

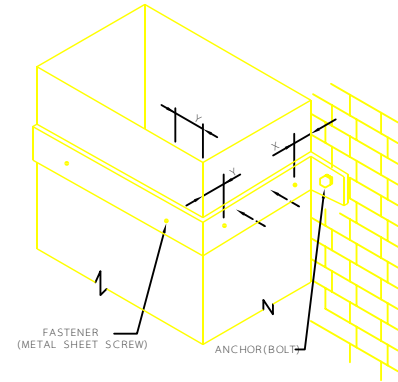
DETAIL OF DUCT FABRICATION & SUPPORTS

| | | | | | |
|-----|-------------|------|--|------|-------------|
| C | | | IRANIAN PETROLEUM STANDARDS | | |
| B | | | NO REVISION PERMITTED UNLESS APPROVED BY STANDARD ORGANIZATION | | |
| A | | | COVER SHEET | DATE | DRAWING No. |
| REV | DESCRIPTION | DATE | | | SHT/REV. |
| | | | | | 1/11 |

FIG. A - SUGGESTED SIZING

| DUCT SIZE mm (in) | BAND mm (in) |
|-----------------------|---------------------------|
| 450 (18") x 300 (12") | 38 (1 1/2") x 1.6 (1/16") |
| 600 (24") x 500 (20") | 25 (1") x 3 (1/8") |

| DUCT THK. mm. (GA) | ALLOWABLE LOAD PER FASTENER (Kg) |
|----------------------------------|----------------------------------|
| 0.5 (28) , 0.55 (26) | 11.5 |
| 0.70 (24) , 0.85 (32) , 1.0 (20) | 16 |
| 1.3 (18") , 1.6 (16) | 23 |



--- SHOWS SUPPLEMENTAL FASTENER LOCATION

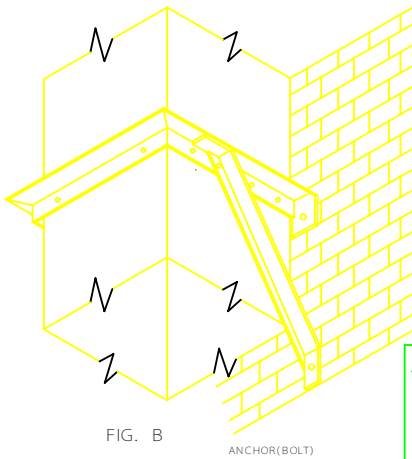
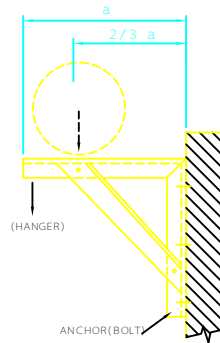


FIG. B

ANCHOR(BOLT)

*WELD, BOLT OR No. 8 SCREW (MIN.) DEVIATION PERMITTED BY OTHER ANALYSIS
 $X = 25 \text{ mm.}(1")$, $Y = 50 \text{ mm.}(2")$,
 ADD OTHERS TO ACCOMMODATE LOAD.
 MINIMUM OF 3 ON 600 mm.(24") WIDTH AND UP.
 ADD ALONG SIDES NEAREST ANCHORS.



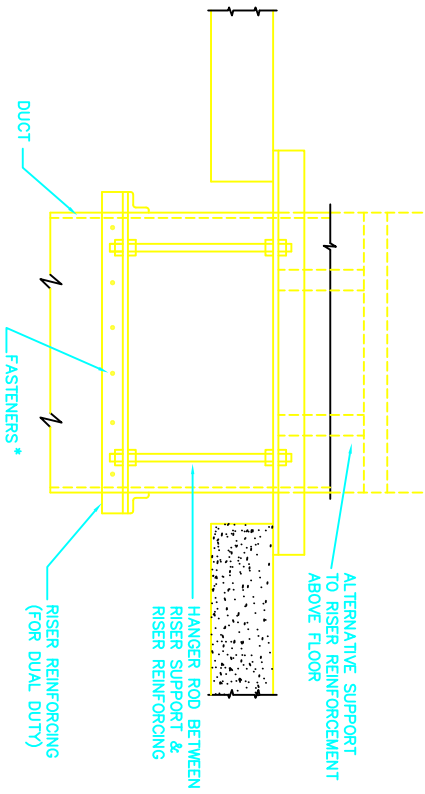
KNEE BRACKET FOR ROUND DUCT LOCATION POINT

FIG. B - SUGGESTED SIZING

| DUCT SIZE mm (in) | ANGLE mm (in) |
|------------------------|--------------------------------------|
| 750 (30") x 300 (12") | 25 (1") x 25 (1") x 3 (1/8") |
| 900 (36") x 450 (12") | 25 (1") x 25 (1") x 3 (1/8") |
| 1050 (42") x 600 (24") | 32 (1 1/4") x 32 (1 1/4") x 3 (1/8") |
| 1200 (48") x 750 (30") | 32 (1 1/4") x 32 (1 1/4") x 3 (1/8") |

- NOTES: 1. BRACKETS ARE SIZED FOR 3.65 m (12 ft) OF DUCT, MAXIMUM.
 2. LOCATE DUCTS AGAINST WALL OR MAXIMUM OF 50 mm.(2") AWAY FROM WALL.
 3. EACH WALL ANCHOR SHALL SATISFY THE FOLLOWING CRITERIA UNLESS OTHER ANALYSIS IS MADE.
 A. TENSILE LOAD = $3/8 \times$ DUCT WEIGHT; SAFETY FACTOR OF 4.
 B. SHEAR LOAD = $1/2 \times$ DUCT WEIGHT; SAFETY FACTOR OF 4.

| | | | | | | |
|-----|-------------|------|---|--------------|-----|------|
| C | | | IRANIAN PETROLEUM STANDARDS  | | | |
| B | | | NO REVISION PERMITTED UNLESS APPROVED BY STANDARD ORGANIZATION | | | |
| A | | | DATE | DRAWING No. | SHT | REV. |
| REV | DESCRIPTION | DATE | DUCT WALL SUPPORTS | IPS-D-AR-013 | 2 | 11 |



MINIMUM NUMBER OF FASTENERS
* ON EACH OF TWO SUPPORT BARS
FIG. B

| LARGEST DUCT DIM. mm (IN) | MINIMUM NUMBER OF FASTENERS |
|---------------------------|-------------------------------------|
| 100 (16") AND DOWN | 2 |
| 425 (17")-600 (24") OVER | 3 |
| | LARGEST DUCT DIM. DIVIDED BY 203(8) |

SUGGESTED SIZING FOR SUPPORT OF 300mm. OF DUCT

| DUCT SIZE mm (IN) | ANGLE mm (IN) |
|-------------------------|--|
| 900 (36") x 450 (18") | 40 (1 1/2") x 40 (1 1/2") x 3 (1/8") |
| 1200 (48") x 600 (24") | 40 (1 1/2") x 40 (1 1/2") x 3 (1/8") |
| 1500 (60") x 750 (30") | 40 (1 1/2") x 40 (1 1/2") x 5 (13/64") |
| 1500 (60") x 1500 (60") | 40 (1 1/2") x 40 (1 1/2") x 6 (1/4") |
| | OR 50 (2") x 50 (2") x 3 (1/8") |

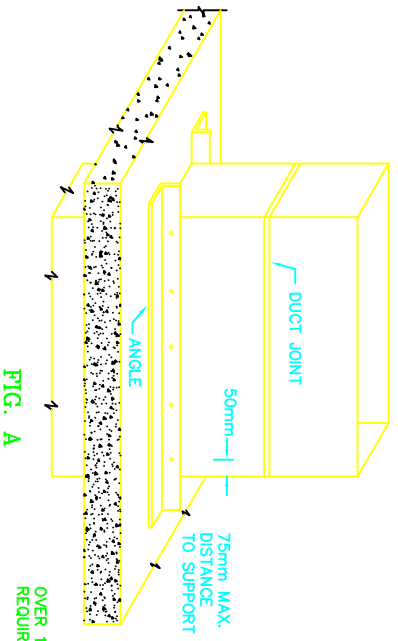



FIG. A
OVER 1500mm. INCREASE ANGLE SIZE AS REQUIRED FOR SPACE & DUCT SIZE

| | | | |
|------|-------------|---|---|
| C | | IRANIAN PETROLEUM STANDARDS  | |
| B | | | |
| A | | | |
| REV. | DESCRIPTION | DATE | NO REVISION PERMITTED UNLESS APPROVED BY STANDARD ORGANIZATION |
| | | | RISER SUPPORTS- FROM FLOOR |
| | | | DATE: _____ DRAWING No. _____ SHT REV. _____ IPS-D-AR-013 3 / 11 |

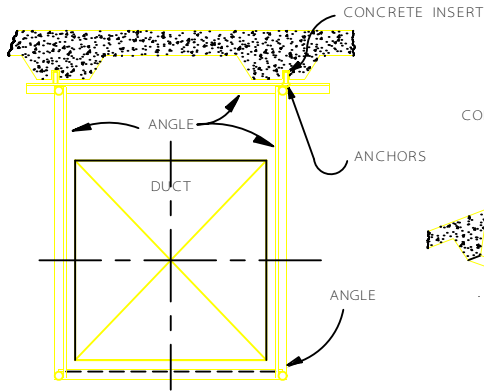


FIG. A

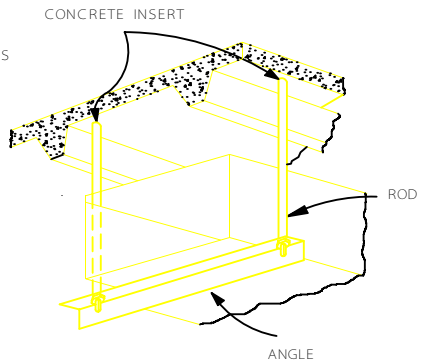


FIG. B

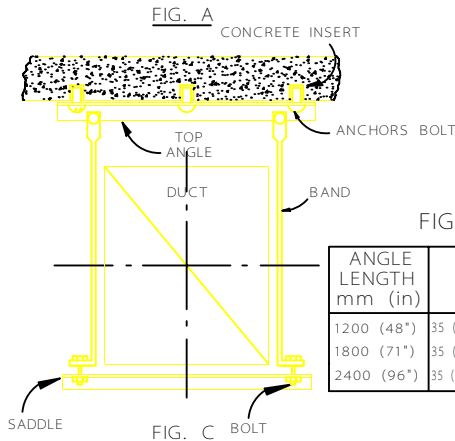


FIG. C


FIG. B - SUGGESTED SIZING

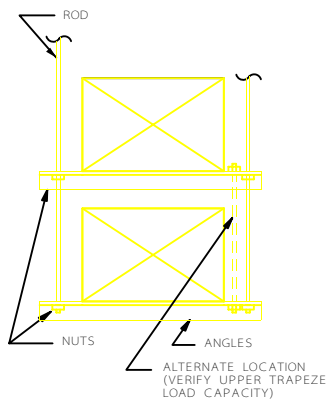
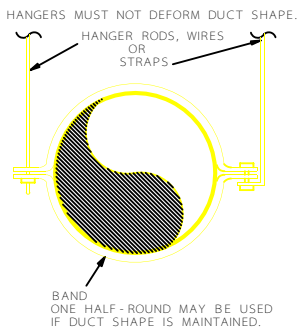
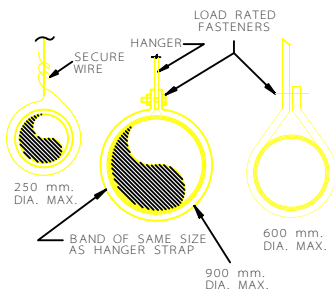
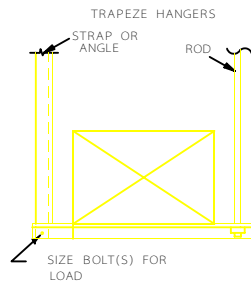
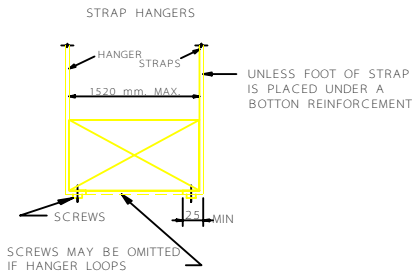
| ANGLE LENGTH mm (in) | ANGLE mm (in) | ROD DIA. mm (in) | SPACING mm (ft) |
|-------------------------|---|---------------------|--------------------|
| 1200 (48") | 35 (1 1/8") x 35 (1 1/8") x 4 (5/32) | 6.5 (17/64") | 2.50 (8.2) |
| 1800 (71") | 35 (1 1/8") x 35 (1 1/8") x 4 (5/32) | 6.5 (17/64") | 2.50 (8.2) |
| 2400 (96") | 35 (2 3/16") x 55 (2 3/16") x 5 (13/64) | 8 (10/32") | 2.50 (8.2) |

FIG. A & FIG. C - SUGGESTED SIZING

| DUCT SIZE mm (in) | TOP ANGLE mm (in) | SHELF ANGLE mm (in) | BAND mm (in) S | SPACING mt (ft) |
|------------------------|--------------------------------------|--------------------------------------|---------------------------|-----------------|
| 600 (24") x 300 (12") | 25 (1") X 25 (1") X 5 (13/64") | 25 (1") X 25 (1") X 5 (13/64") | 25 (1") x 3 (1/8") | 2.5 (8.2) |
| 900 (36") x 450 (18") | 35 (1 1/8") X 35 (1 1/8") X 6 (1/4") | 35 (1 1/8") X 35 (1 1/8") X 6 (1/4") | 25 (1") x 3 (1/8") | 2.5 (8.2) |
| 1200 (48") x 600 (24") | 35 (1 1/8") X 35 (1 1/8") X 6 (1/4") | 35 (1 1/8") X 35 (1 1/8") X 6 (1/4") | 30 (1 3/16") x 5 (13/64") | 2.5 (8.2) |
| 1350 (60") x 750 (30") | 50 (2") X 50 (2") X 6 (1/4") | 50 (2") X 50 (2") X 6 (1/4") | 50 (2") x 5 (13/64") | 2.5 (8.2) |
| over 1350 (60") | 75 (3") X 75 (3") X 6 (1/4") | 75 (3") X 75 (3") X 6 (1/4") | 75 (3") x 5 (13/64") | 2.5 (8.2) |

NOTE: THE DUCT SHOWN IN FIG A,B, AND C CAN BE CONSIDERED AS INSULATED.

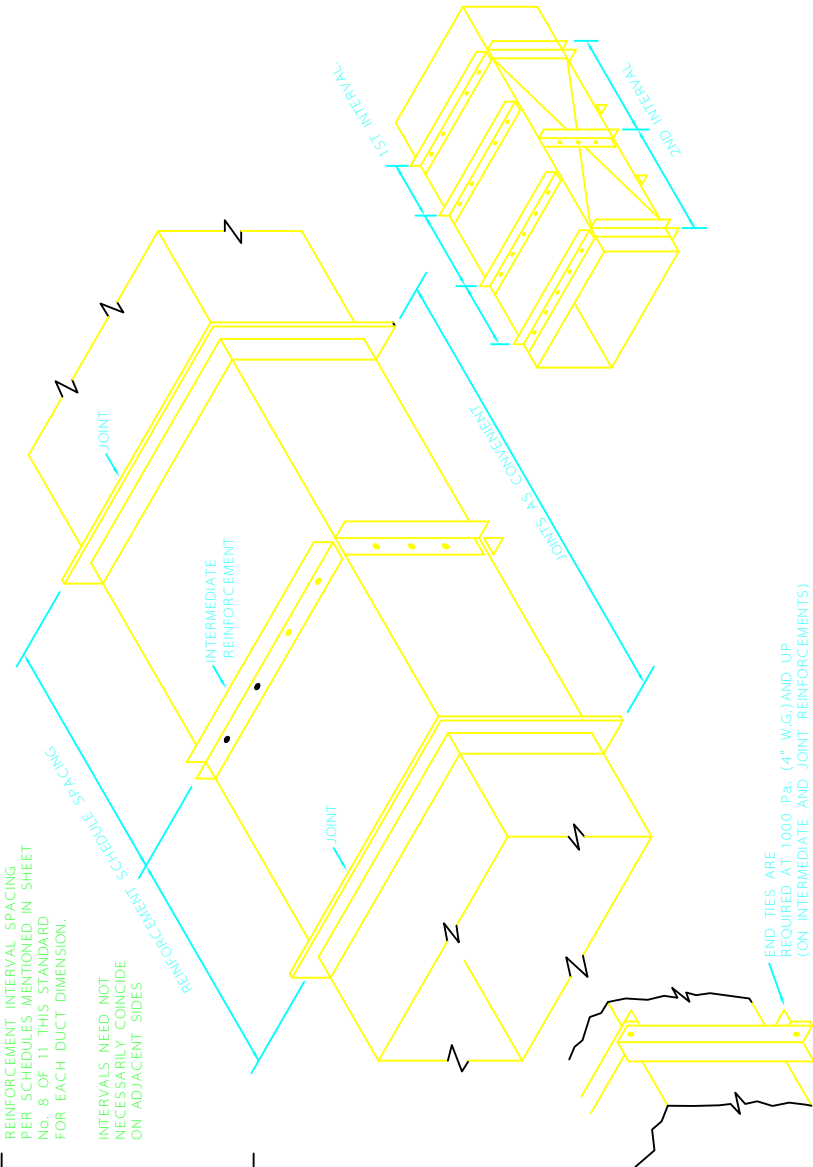
| | | | | | |
|-----|-------------|------|---|--------------|----------|
| C | | | IRANIAN PETROLEUM STANDARDS  NO REVISION PERMITTED UNLESS APPROVED BY STANDARD ORGANIZATION | | |
| B | | | | | |
| A | | | DATE | DRAWING No. | SHT/REV. |
| REV | DESCRIPTION | DATE | HANGERS FOR HORIZONTAL DUCTS | | 4 11 |
| | | | | IPS-D-AR-013 | |



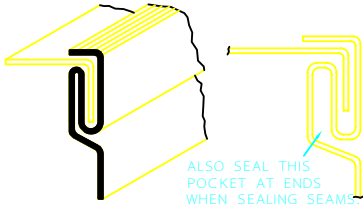
NOTES:

1. REINFORCEMENT MAY BE USED FOR ATTACHMENT IF IT QUALIFIES FOR BOTH DUTIES.
2. ALLOWABLE LOAD LIMITS SHALL NOT BE EXCEEDED.

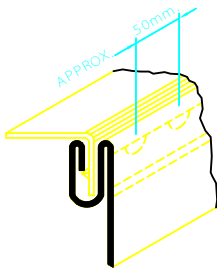
| | | | | | | | |
|-----|-------------|------|---|------|--------------------|-----|------|
| C | | | IRANIAN PETROLEUM STANDARDS  NO REVISION PERMITTED UNLESS APPROVED BY STANDARD ORGANIZATION | | | | |
| B | | | | | | | |
| A | | | HANGER ATTACHMENTS FOR DUCTING | DATE | DRAWING No. | SHT | REV. |
| REV | DESCRIPTION | DATE | | | IPS - D - AR - 013 | 5 | 11 |



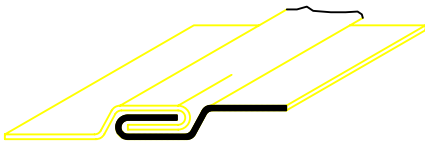
| | | | | | | |
|-----|-------------|------|---|--------------------|-------------|----------|
| C | | | IRANIAN PETROLEUM STANDARDS  NO REVISION PERMITTED UNLESS APPROVED BY STANDARD ORGANIZATION | | | |
| B | | | | | | |
| A | | | DUCT REINFORCED ON ALL SIDES | DATE | DRAWING No. | SHT/REV. |
| REV | DESCRIPTION | DATE | | IPS - D - AR - 013 | 6 | 11 |



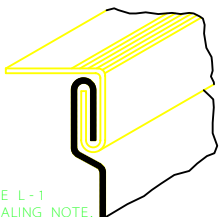
L-1
PITTSBURGH LOCK



L-2
BUTTON PUNCH SNAP LOCK

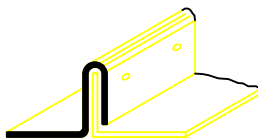


L-3
GROOVED SEAM
ALSO CALLED FLAT LOCK AND PIPE LOCK



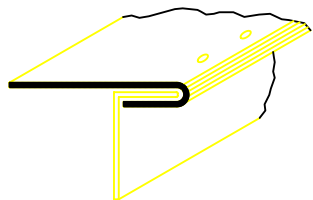
SEE L-1
SEALING NOTE.

L-6
DOUBLE CORNER SEAM



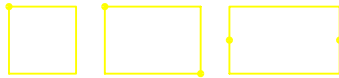
SEE FIG. L-6
ALSO

L-4
STANDING SEAM



L-5
SINGLE CORNER SEAM

SEAM LOCATIONS



(a)



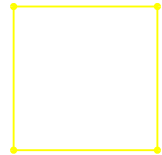
(b)



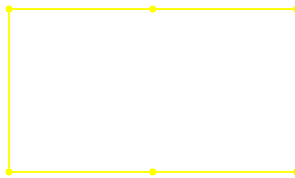
(c)



(d)




(e)



(f)

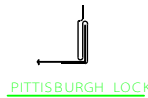
NUMBER OF SEAMS AND LOCATION VARIES WITH JOINT TYPE, SHEET STOCK AND ASSEMBLY PLANS.

| | | | | | | |
|-----|-------------|------|---|------|--------------|----------|
| C | | | IRANIAN PETROLEUM STANDARDS  | | | |
| B | | | NO REVISION PERMITTED UNLESS APPROVED BY STANDARD ORGANIZATION | | | |
| A | | | LONGITUDINAL SEAMS (RECT. DUCT) | DATE | DRAWING No. | SHT/REV. |
| REV | DESCRIPTION | DATE | | | IPS-D-AR-013 | 7/11 |

NOTES:

- 1- ALL LONGITUDINAL SEAMS SHALL BE PITTSBURGH LOCK
- 2- CLOSEST EQUIVALENT IN MILLIMETER DIMENSIONS SHALL BE CONSIDERED.

| DIMENSION OF LONGEST SIDE mm. (IN.) | SHEET METAL GAGE (ALL FOUR SIDES) | | | TRANSVERSE REINFORCEMENT | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------------|-----------------------------------|----------------|------------|---|--------------------|----------------|----------------|--------------------|---------------------|------------|--------------------------|-------------------------|-------------|--------------------------|--------------------------|-----------------------|---------------------|---|----------|----------|-------------------------------|-------------------------------|------------------------|-------------------------------|-------------------------------|
| | | | | AT JOINTS | | | | | | | | | | | | | | | | | | | | | |
| | STEEL | ALUMINUM ALLOY | COPPER | MINIMUM REINFORCING ANGLE SIZE mm. (IN.) AND MAXIMUM LONGITUDINAL SPACING mm. (IN.) BETWEEN TRANSVERSE JOINTS AND/OR INTERMEDIATE REINFORCING | MINIMUM HIGH (mm.) | PLAIN "S" SLIP | HEMME "S" SLIP | ALTERNATE BAR SLIP | REINFORCED BAR SLIP | ANGLE SLIP | BAR SLIP | STANDING SEAM | POCKET LOCK | GASKET OR SEALER | COMPANION ANGLES | | | | | | | | | | |
| | | | | | | | | | | | | | | | | RECOMMENDED THICKNESS | | | | | REINFORCED ANGLE SIZE mm. IN. | REINFORCED ANGLE SIZE mm. IN. | RECOMMEN-DED. mm.(Ga.) | REINFORCED ANGLE SIZE mm. IN. | REINFORCED ANGLE SIZE mm. IN. |
| | | | | | | | | | | | | | | | | mm.(Ga.) | THICKNESS mm. (IN.) | KG/m ² (OZ/ft ²) | mm.(Ga.) | mm.(Ga.) | mm.(Ga.) | mm.(Ga.) | mm.(Ga.) | mm.(Ga.) | mm.(Ga.) |
| UP THRU 300(12) | 0.55(26) | 0.50 (0.020) | 4.85 (16) | NONE RECOMMENDED | 25 | 0.55(26) | 0.55(26) | 0.70(24) | 0.70(24) | 0.70(24) | NOT REQUIRED | NOT REQUIRED | 0.70(24) | NOT REQUIRED | - | | | | | | | | | | |
| 325 - 450 (13 - 18) | 0.70(24) | 0.60 (0.025) | 7.30 (24) | NONE RECOMMENDED | 25 | 0.70(24) | 0.70(24) | 0.70(24) | 0.70(24) | 0.70(24) | NOT REQUIRED | NOT REQUIRED | 0.70(24) | NOT REQUIRED | - | | | | | | | | | | |
| 475 - 750 (19 - 30) | 0.70(24) | 0.60 (0.025) | 7.30 (24) | 25x25x3 & 1500 1x1x1/8 & 60 | 25 | | 0.70(24) | 0.70(24) | 0.70(24) | 0.70(24) | NOT REQUIRED | NOT REQUIRED | 0.70(24) | NOT REQUIRED | - | | | | | | | | | | |
| 775 - 1050 (31 - 42) | 0.85(22) | 0.80 (0.032) | 9.75 (32) | 25x25x3 & 1500 1x1x1/8 & 60 | 25 | | | 0.85(22) | 0.85(22) | 0.85(22) | NOT REQUIRED | NOT REQUIRED | 0.85(22) | NOT REQUIRED | - | | | | | | | | | | |
| 1075 - 1350 (43 - 54) | 0.85(22) | 0.80 (0.032) | 9.75 (32) | 40x40x3 & 1500 1 1/2x1 1/2x1/8 & 60 | 40 | | | 0.85(22) | 0.85(22) | 0.85(22) | 40x40x3 1 1/2x1 1/2x1/8 | NOT REQUIRED | 0.85(22) | NOT REQUIRED | - | | | | | | | | | | |
| 1375 - 1500 (55 - 60) | 1.0(20) | 1.0 (0.040) | 11.0 (36) | 40x40x3 & 1500 1 1/2x1 1/2x1/8 & 60 | 40 | | | 0.85(22) | 0.85(22) | 0.85(22) | 40x40x3 1 1/2x1 1/2x1/8 | NOT REQUIRED | 0.85(22) | NOT REQUIRED | - | | | | | | | | | | |
| 1525 - 2100 (61 - 84) | 1.0(20) | 1.0 (0.040) | 11.0 (36) | 40x40x3 & 1500 1 1/2x1 1/2x1/8 & 60 | 40 | | | 0.85(22) | 0.85(22) | 0.85(22) | 40x40x3 1 1/2x1 1/2x1/8 | 40x40x3 1 1/2x1 1/2x1/8 | 0.85(22) | 40x40x3 1 1/2x1 1/2x1/8 | - | | | | | | | | | | |
| 2125 - 2400 (85 - 96) | 1.30(18) | 1.25 (0.050) | 14.65 (48) | 40x40x3 & 750 1 1/2x1 1/2x1/8 & 30 | 40 | | | | 0.85(22) | 0.85(22) | 40x40x4 1 1/2x1 1/2x3/16 | 40x40x3 1 1/2x1 1/2x1/8 | 0.85(22) | 40x40x4 1 1/2x1 1/2x3/16 | 40x40x4 1 1/2x1 1/2x3/16 | | | | | | | | | | |
| 2425 - 3000 (97 - 120) | 1.30(18) | 1.25 (0.050) | 14.65 (48) | 50x50x6 & 750 2x2x1/4 & 30 | 50 | | | | 0.85(22) | 0.85(22) | 50x50x6 2x2x1/4 | 50x50x6 2x2x1/4 | 0.85(22) | 50x50x6 2x2x1/4 | 50x50x6 2x2x1/4 | | | | | | | | | | |
| 3000 OVER(120) | 1.30(18) | 1.25 (0.050) | 14.65 (48) | 50x50x6 & 750 2x2x1/4 & 30 | 50 | | | | 0.85(22) | 0.85(22) | 50x50x6 2x2x1/4 | 50x50x6 2x2x1/4 | 0.85(22) | 50x50x6 2x2x1/4 | 50x50x6 2x2x1/4 | | | | | | | | | | |

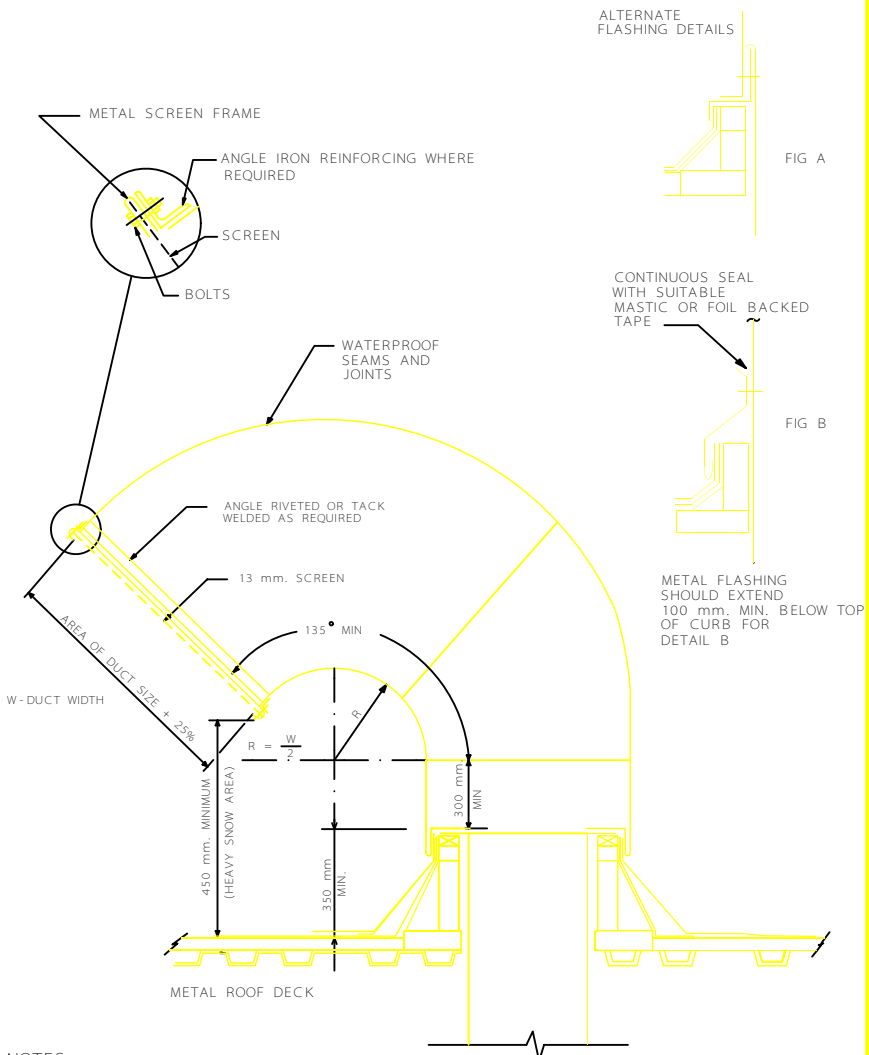


| | | |
|-----|-------------|------|
| REV | DESCRIPTION | DATE |
| C | | |
| B | | |
| A | | |

IRANIAN PETROLEUM STANDARDS 
NO REVISION PERMITTED UNLESS APPROVED BY STANDARD ORGANIZATION

RECOMMENDED CONSTRUCTION
RECTANGULAR LOW PRESSURE DUCT

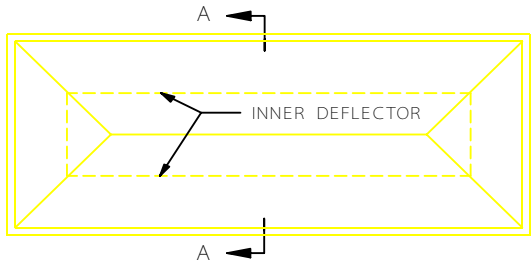
| | | | |
|------|--------------------|-------|------|
| DATE | DRAWING No. | SHEET | REV. |
| | IPS - D - AR - 013 | 8 | 11 |



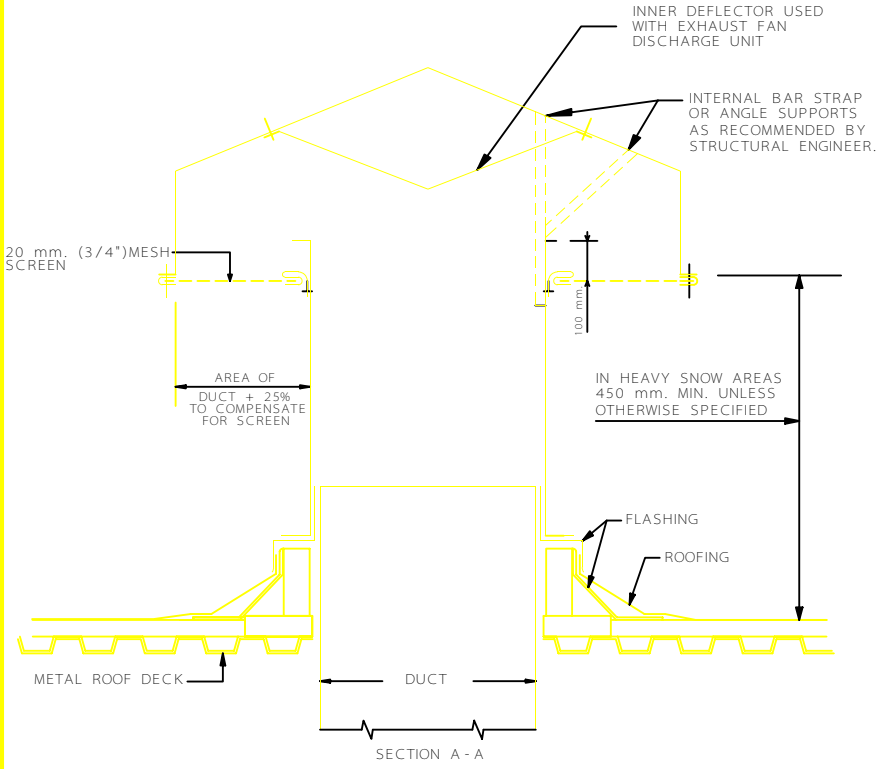
NOTES :

- 1 - CURBS ARE PREFERABLE FOR ALL DUCT PENETRATIONS ON ROOFS.
- 2 - FLASHING MATERIAL DETAIL SHALL BE PER RECOMMENDED BY CIVIL ENGINEER.
- 3 - W= DUCT WIDTH

| | | | | | | |
|-----|-------------|------|------------------------------------|------|--------------------|----------|
| C | | | IRANIAN PETROLEUM STANDARDS | | | |
| B | | | | | | |
| A | | | RECTANGULAR GOOSENECK. | DATE | DRAWING No. | SHT/REV. |
| REV | DESCRIPTION | DATE | | | IPS - D - AR - 013 | 9/11 |




PLAN VIEW

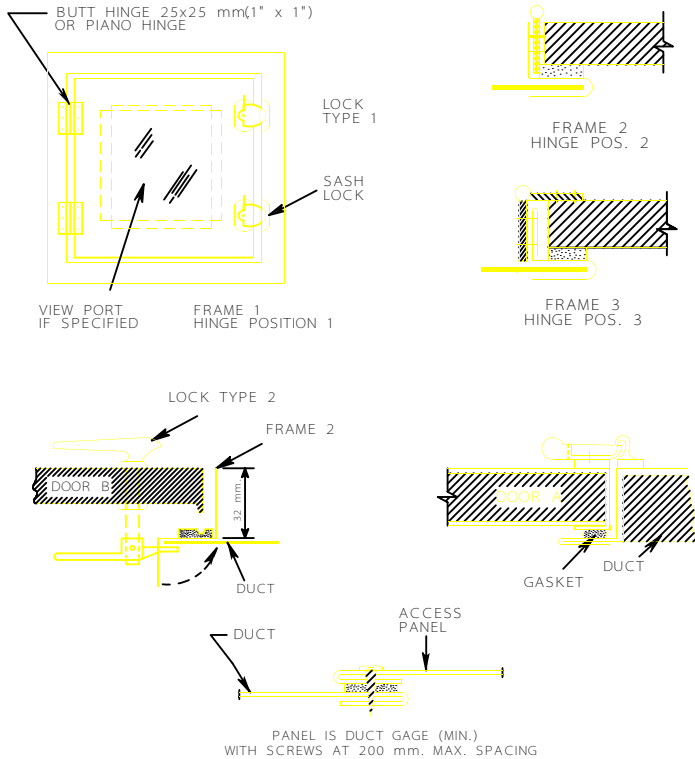


SECTION A - A

NOTES:

1. SEE DWG.NO IPS-D-AR-013 SHT. 9/11 FOR CURB OPTIONS
2. METAL GAUGES DUCT SCHEDULE SHALL BE BASED ON SMACNA STANDARDS.

| | | | | | | | |
|-----|-------------|------|--|------|--------------|-----|------|
| C | | | IRANIAN PETROLEUM STANDARDS  NO REVISION PERMITTED UNLESS APPROVED BY STANDARD ORGANIZATION | | | | |
| B | | | | | | | |
| A | | | LARGE INTAKE OR EXHAUST COVERS ON ROOF | DATE | DRAWING No. | SHT | REV. |
| REV | DESCRIPTION | DATE | | | IPS-D-AR-013 | 10 | 11 |



- Notes: 1- CONSTRUCTION AND AIR TIGHTNESS SHALL BE SUITABLE FOR THE DUCT PRESSURE CLASS USED.
 2- CLOSEST EQUIVALENT DIMENSIONS (MILLIMETER) & PRESS (Pa.) SHALL BE CONSIDERD.

| STATIC PRESSURE | Door Size(mm.) | No. OF Hinges | No. OF Locks | MATERIAL THK. mm.(GA.) | | |
|--|----------------|---------------|---------------|------------------------|----------|----------|
| | | | | Frame | Door | Back |
| 500 Pa.(2"W.g.) Static and Less | 300 x 300 | 2 | 1-S | 0.70(24) | 0.55(26) | 0.55(26) |
| | 400 x 500 | 2 | 2-S | 0.85(22) | 0.70(24) | 0.55(26) |
| | 600 x 600 | 3 | 2-S | 0.85(22) | 0.85(22) | 0.55(26) |
| 750 Pa.(3"W.g.) Static | 300 x 300 | 2 | 1-S | 0.85(22) | 0.85(22) | 0.55(26) |
| | 400 x 500 | 2 | 1-S, 1-T, 1-B | 1.0 (20) | 1.0 (20) | 0.55(26) |
| | 600 x 600 | 3 | 2-S, 1-T, 1-B | 1.0 (20) | 1.0 (20) | 0.70(24) |
| 1000 Pa.(4"W.g.) to 2500 Pa(10"W.g.) | 300 x 300 | 2 | 1-S, 1-T, 1-B | 1.0 (20) | 1.0 (20) | 0.55(26) |
| | 400 x 500 | 3 | 2-S, 1-T, 1-B | 1.0 (20) | 1.30(18) | 0.70(24) |
| | 600 x 600 | 3 | 2-S, 2-T, 2-B | 1.30(18) | 1.30(18) | 0.70(24) |

S = Side opposite hinges, T = Top, B = Bottom

| | | | | | | |
|-----|-------------|------|--|------|--------------|----------|
| C | | | IRANIAN PETROLEUM STANDARDS | | | |
| B | | | NO REVISION PERMITTED UNLESS APPROVED BY STANDARD ORGANIZATION | | | |
| A | | | RECTANGULAR DUCT ACCESS DOORS. (REACH THROUGH) | DATE | DRAWING No. | SHT/REV. |
| REV | DESCRIPTION | DATE | | | IPS-D-AR-013 | 11/11 |