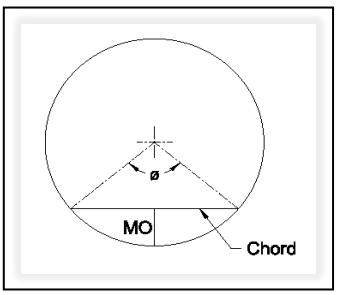


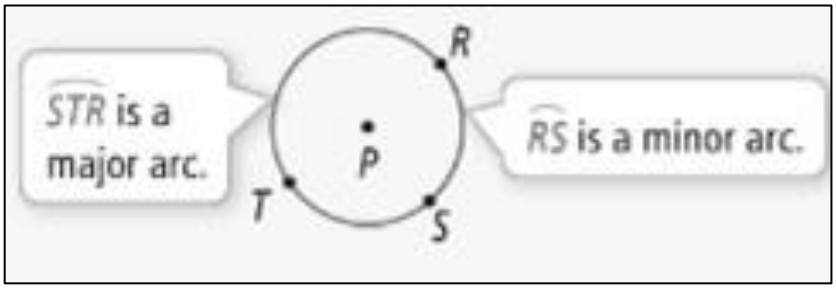
Tangent:

A line in the plane of the circle that intersects the circle in exactly one point.

Middle ordinate:

The perpendicular distance from midpoint of chord to circle/arc.



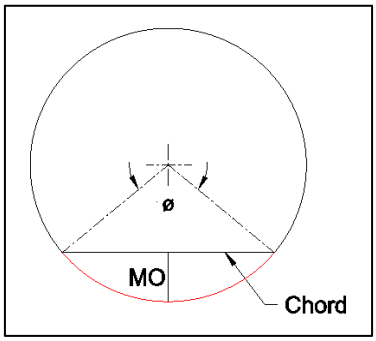


Arcs:

An arc is a part of a circle. A semicircle is one type of arc – half of a circle. A minor arc is smaller than a semicircle. A major arc is larger than a semicircle.

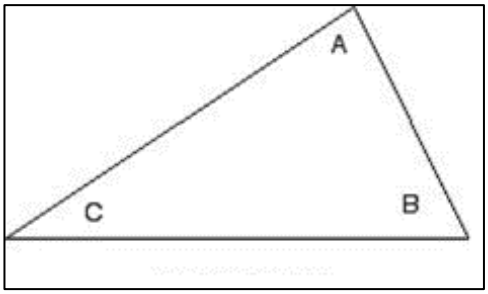
Formulas:

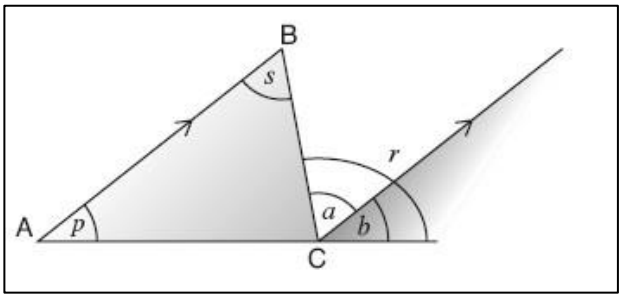
1. Circumference of a circle = 2.π.r (or) π.D.
2. Area of circle = $\pi.r^2$ (or) $\pi.D^2/4$
3. Chord length = 2.r. sin (Ø/2)
4. Middle ordinate, MO = r. [1- Cos (Ø/2)]
5. Arc length = π. D. (Ø/360)



Properties of Triangle:

1. The sum of interior angles of a triangle should be 180º. A + B + C = 180º.

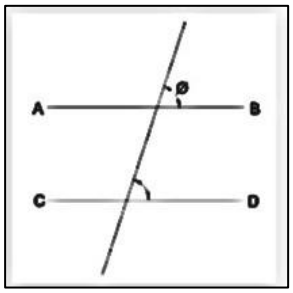


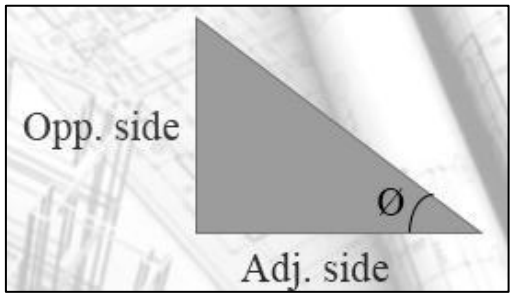


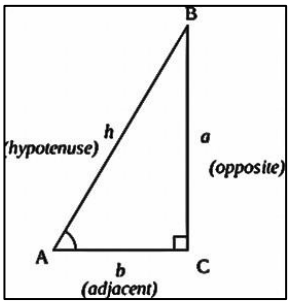
2. The exterior angle of a triangle is equal to sum of opposite interior angles.

   p + s = r; where p = b, s =a and r = a + b

3. Parallel line theorem θ = ω





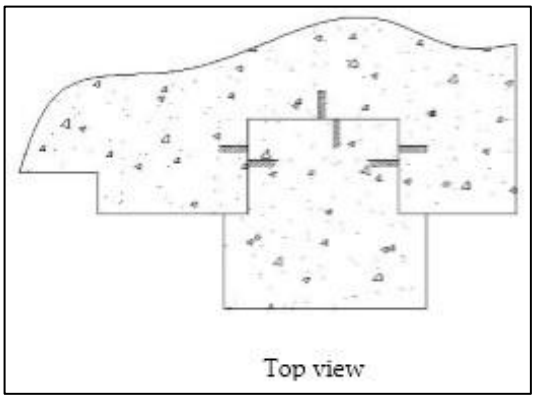


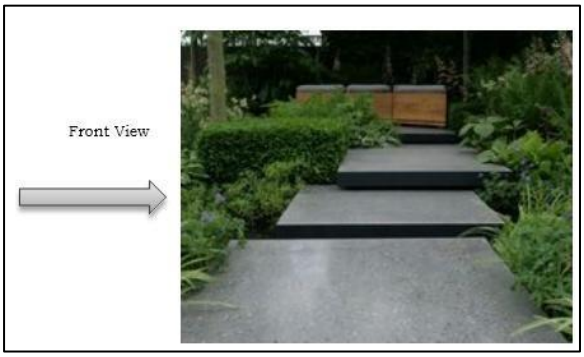
Trigonometric relations:

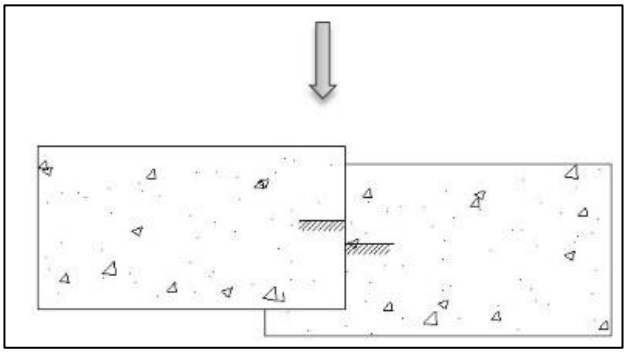
Sin Ø = Opp. Side / Hypotenuse	Ø = Sin-1 (Opp. Side / Hypotenuse)
Cos Ø = Adj. Side / Hypotenuse	Ø = Cos-1 (Adj. Side / Hypotenuse)
Tan Ø = Opp. Side / Adj. Side	Ø = Tan-1 (Opp. Side / Adj. Side)

Basic types of Surfaces:

Uneven Surface, Flat Surface, Slope surface and Step surface- Step Up & Step-Down Surface.





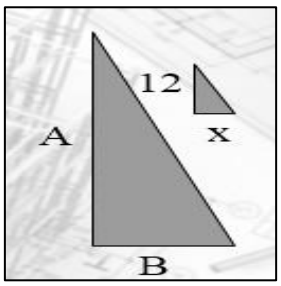


Slope:

Slope surfaces are those whose are inclined from horizontal. Inclination of Slope surfaces can be denoted using angles/bevel.

Bevel & Calculation:

Bevel is representation of the slope of an object. It is the distance of vertical/horizontal with respect to 1'-0 (or) 12 inches.



A / B = 12 / x Where, A= Vertical distance

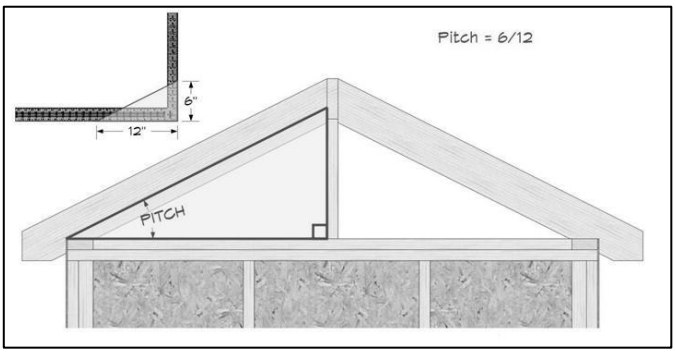
B = Horizontal distance

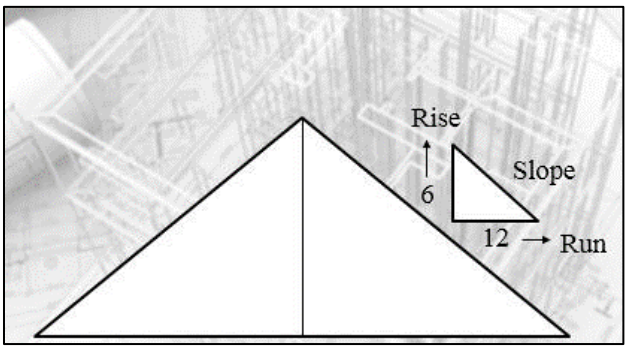
X = Rise value for 1'-0 (or) 12"

Pitch:

Pitch is the inclination / slope of an object with 1'-0 (or) 12" as a base.

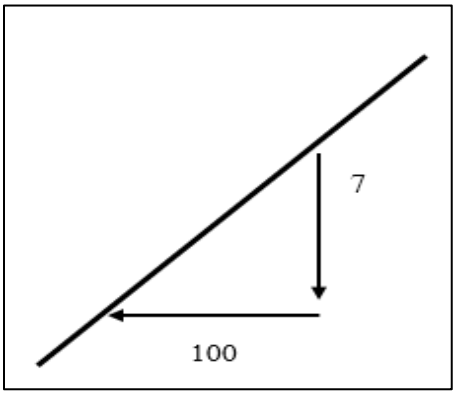
Representation of bevel:





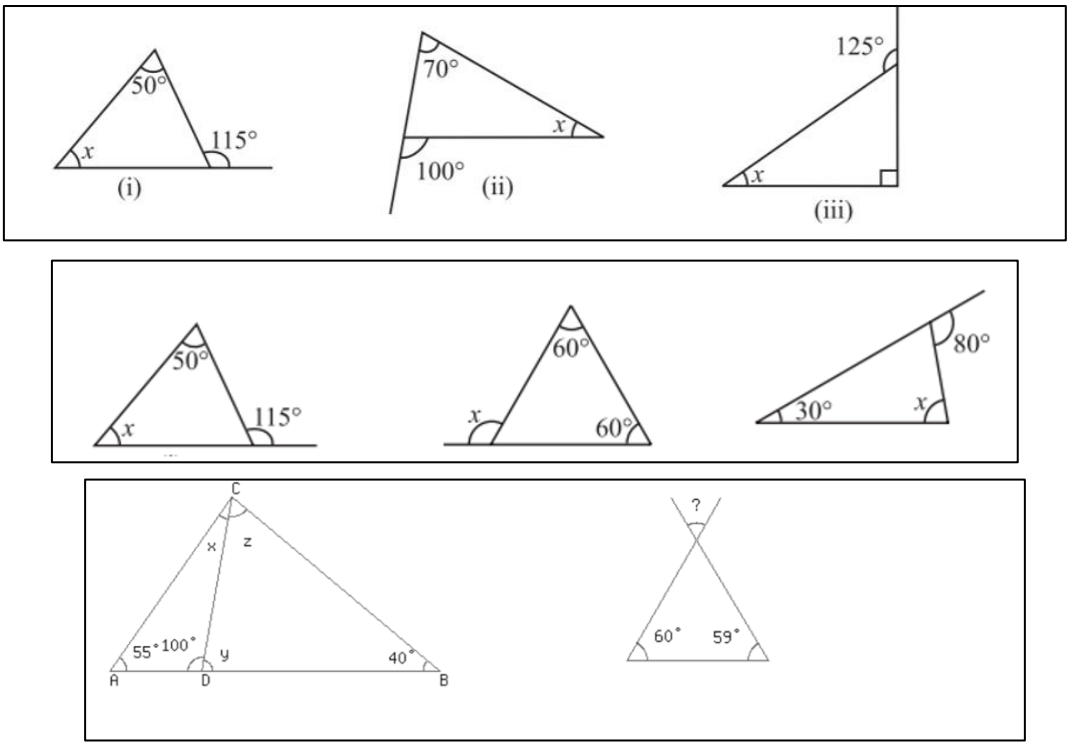
Calculation of slope by percentage:

What does the 7% mean- 7% is the slope of the road. It means the road drops 7 feet vertically for every 100 feet horizontally.



Practice Question:

1. Calculate value of X, Y & Z.



2. A right triangle with sides 3 cm, 4 cm and 5 cm is rotated the side of 3 cm to form a cone. The volume of the cone so formed is:

3. The angle of elevation of a ladder leaning against a wall is 60° and the foot of the ladder is 4.6 m away from the wall. What is the length of the ladder?

4. Calculate the value of third angle of a triangle, where Value of first angle = 10% of 60º + 90% of 30º + 30% of 50 & Second angle is right angle.

5. Area of a circle is equal to area of a rectangle, where value of pi (∏) = 3, Radius of circle = 2 X (5/16 + 1/8 + 3/4 + 1/2 – 11/16), Length of a side of rectangle= 1% of 333 – 1% of 33. Calculate length of diagonal of the rectangle

6. The ratio between the length and the breadth of a rectangular park is 3 : 2. If a man can cycling along the boundary of the park at the speed of 12 Km/ H completes one round in 8 minutes. What is the area of the park (in Square Meter).

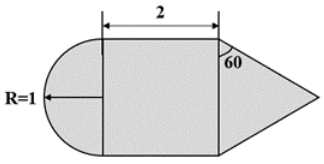
7. Calculate the slope of a ramp in percentage with run of 51'- 0" and raise of 1'- 6".

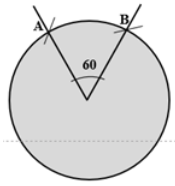
8. Calculate the slope of a ramp in percentage with run of 40'- 0" and raise of 1'- 2".

9. Calculate the slope of a ramp in bevel with run of 51'- 0" and raise of 1'- 6".

10. Calculate the slope of a ramp in bevel with run of 40'- 0" and raise of 1'- 2".

11. Calculate area of the below figure in mm.





12. Calculate length of the arc AB. Diameter of circle is 7.5 cm for above figure.

3 BASIC OF ENGINEERING DRAWING

Refer Engineering Drawing or Engineering Graphic book to study and practice following topics.

1. Basic Shapes
2. Line Types: Visible, Dimension and Extension, Hidden, Centre, Dotted, Break Line.
3. Dimensioning Method
   - Continuous or Chain Dimensioning
   - Parallel or Progressive Dimensioning
4. Projection:
   - Orthographic Projection: 1st Angle & 3rd Angle Projection.
   - Isometric Projection
5. Views:
   - Principal views: Top, Bottom, Front, Rear, Left-Hand & Right-Hand views.
   - Representation of cutting plane lines
   - Section View
   - Enlarged View

Scale:

The proportion by which the drawing of an object is enlarged or reduced is called the scale of the drawing. A scale is defined as the ratio of the linear dimensions of the object as represented in a drawing to the actual dimensions of the same. Drawings drawn with the same size as the objects are called full scale drawing. A drawing has one scale. Sections & details may have different scale.

Types of scale: Reducing scale, Enlarging scale and Full scale (1:1).

Reducing scales 1:Y (Y>1)	1:2 1:20 1:200	1:5 1:50 1:500	1:10 1:100 1:1000
Enlarging scales X:1 (X>1)	50:1 5:1	20:1 2:1	10:1
Full size scales			1:1

Representative Factor:

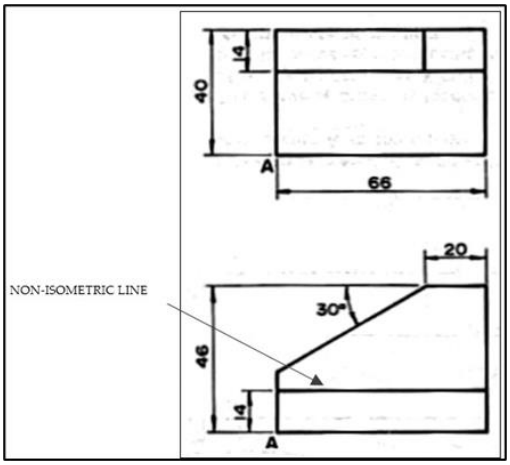
$$R.F. = \frac{\text{Length of an object on the drawing}}{\text{Actual Length of the object}}$$

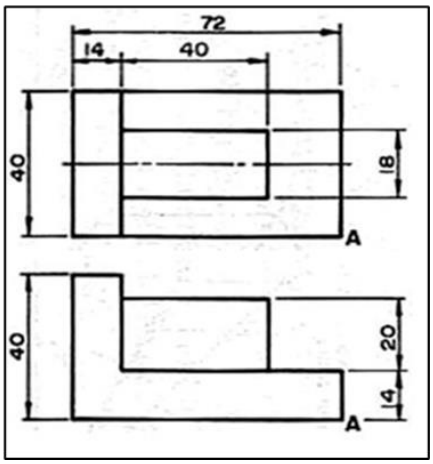
In Imperial system, Scales are represented always with reference to 1'-0.

Example for reducing scale	Example for enlarging scales
· 1/4": 1'-0	· 1'- 0 : 1"
· 1/8":1'-0	· 1'- 0 : 3"
· 3/8": 1'-0	· 1'- 0 : 6"
· 1/2": 1'-0	
· 1" : 1'-0	

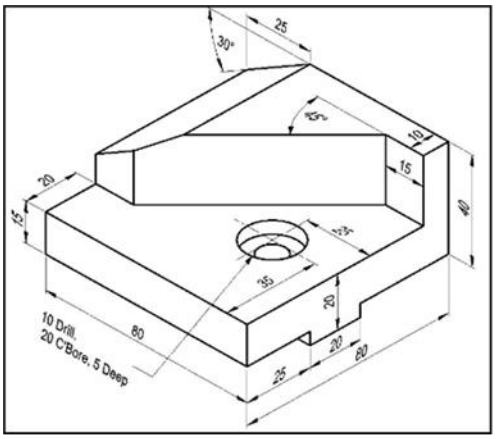
Practice Question:

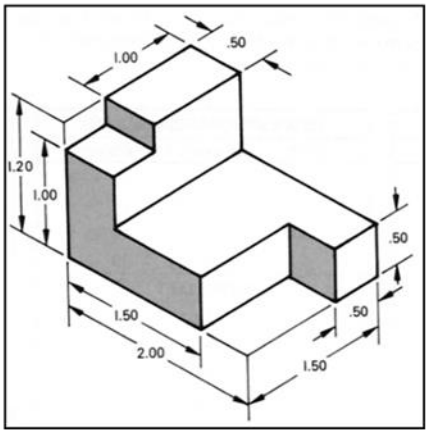
1. A line drawn with a long section, short dash- What is the line type?
2. Draw the section line symbol?
3. What is 'Representative fraction'?
4. Draw isometric drawing for following diagrams.

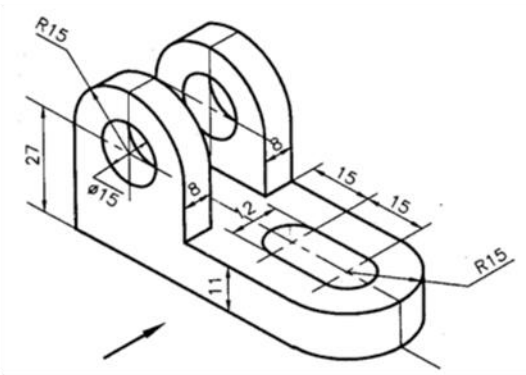


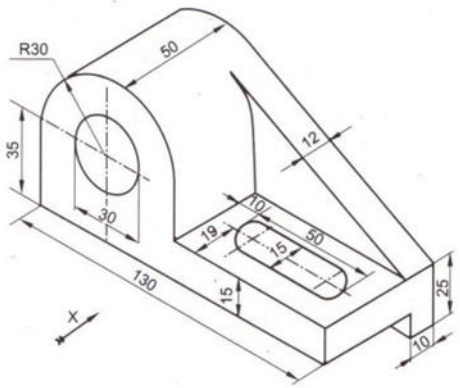


5. Draw orthographic drawings (3 views) for following figures in 1st & 3rd angle projection.

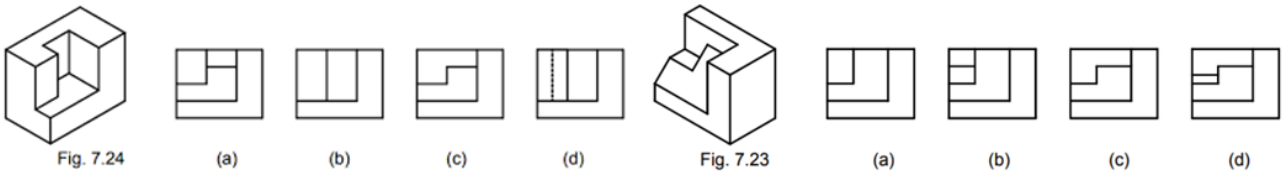








6. Select the correct view.



7. Calculate 6'-6 length in 1/4": 1'-0 Scale.
8. Calculate 6'-6 length in 1'-0 : 1" Scale

4. SHAPES & GRADES.

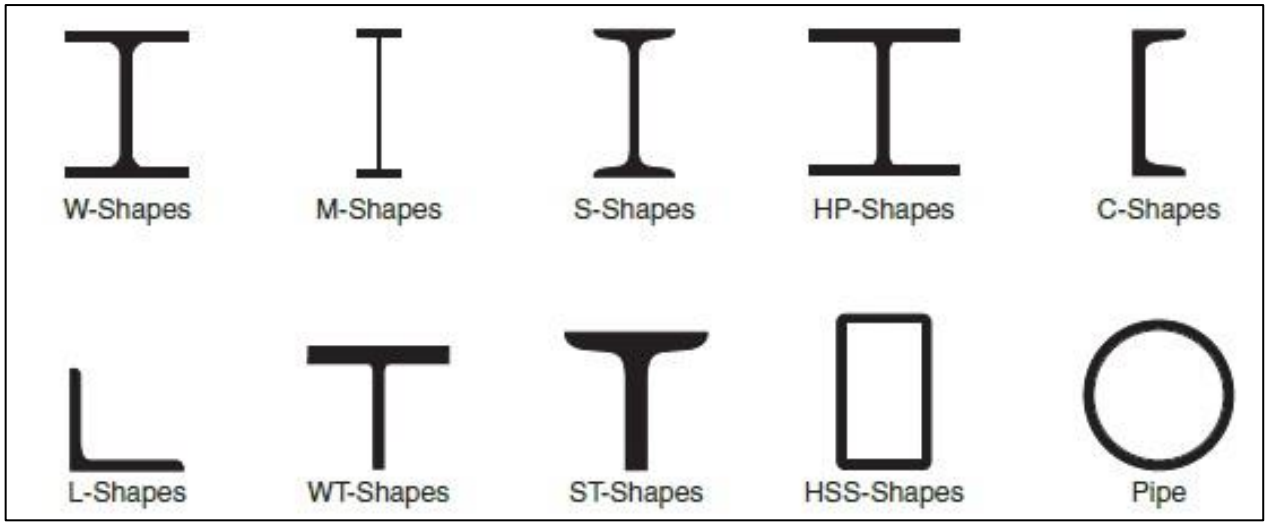
Structural Shapes:

1. Wide Flange
2. Channel
3. Angle
4. Structural Tee
5. Hollow Structural Section
6. Pipe
7. Plate Products
8. Raised Pattern Floor Plate

Structural Grade:

Grade helps to know the strength of the material. These are decided by ASTM depending on material chemical composition. Different grade to be used depending upon the requirement of project. Material grade information for a project is available in:

- General Notes in Contract Drawings
- Project Specification
- Typical Details and Section in Structural & Architectural Drawings (If UNO mentioned in General Notes)



Refer attached data sheet and following link for Structural Steel Dimensioning Tool for more details.

https://www.aisc.org/publications/detailing-resources3/dimensioningtool/

Practice Question:

1. Draw front view, top view & side view of following shape having length 6 inch.

Shape	Area, A	Depth, d	Web		Flange		Distance				
			Thickness, t_w	$\frac{t_w}{2}$	Width, b_f	Thickness, t_f	k		k_1	T	Work-able Gage
							k_{des}	k_{det}			
	in.^{2}	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
W8×67	19.7	9.00 9	0.570 $^{9}/_{16}$	$^{5}/_{16}$	8.28 $8^{1}/_{4}$	0.935 $^{15}/_{16}$	1.33	$1^{5}/_{8}$	$^{15}/_{16}$	$5^{3}/_{4}$	$5^{1}/_{2}$

2. Draw front view, top view & side view of following shape having length 6 inch.

Shape	Area, A	Depth, d		Web			Flange				Distance			
				Thickness, t_w		$\frac{t_w}{2}$	Width, b_f		Thickness, t_f		k	k_1	T	Workable Gage
	in.^{2}	in.		in.		in.	in.		in.		in.	in.	in.	in.
HP8×36[f]	10.6	8.02	8	0.445	7/16	1/4	8.16	8 1/8	0.445	7/16	1 1/8	7/8	5 3/4	5 1/2

3. Draw front view, top view & side view of following shape having length 6 inch.

Shape	Area, A	Depth, d		Web			Flange				Distance					
				Thickness, t_w		$\frac{t_w}{2}$	Width, b_f		Thickness, t_f		k	T	Work-able Gage	r_{ts}	h_o
	in.^{2}	in.		in.		in.	in.		in.		in.	in.	in.	in.	in.
C8×18.7	5.51	8.00	8	0.487	1/2	1/4	2.53	2 1/2	0.390	3/8	15/16	6 1/8	1 1/2[g]	0.800	7.61

4. Draw front view, top view & side view of following angels having length 6 inch each.

Shape	k	Wt.	Area, A	Axis X-X						Flexural-Torsional Properties		
				I	S	r	$\bar{y}$	Z	y_p	J	C_w	$\bar{r}_o$
	in.	lb/ft	in.^{2}	in.^{4}	in.^{3}	in.	in.	in.^{3}	in.	in.^{4}	in.^{6}	in.
L6×4×7/8	1 3/8	27.2	7.98	27.7	7.13	1.86	2.12	12.7	1.44	2.03	4.04	2.82
L4×4×3/4	1 1/8	18.5	5.44	7.62	2.79	1.18	1.27	5.02	0.679	1.02	1.12	2.10

5. Draw front view, top view & side view of following shape having length 6 inch each.

Shape	Area, A	Depth, d		Web			Flange				Distance			
				Thickness, t_w		$\frac{t_w}{2}$	Width, b_f		Thickness, t_f		k	k_1	T	Workable Gage
	in.^{2}	in.		in.		in.	in.		in.		in.	in.	in.	in.
M12.5×12.4[c,v]	3.63	12.5	12 1/2	0.155	1/8	1/16	3.75	3 3/4	0.228	1/4	9/16	3/8	11 3/8	—
×11.6[c,v]	3.40	12.5	12 1/2	0.155	1/8	1/16	3.50	3 1/2	0.211	3/16	9/16	3/8	11 3/8	—

6. Draw front view, top view & side view of following shape having length 6 inch each.

Shape	Area, A	Depth, d		Web			Flange				Distance				
				Thickness, t_w		$\frac{t_w}{2}$	Width, b_f		Thickness, t_f		k		k_1	T	Work-able Gage
											k_{des}	k_{det}			
	in.^{2}	in.		in.		in.	in.		in.		in.	in.	in.	in.	in.
W12×58	17.0	12.2	12 1/4	0.360	3/8	3/16	10.0	10	0.640	5/8	1.24	1 1/2	15/16	9 1/4	5 1/2
×53	15.6	12.1	12	0.345	3/8	3/16	10.0	10	0.575	9/16	1.18	1 3/8	15/16	9 1/4	5 1/2

7. Draw front view, top view & side view of following shape having length 6 inch.

Shape	Area, A	Depth, d		Web			Flange				Distance				
				Thickness, t_w		$\frac{t_w}{2}$	Width, b_f		Thickness, t_f		k		k_1	T	Work-able Gage
											k_{des}	k_{det}			
	in.^{2}	in.		in.		in.	in.		in.		in.	in.	in.	in.	in.
W8×67	19.7	9.00	9	0.570	9/16	5/16	8.28	8 1/4	0.935	15/16	1.33	1 5/8	15/16	5 3/4	5 1/2

8. Refer AISC Quiz session for practice.

5. STEEL STRUCTURE & DETAILING INDUSTRY

Construction is the process of constructing a building or infrastructure. Construction as an industry comprises six to nine percent of the gross domestic product of developed countries. Construction industry is the second largest industry in this world, after agriculture. Even it is quite larger than the information technology, telecom or electronics industries. This industry includes construction of residential & commercial buildings, roads & transportation, airport, railway, port setup & expansion of new factory & industry– power plant, cement plant, steel plant, chemical plant, oil & gas plant, on shore & offshore projects etc. At present business turnover of construction industry is around US$ 9.0 trillion and every year it is increasing by 3.9 percent. In 2020, turnover of construction industry is projected to be US$ 10.3 trillion.

Steel detailing industry is a part of construction industry. Steel detailing industry is responsible for preparation of construction drawings for construction industry. Steel detailing is a specialist area of structural drafting. Steel detailing is the process of translating design/ engineering/ contract drawings to shop & field drawings. This process involves detailing of all steel parts for their interconnectivity & assembly during fabrication & erection. Business Volume of Steel Detailing Industry business is around 2 to 3 percent of construction industry. Turnover of Steel Detailing Industry is around US$ 180 billion to US$ 270 billion, in 2017.

Steel fabricator & erector require drawings for every piece of steel used on a structure. Structural steel detailing is an important and mandatory process in all types of manufacturing and construction activities, such as erection of residential and commercial buildings, factories and institutes, as well as shipbuilding. The process of steel detailing is a vital 'communications link' that connects key professionals such as engineers, architects, contractors, fabricators and others. Steel detailing services also include other important stages such as reinforcing steel detailing, anchor setting plans, steel design, connectivity diagrams, bolt summary and material estimation report. Structural steel detailing is a critical process of structural engineering and it demands almost 100% accuracy.

List of American Construction Standard:

1. The American Institute of Steel Construction (AISC)
2. American Society for Testing Materials (ASTM)
3. The Research Council for Structural Connections (RCSC
4. American Welding Society (AWS)
5. Society for Protective Coatings (SSPC)
6. Occupational Safety and Health Administration (OSHA)
7. National Institute of Steel Detailing (NISD)
8. Steel Joist Institute (SJI)
9. Steel Deck Institute (SDI)

List of parties involved in American Construction Industry:

1. Owner: Project/ construction are performed for the owner. The owner deploys general contractor (GC) to control over all construction work on behalf of owner.
2. General Contractor: General contractor is responsible for complete the project or construction on behalf of owner within stipulated budget, time with specified quality & specification. The general contractor deploys Structural Engineer, Architect, Fabricator/ Erector & Detailer directly or indirectly under them to execute project or construction work.
3. Architect& Structural Engineer: The Architect is responsible for overall design and layout of commercial building projects. The Engineer is the registered design professional, who are responsible for the design of the structural steel system.
4. Fabricator/ Erector the steel fabricator is responsible for fabrication of every piece of steel used on a structure. The steel erector is responsible for erection of every piece of steel used on a structure at site.

6. CONVENTIONAL STEEL DETAILING PROCESS.

A Steel detailer is a person who produces detailed drawings for steel fabricators and steel erectors. The detailer prepares detailed plans, drawings and other documents for the manufacture and erection of steel members (columns, beams, braces, trusses, stairs, handrails, ladders, joists, metal decking etc.) used in the construction of building, bridges, industrial plans and non-building structures. A steel detailer's projects are usually commercial, residential, public industrial or municipal; low-rise residential projects. A steel detailer prepares two primary types of drawings: Shop/ Fabrication drawings and Field/ Erection drawings.

Shop drawings: Shop drawings, also called as a detail drawing, are used to specify the exact detailing requirements for fabricating each and individual member (or "piece") of a structure and are used by the steel fabricator to fabricate these members. Complete shop drawings show material specifications, member sizes, all required dimensions, welding, bolting, and surface preparation and painting requirements, and any other information required to describe each completed member. The shop drawings are intended for use by the fabrication shop, and thus contain little or no information about the erection and installation of the steel members they depict; this information belongs in the erection drawings.

Erection drawing: Erection drawing are used to guide the steel erector on the construction site ("in the field"). As to where and how to erect the fabricated steel members. These drawings usually show dimensioned plans to locate the steel members, and they often also show details with specific information and requirements, including all work that must be done in the field (such as bolting, welding or installing wedge anchors). Since the erection drawings are intended for use in the field, they contain very little specific information about the fabrication of any individual steel member; members should already be completed by the time of erection drawings are used.

Project Input: For any project execution three types of input are required as listed following.

1. Construction standards & Statutory requirement: Building code, Safety code, Steel construction code, Supplementary code.
2. Project Information: Scope List/ scope of work, Contract Drawings Set, Project Specifications (Division V) and Schedule & Sequencing.
3. Fabricator Specification & Standards

Project Output: For any executed project four types of outputs are required as per client requirement. Same is listed below.

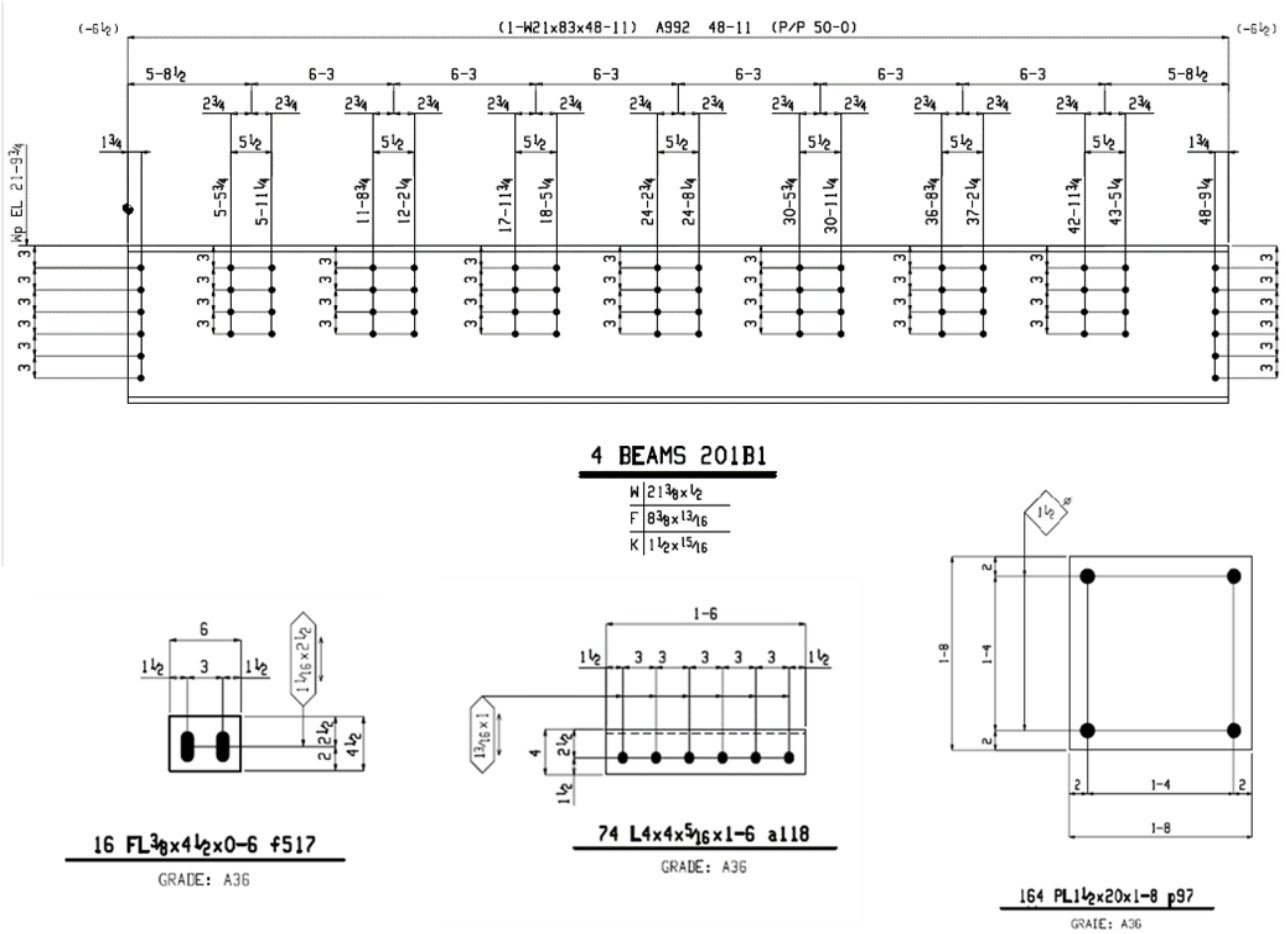
1. Drawings: ISO Metric drawing, Shop drawings, Erection drawings, Sub material / part / Gather drawings.
2. Files
3. Reports
4. Logs:

Refer following link for Conventional Steel Detailing Process (Module-1 to 10) for more detail.

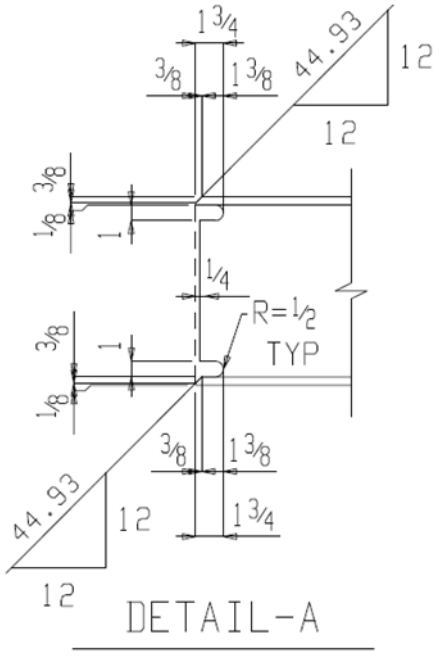
https://www.aisc.org/publications/detailing-resources3/detailer-training-series-online-course/

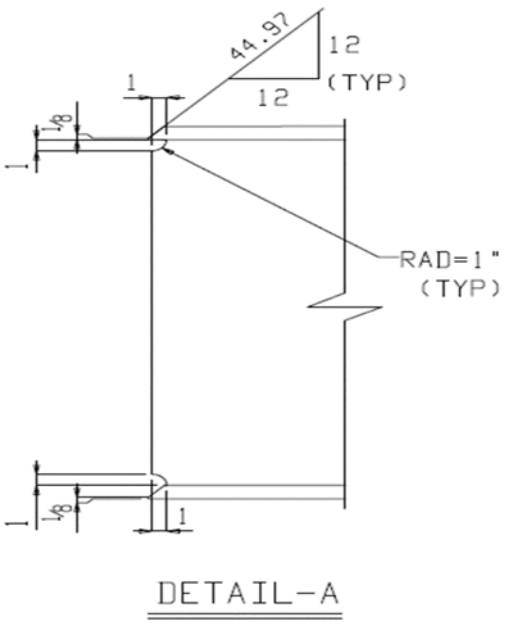
7. CONCEPT OF STEEL DETAILING

Hole Marking: Detailer needs to mention hole locking dimension, hole diameter.

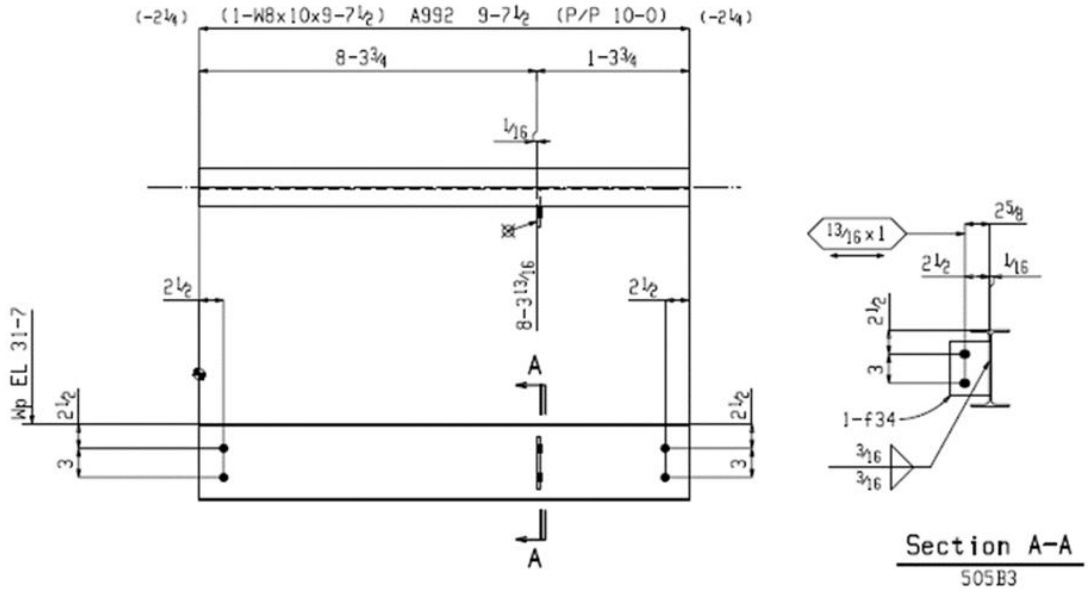


Surface & Edge Preparation: Detailer needs to provide rat hole preparation & top and bottom flange preparation for full penetration welding, Mill finish, Square cut & saw cut information



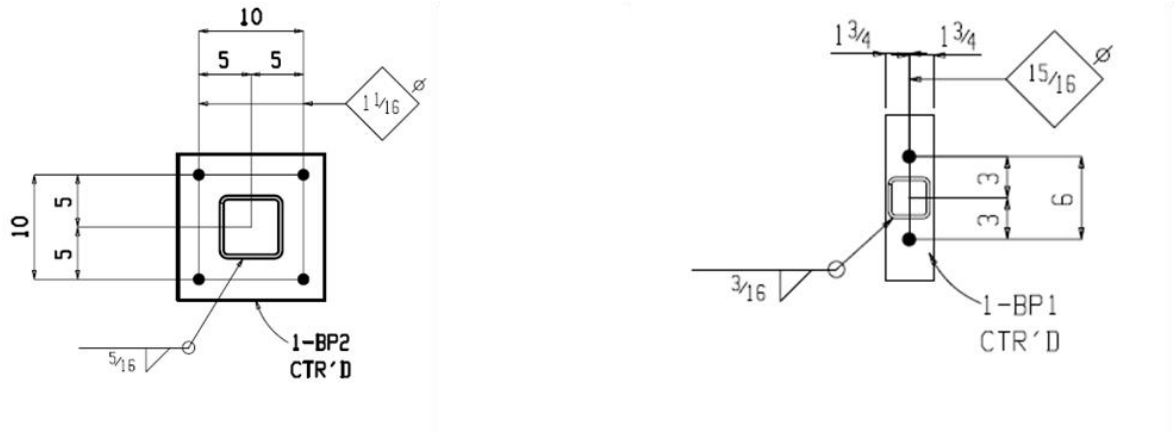


Material Attachment: Detailer needs to mention locating dimension in horizontal & vertical axis of attached material, Minor piece mark, weld type & size.

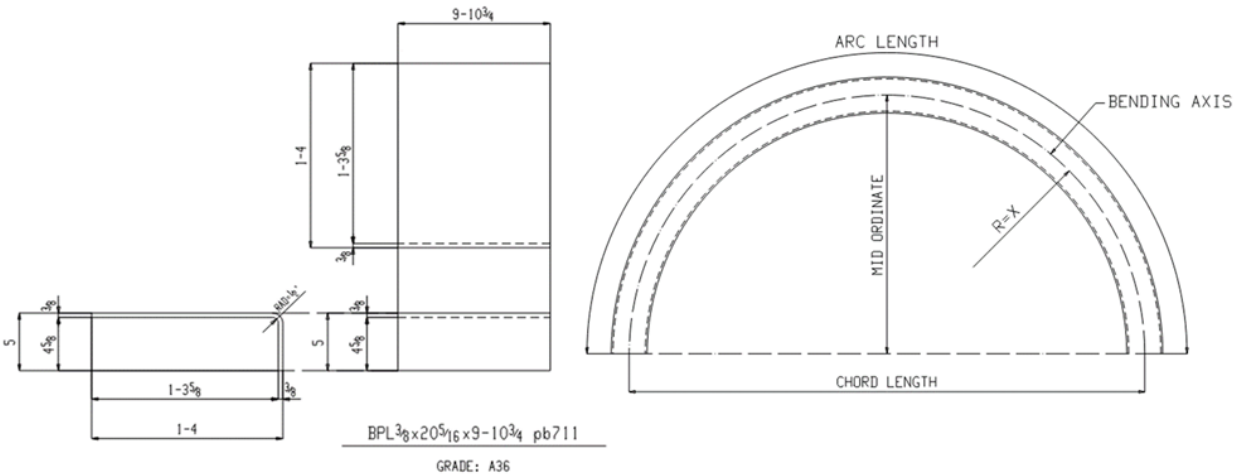


ONE BEAM 505B3

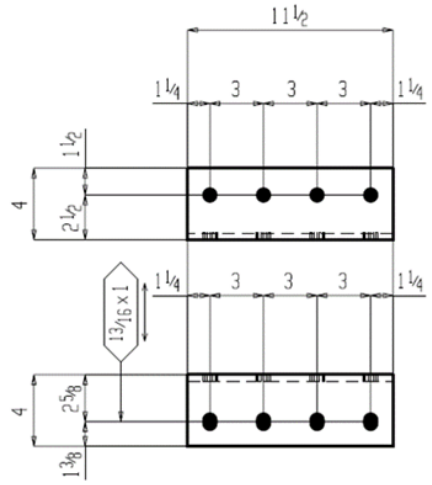
W	7⅞x3/16
F	315/16x3/16
K	111/16x9/16



Material Bending: Detailer needs to provide the Arc length, Chord length, Mid Ordinate and Radius and leg dimensions, overall length, plate thickness and bending radius for bent plate.

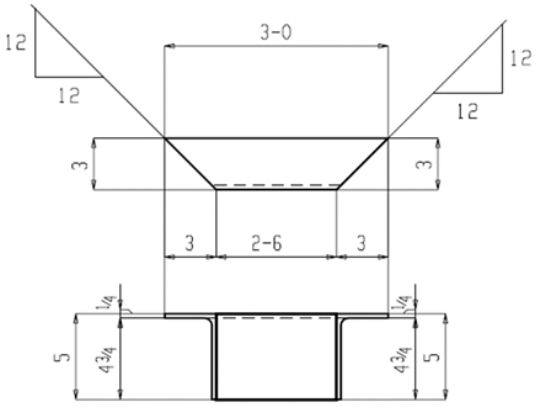


Refer following diagram to understand detailing practice.



L4x4x3/8x0-11 1/2 a502

GRADE: A36



L5x3x1/4x3-0 a652

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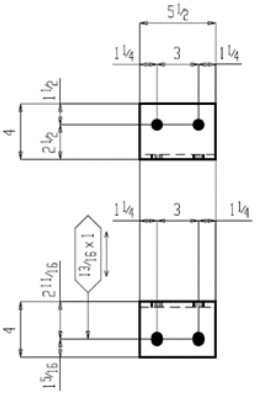
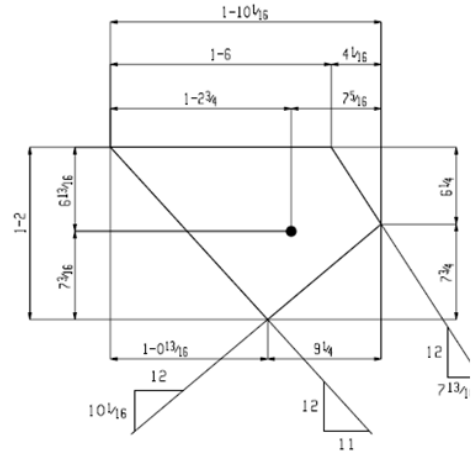


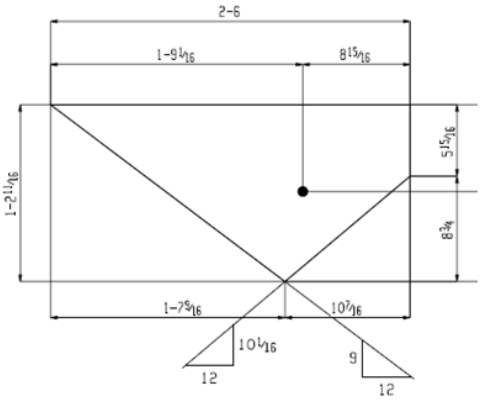
L4x4x3/8x0-5 1/2 a584

GRADE: A36



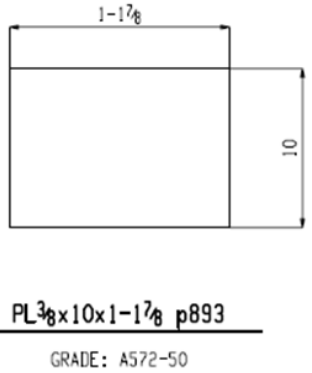
PL1x14x1-10 1/16 p825

GRADE: A36



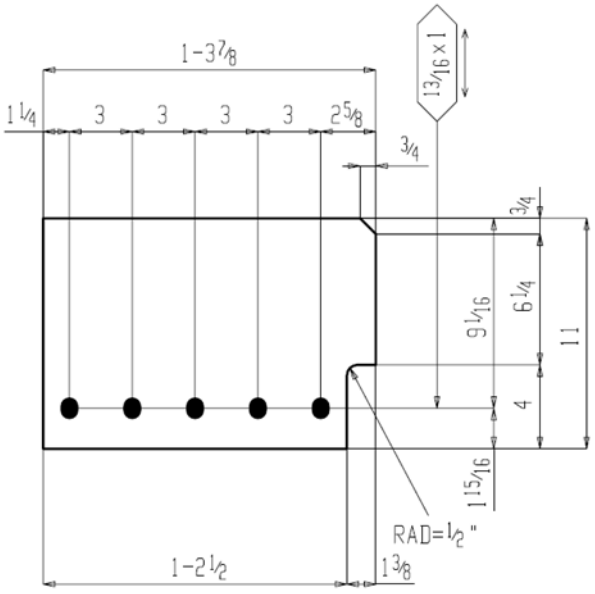
PL1x14 11/16x2-6 p870

GRADE: A36



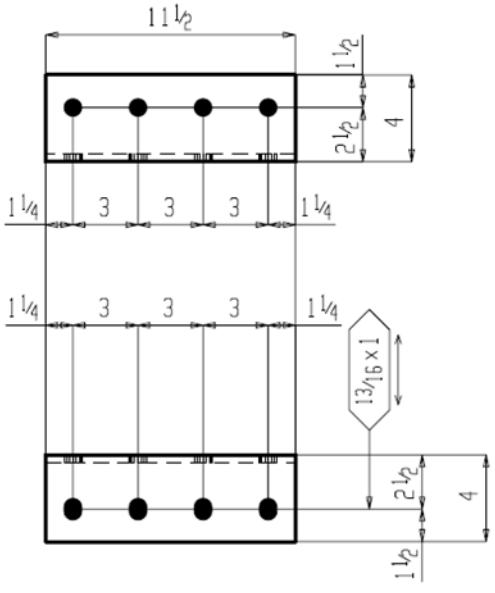
PL3/8x10x1-1 7/8 p893

GRADE: A572-50



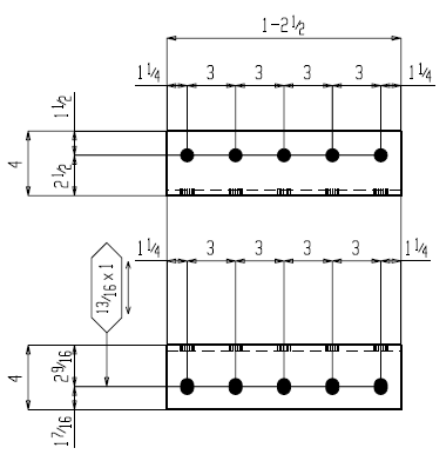
PL3/8x11x1-3 7/8 p1483

GRADE: A572-50



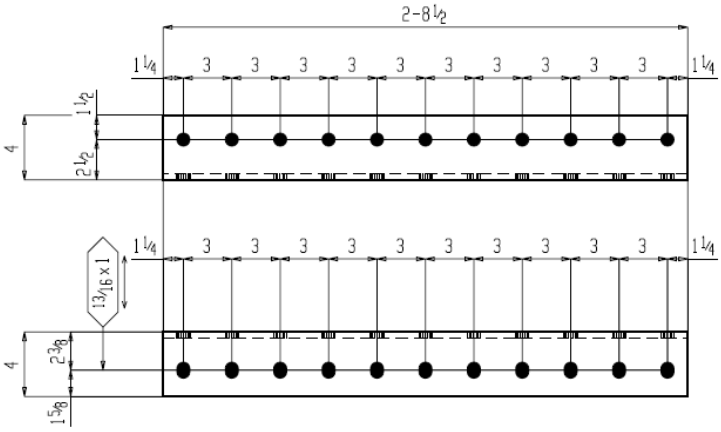
L4x4x3/8x0-11 1/2 a1077

GRADE: A36



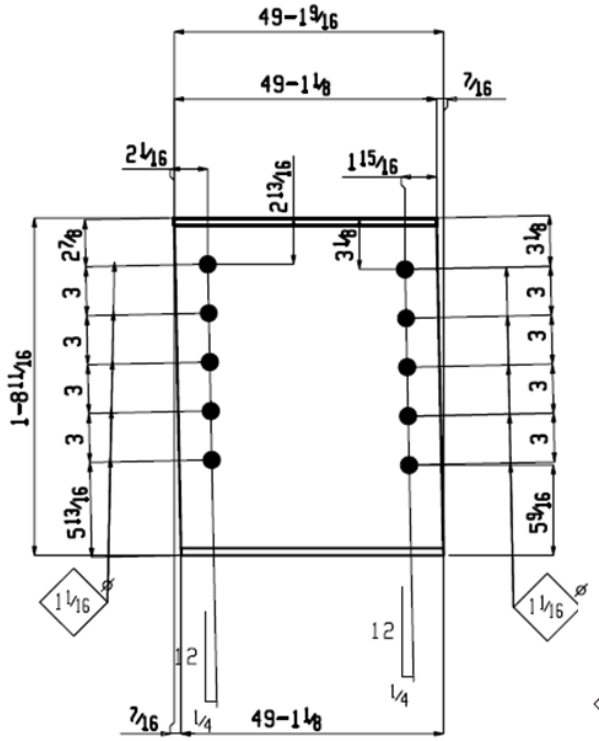
L4x4x3/8x1-2 1/2 a508

GRADE: A36



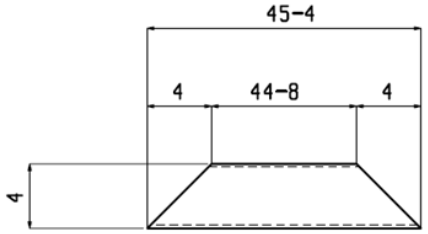
L4x4x3/8x2-8 1/2 a512

GRADE: A36



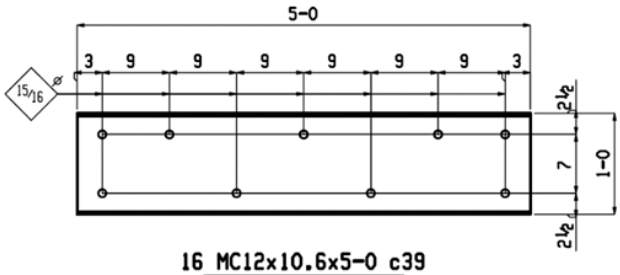
12 W21x44x49-1 9/16 w45

GRADE: A992



8 HSS12x4x3/16x45-4 hss340

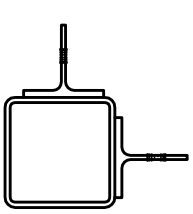
GRADE: A500C



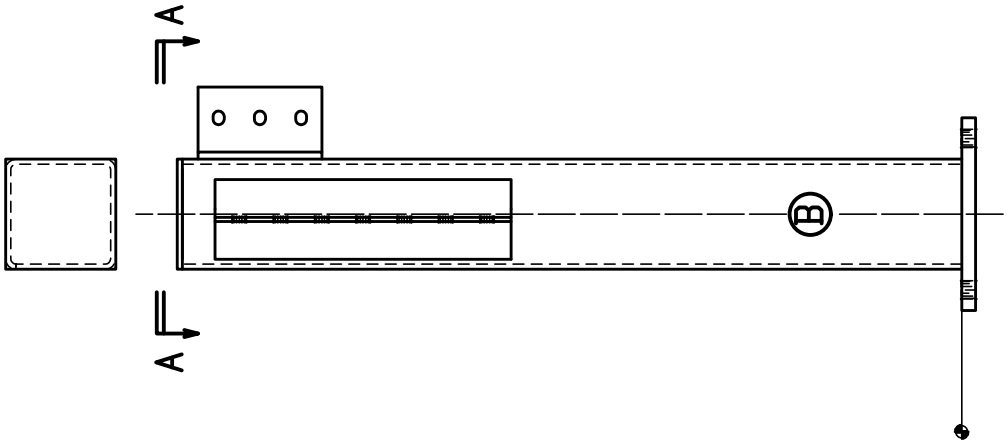
16 MC12x10.6x5-0 c39

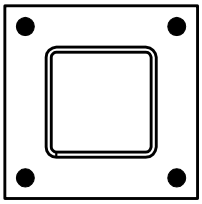
GRADE: A36

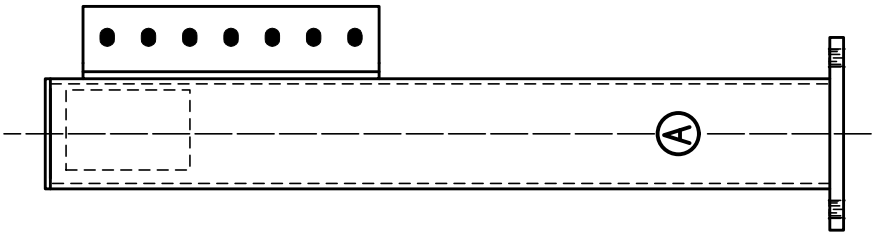
Refer AISC drawing and following questions for practice.



Section A-A
6C1







ONE COLUMN 6C1

TrueMind

TRUEMIND SOLUTION LLP

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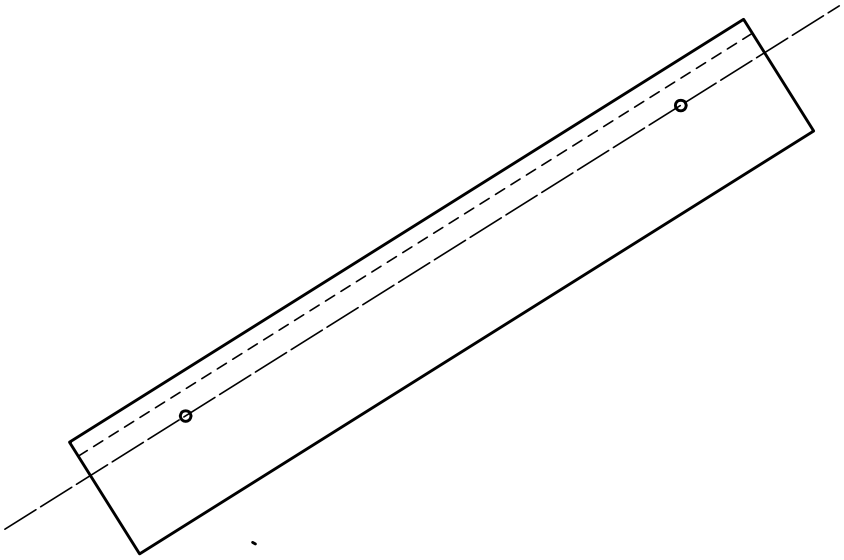
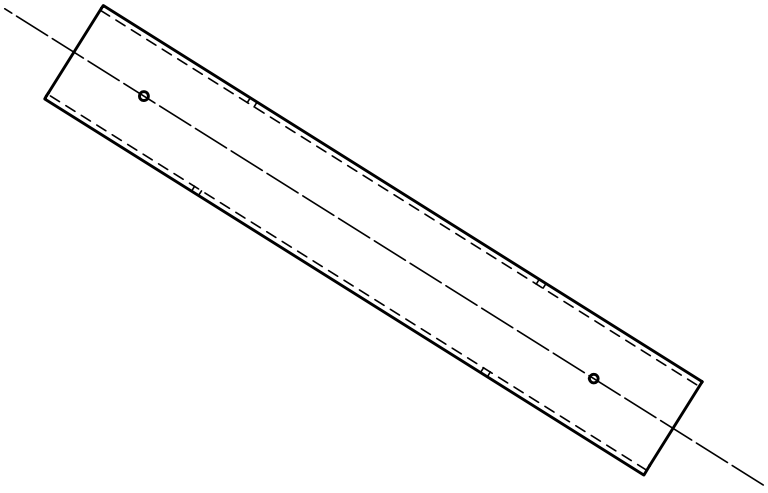


ONE VERTICAL BRACE VB_247



ONE VERTICAL BRACE VB_246

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TRUEMIND SOLUTION LLP

DETAILING TEST PAPER

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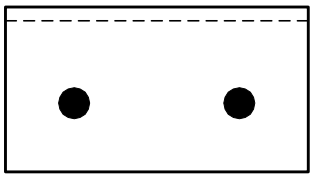
ONE L1 1/2 x 1 1/2 x 1/8 x 6-11 a5

GRADE: A36



ONE L5 x 3 x 1/4 x 0-5 1/2 a122

GRADE: A36

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DETAILING TEST PAPER

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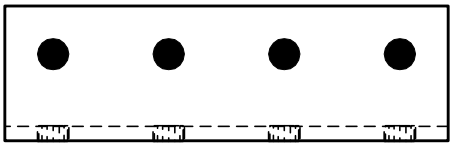

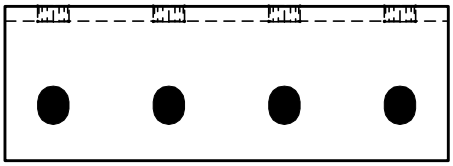

ONE L4x3 1/2 x 3/8 x 0-11 1/2 a128

GRADE: A36

ONE L3x2x 1/4 x3-5 a133

GRADE: A36

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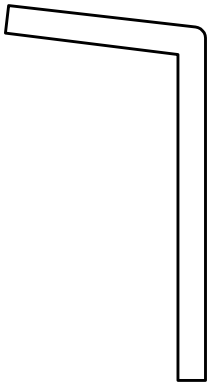
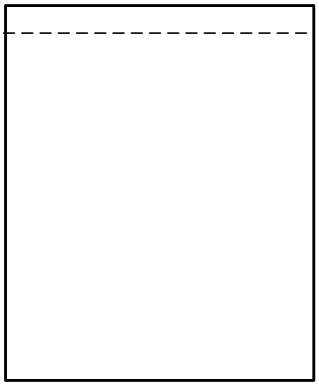
DETAILING TEST PAPER

DESCRIPTION: TM/PM/012	DATE: 02-FEB-18	VERSION: 1.0

ONE PL¼x2x0-5 p332

GRADE: A36





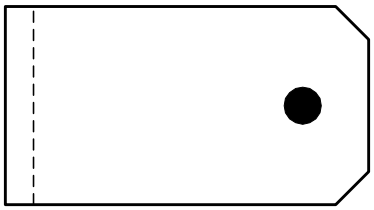
ONE PL¼x12¼x3-8 p268

GRADE: A36

TrueMind	TRUEMIND SOLUTION LLP

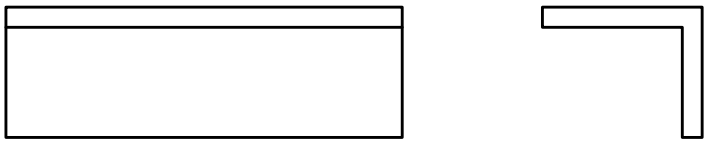
DETAILING TEST PAPER

DESCRIPTION: TM/PM/012	DATE: 02-FEB-18	VERSION: 1.0



ONE PL 1/4 x 3 x 0-5 1/2 p306

GRADE: A36



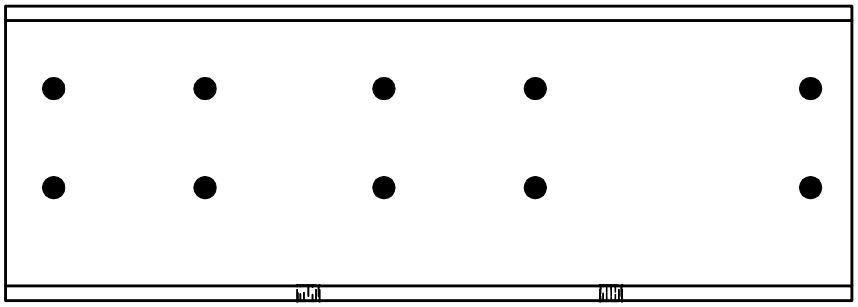
ONE PL 12GA x 44 x 0-4 7/16 p501

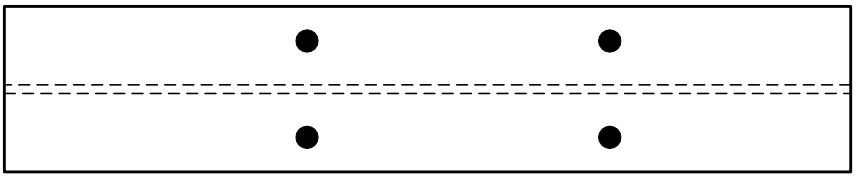
GRADE: A36

TrueMind	TRUEMIND SOLUTION LLP

DETAILING TEST PAPER

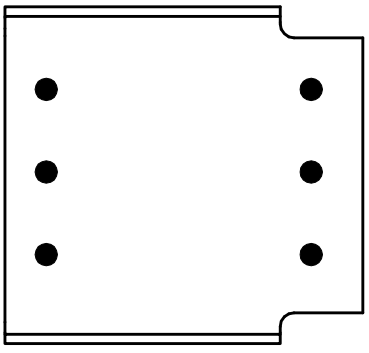
DESCRIPTION: TM/PM/012	DATE: 02-FEB-18	VERSION: 1.0





ONE W18x40x21-5¾ w80

GRADE: A992



ONE W16x26x26-5 w234

GRADE: A992

TrueMind	TRUEMIND SOLUTION LLP

DETAILING TEST PAPER

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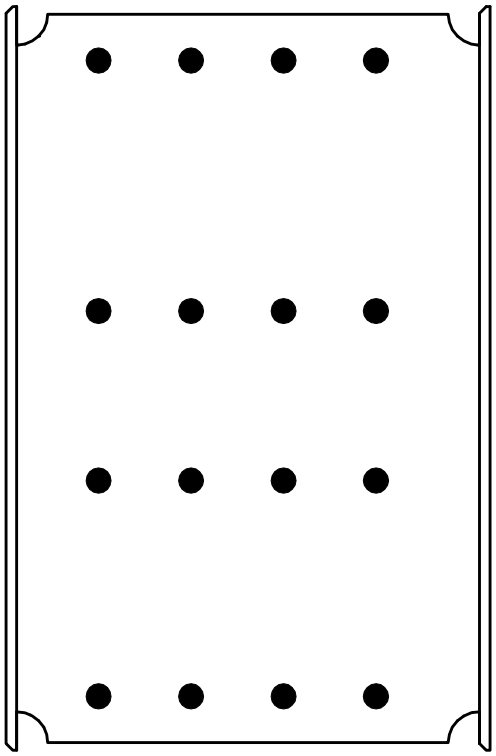
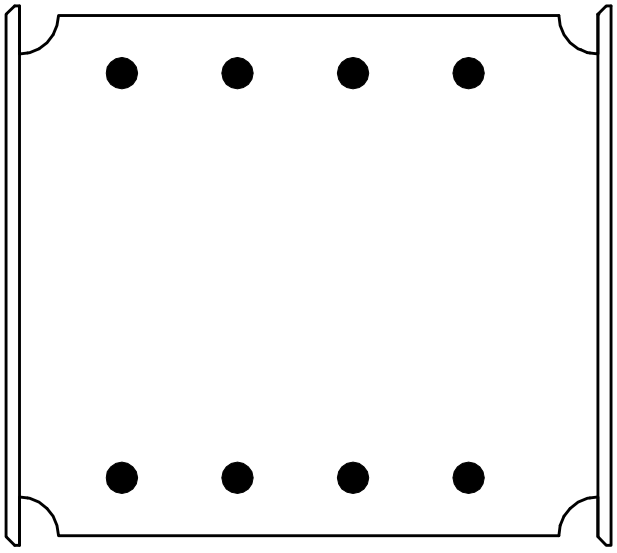


ONE W16x26x16-1 1/8 w358

GRADE: A992



ONE W16x26x18-8 w328

GRADE: A992

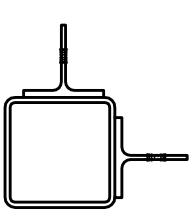
DRAW DETAIL OF RAT HOLE

TrueMind

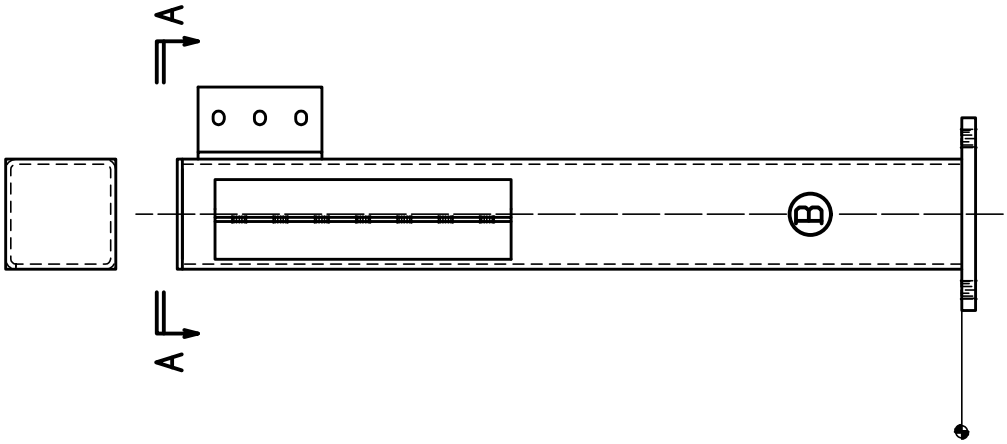
TRUEMIND SOLUTION LLP

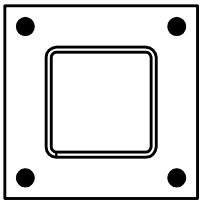
DETAILING TEST PAPER

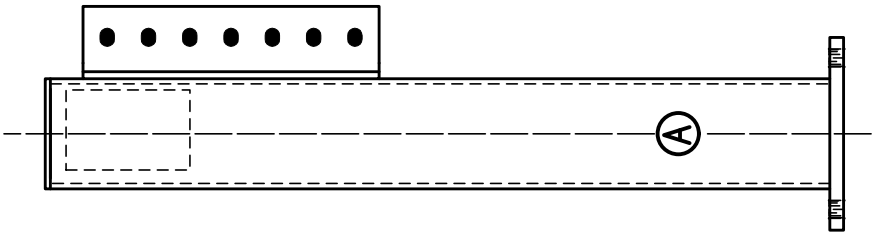
DESCRIPTION: TM/PM/012	DATE: 02-FEB-18	VERSION: 1.0



Section A-A
6C1







ONE COLUMN 6C1

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TRUEMIND SOLUTION LLP

DETAILING TEST PAPER

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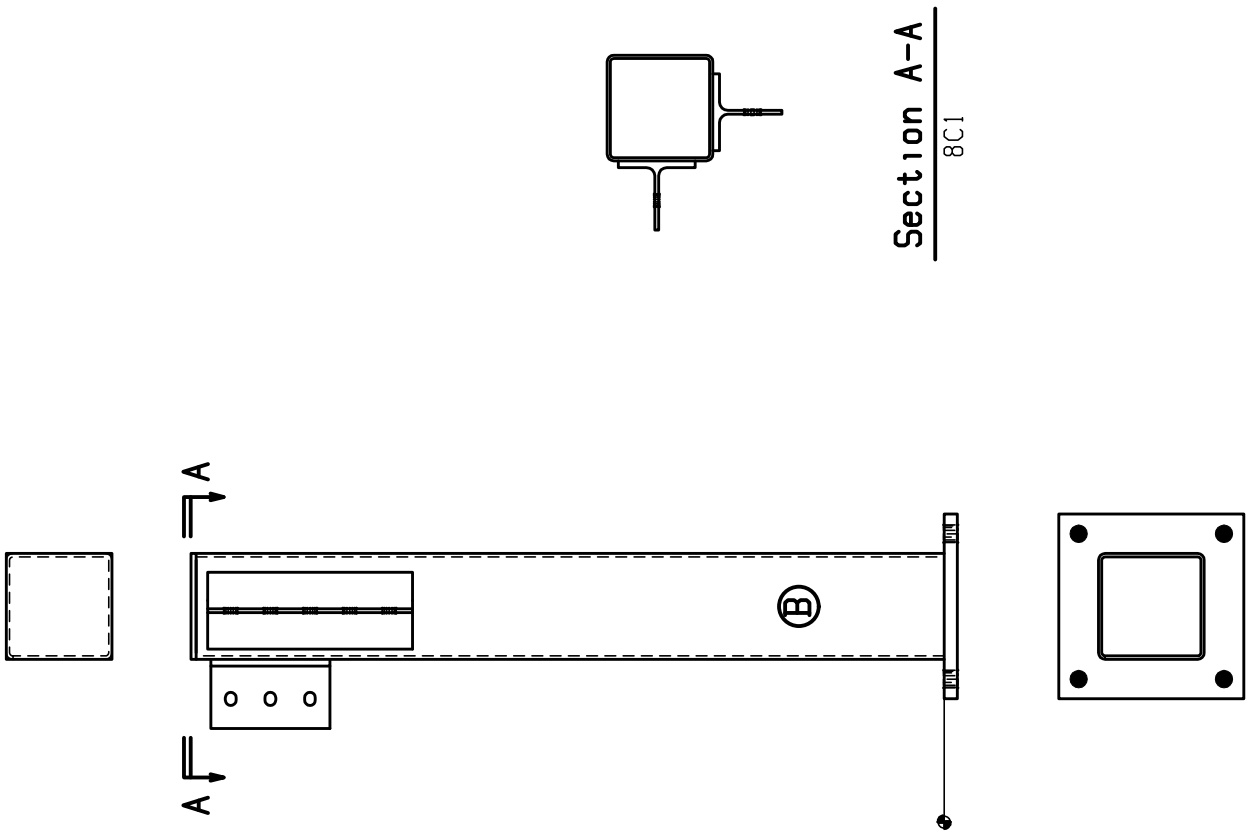
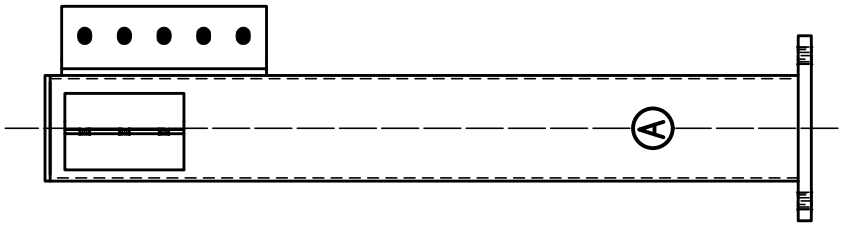




ONE COLUMN 8C1

TrueMind	TRUEMIND SOLUTION LLP	
DETAILING TEST PAPER		
DESCRIPTION: TM/PM/012	DATE: 02-FEB-18	VERSION: 1.0

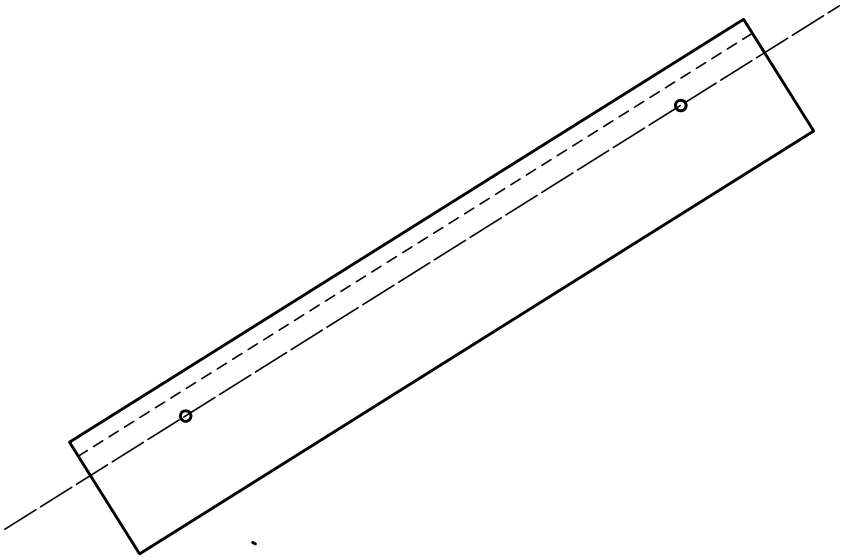
ONE HSS4x4x¼x11-5¾ hss409

GRADE: A500B

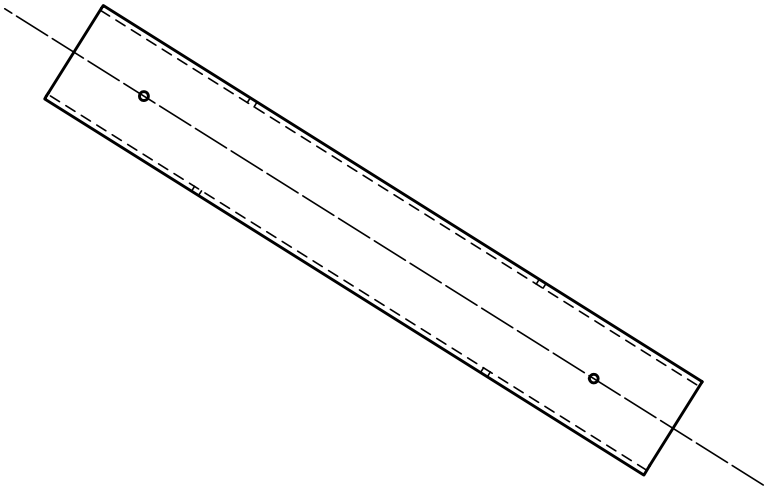
TrueMind	TRUEMIND SOLUTION LLP

DETAILING TEST PAPER

DESCRIPTION: TM/PM/012	DATE: 02-FEB-18	VERSION: 1.0



ONE VERTICAL BRACE VB_247



ONE VERTICAL BRACE VB_246

TrueMind

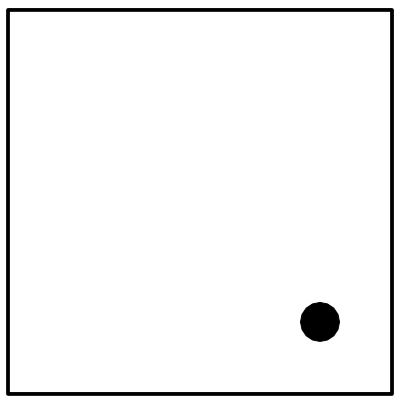
TRUEMIND SOLUTION LLP

DETAILING TEST PAPER

DESCRIPTION: TM/PM/012	DATE: 02-FEB-18	VERSION: 1.0

PL 1/4 x 2 15/16 x 1-0 p128

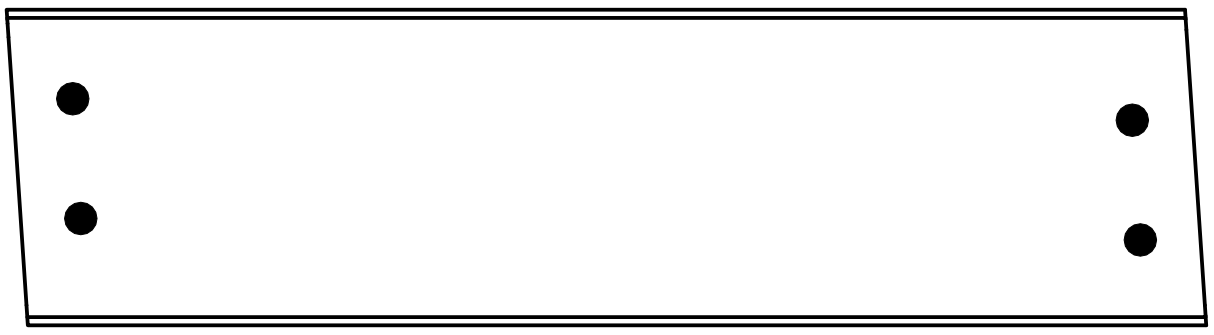
GRADE: A36



PL 3/4 x 8 x 0-8 p74

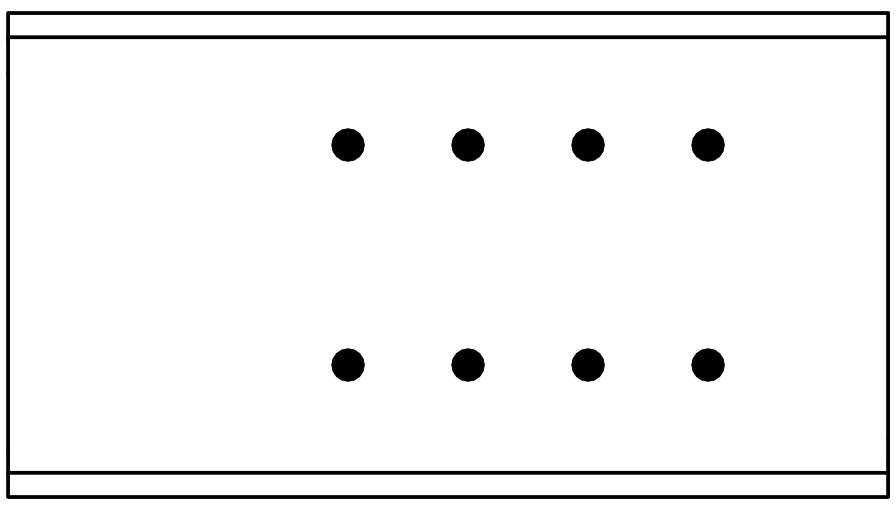
GRADE: A36

TrueMind	TRUEMIND SOLUTION LLP
DETAILING PRACTICE SET-1	
DESCRIPTION: TM/PM/010	DATE: 02-FEB-18 | VERSION: 1.0



ONE W8x10x9-7 13/16 w523

GRADE: A992



ONE W12x65x41-11 w94

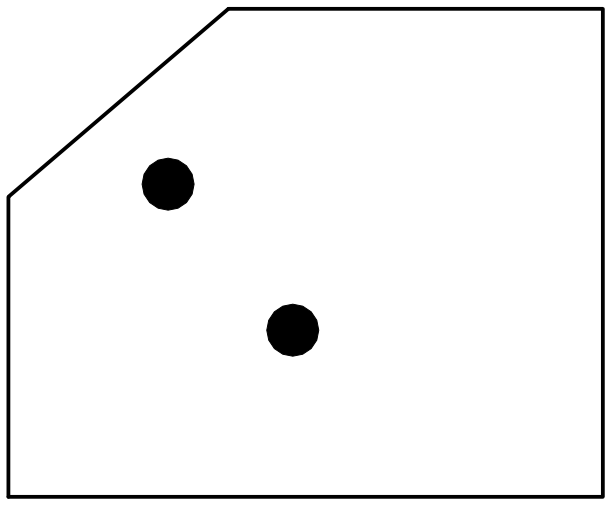
GRADE: A992

TrueMind

TRUEMIND SOLUTION LLP

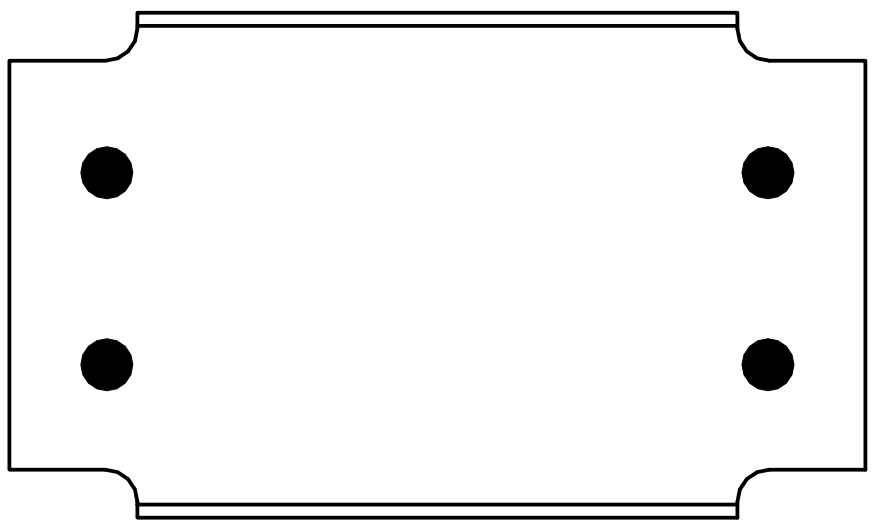
DETAILING PRACTICE SET-1

DESCRIPTION: TM/PM/010	DATE: 02-FEB-18	VERSION: 1.0



ONE PL 1/2 x 7 5/8 x 0-9 5/16 p457

GRADE: A36



ONE W8x10x5-11 3/8 w816

GRADE: A992

TrueMind	TRUEMIND SOLUTION LLP

DETAILING PRACTICE SET-1

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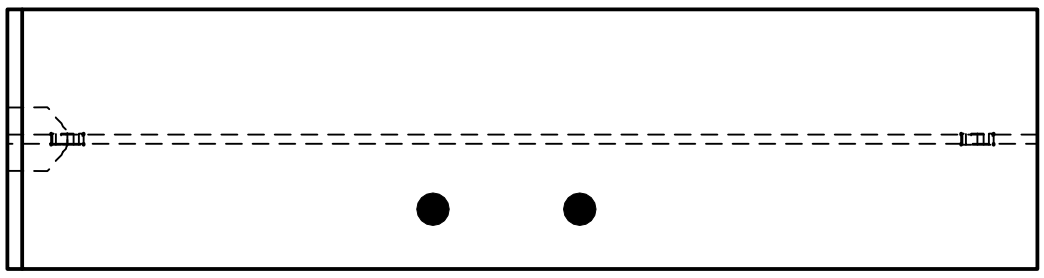
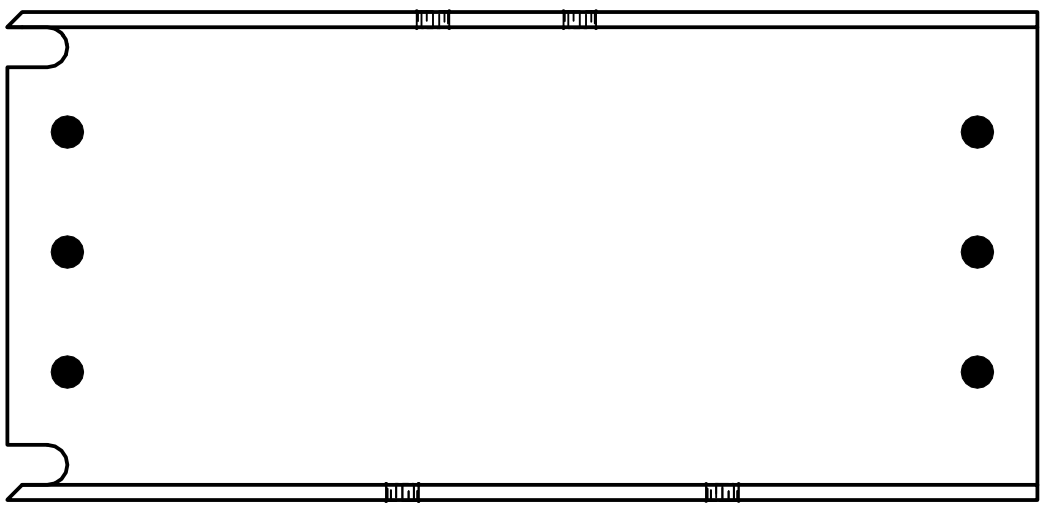
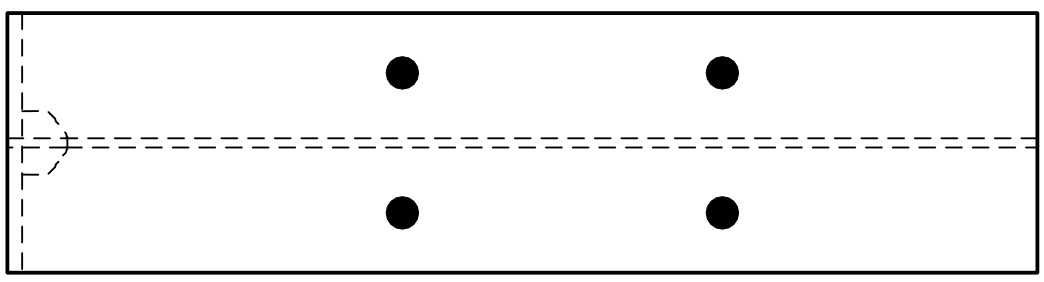






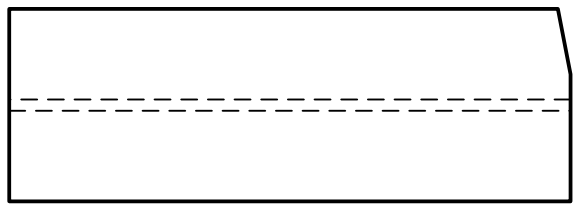
ONE W12x26x20-8¾ w612

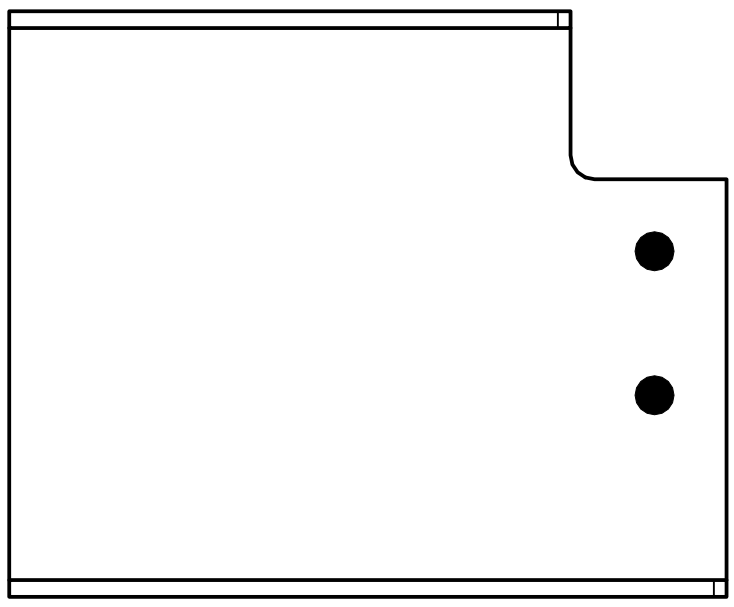
GRADE: A992

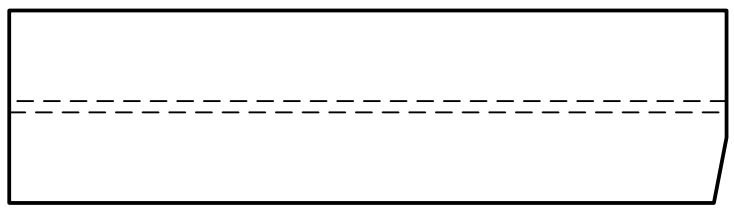
TrueMind	TRUEMIND SOLUTION LLP

DETAILING PRACTICE SET-4

DESCRIPTION: TM/PM/010	DATE: 02-FEB-18	VERSION: 1.0







ONE W12x19x19-5 15/16 w618

GRADE: A992

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DETAILING PRACTICE SET-4

DESCRIPTION: TM/PM/010	DATE: 02-FEB-18	VERSION: 1.0

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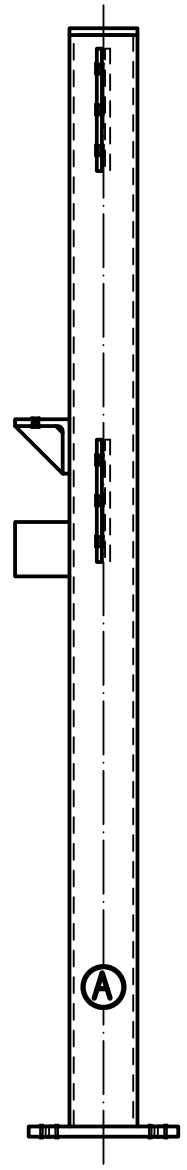
TRUEMIND SOLUTION LLP

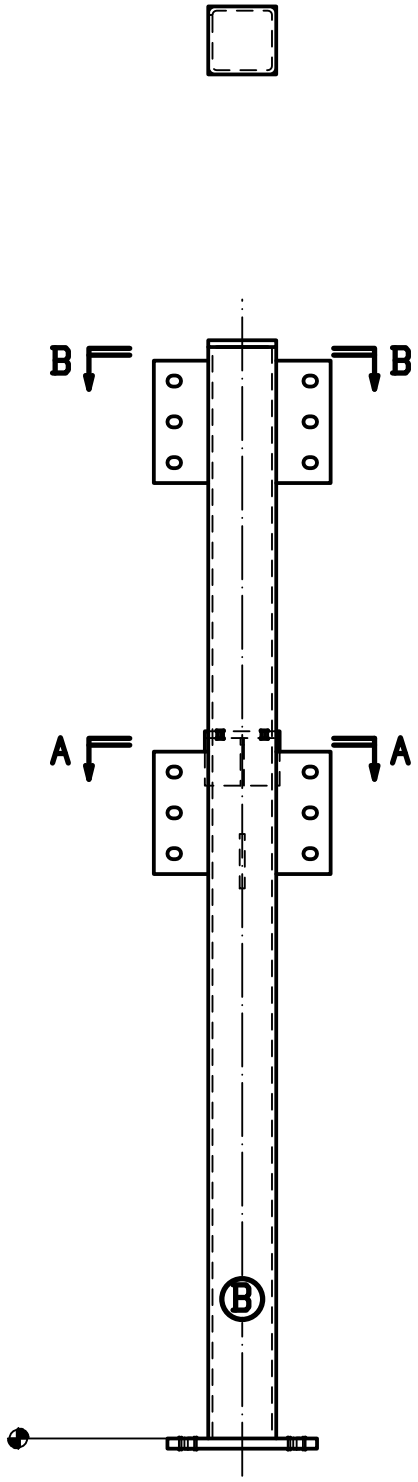
DESCRIPTION: TM/PM/010

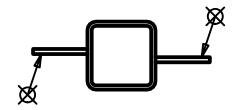
DETAILING PRACTICE SET-4

DATE: 02-FEB-18

VERSION: 1.0

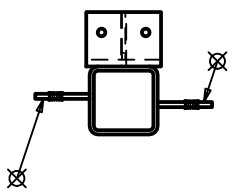






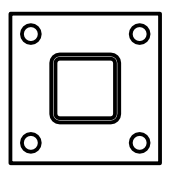
Section B-B

15C2



Section A-A

15C2



ONE COLUMN 15C2

ONE HSS4x4x1/4x8-5 1/16 hss152

GRADE: A500B

ONE HSS4x4x1/4x8-5 3/8 hss151

GRADE: A500B

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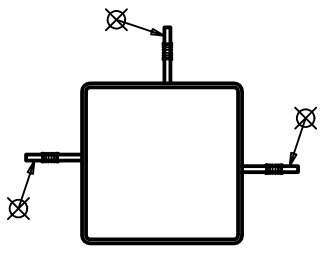
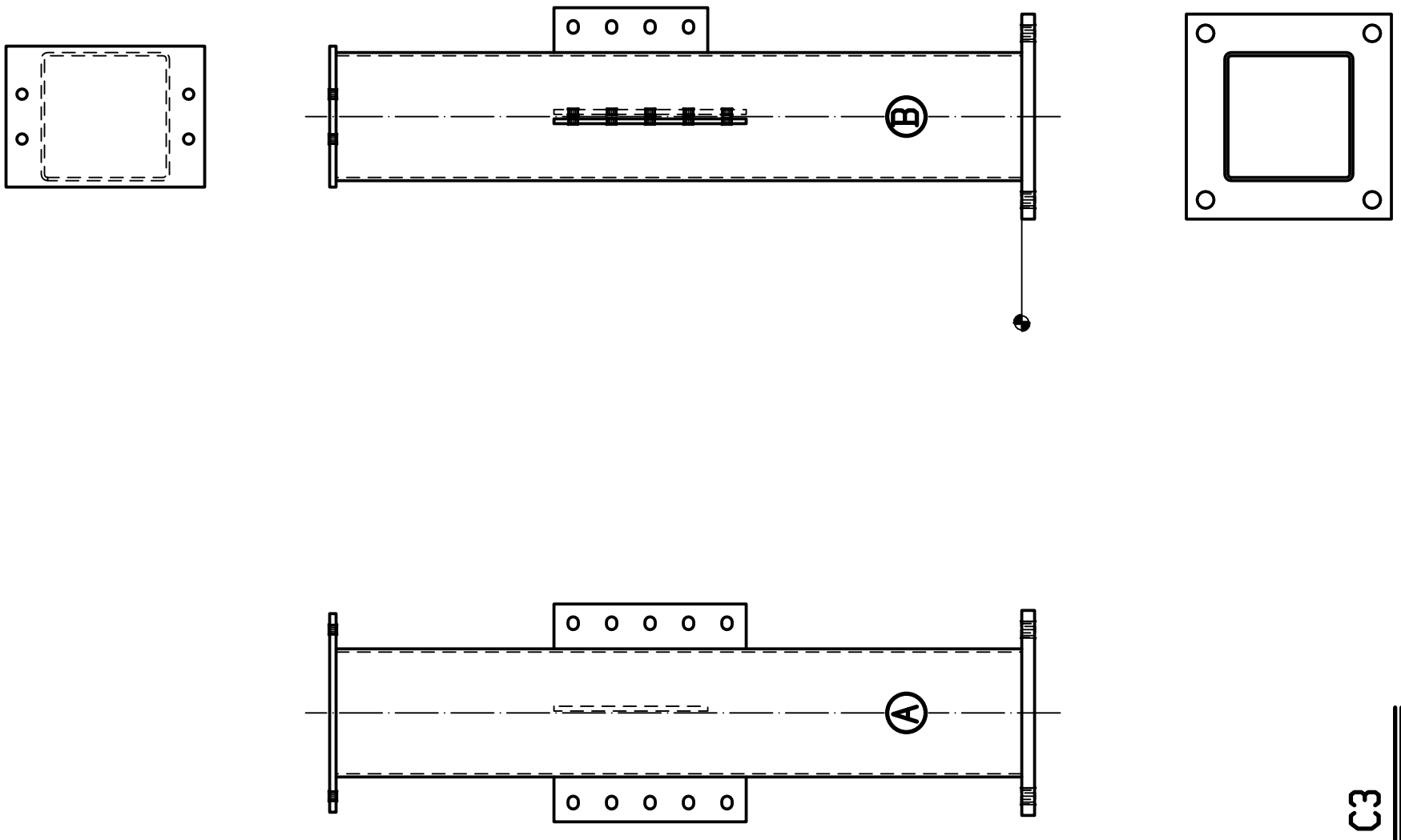
DETAILING PRACTICE SET-4

DESCRIPTION: TM/PM/010	DATE: 02-FEB-18	VERSION: 1.0



Section A-A

C3



ONE COLUMN C3

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TRUEMIND SOLUTION LLP

DETAILING PRACTICE SET-4

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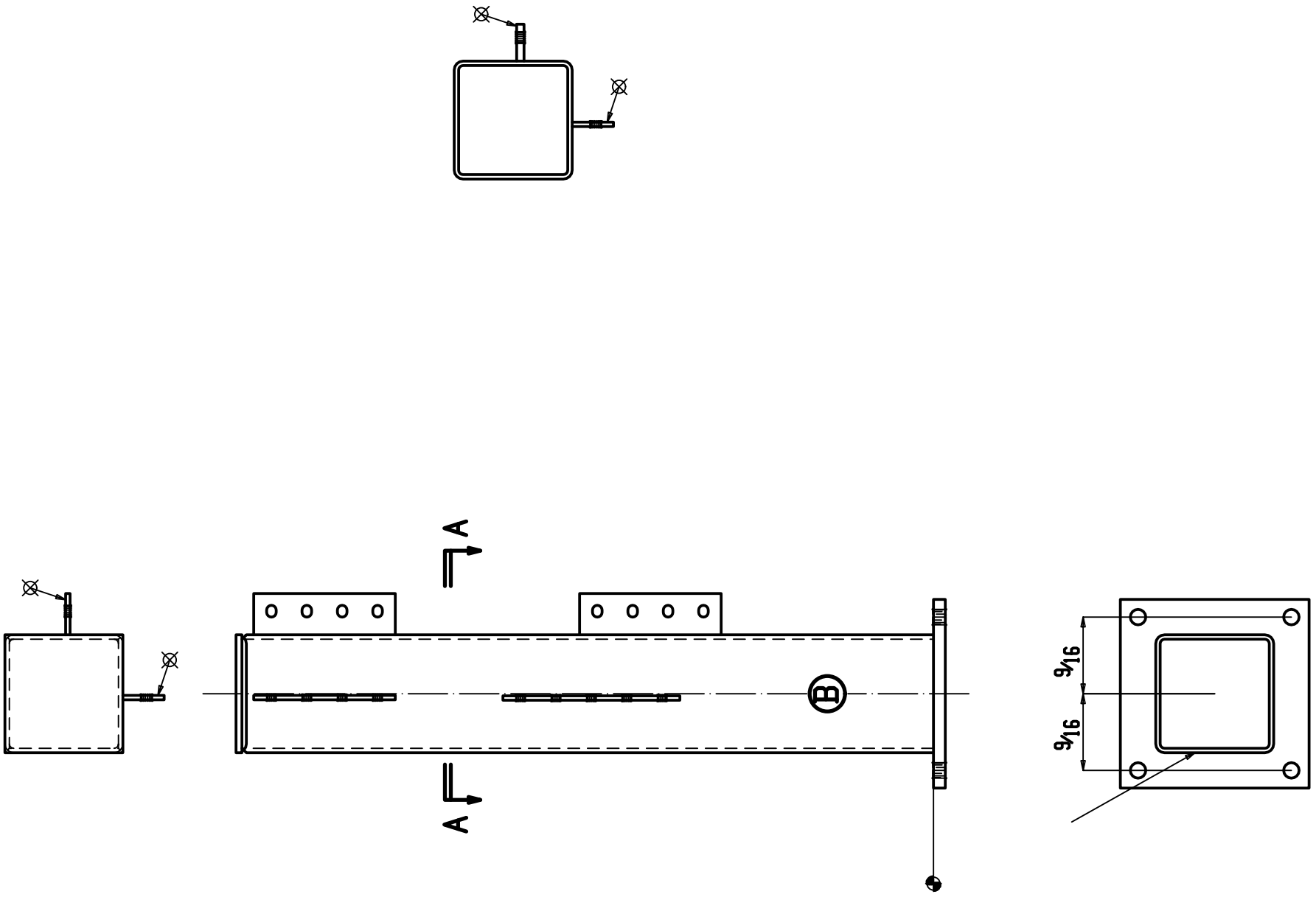

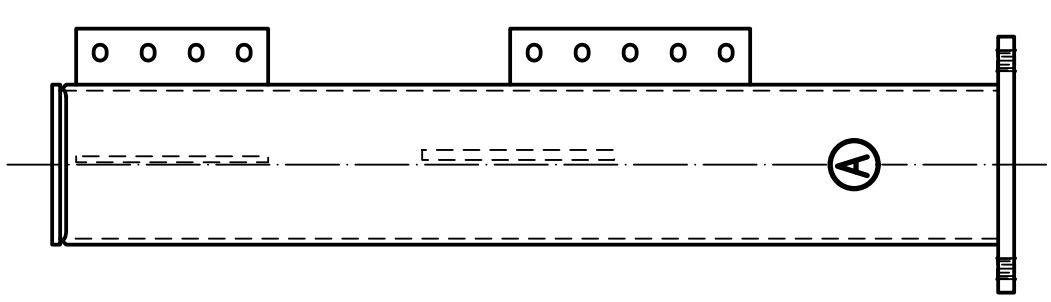

ONE COLUMN C7

TrueMind

TRUEMIND SOLUTION LLP

DETAILING PRACTICE SET-4

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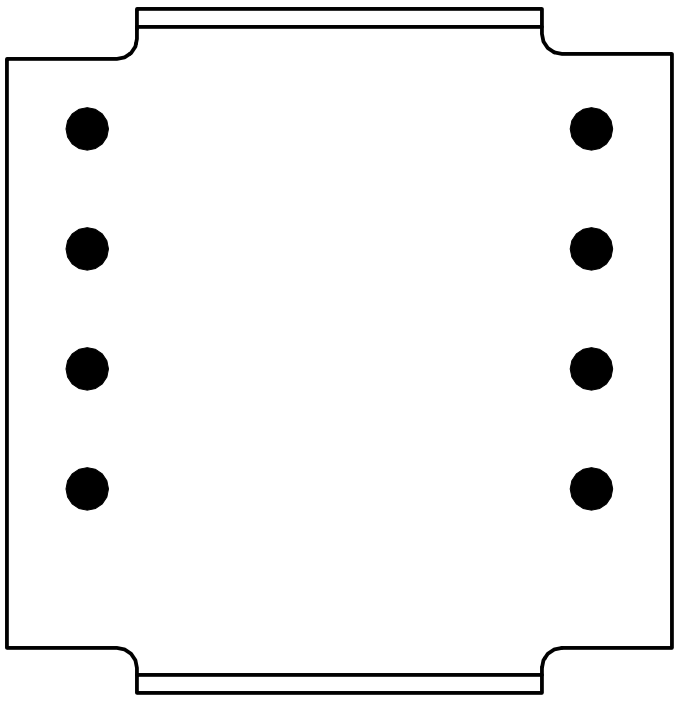
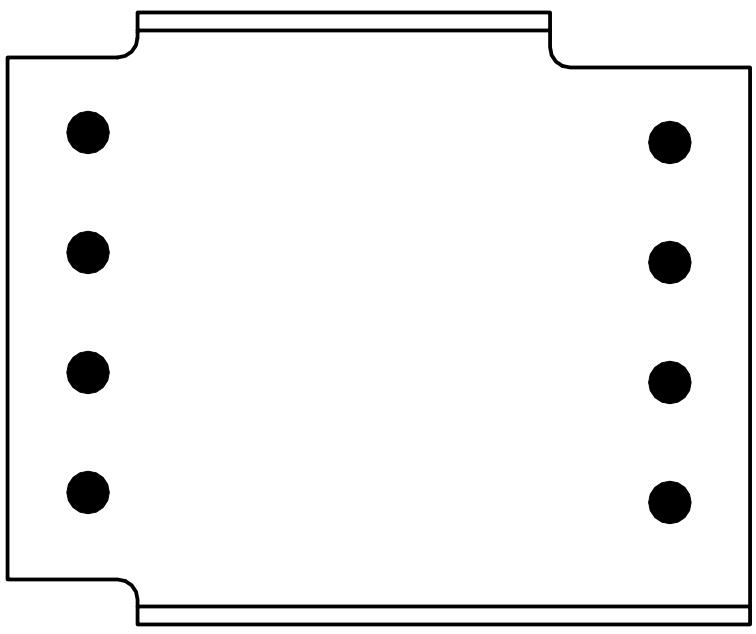


ONE W21x44x47-10 5/8 w457

GRADE: A992



ONE W21x44x47-10 9/16 w458

GRADE: A992

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DETAILING PRACTICE SET-4

DESCRIPTION: TM/PM/010	DATE: 02-FEB-18	VERSION: 1.0