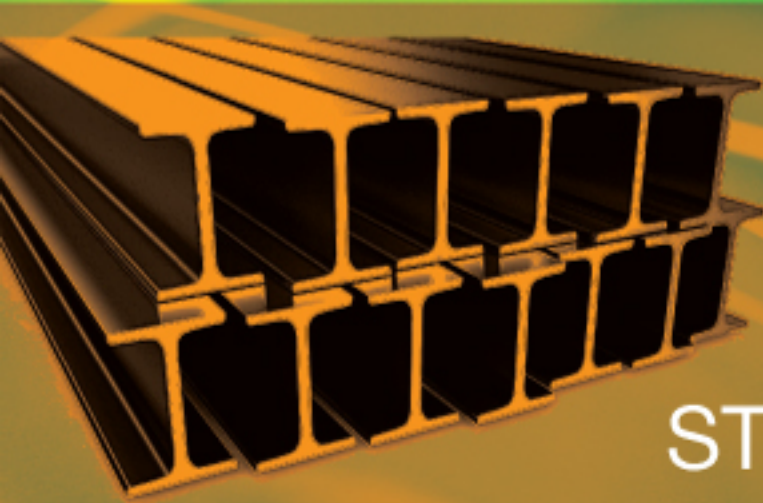




# STRUCTURAL STEEL

RUAMKIJ INTERNATIONAL CO., LTD.  
RUAMKIJ MAKETING CO., LTD.



TIS/JIS STANDARDS

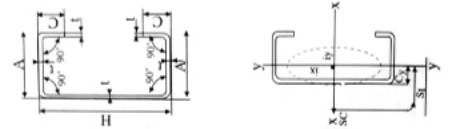


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# เหล็กตัวซี (Lip Channel Steel)

STANDARD - TIS 1228 : 2549



| STANDARD | CHEMICAL COMPOSITION |            |            |           |           | MECHANICAL PROPERTIES    |                            |                    |           |
|----------|----------------------|------------|------------|-----------|-----------|--------------------------|----------------------------|--------------------|-----------|
|          | C<br>Max%            | Si<br>Max% | Mn<br>Max% | P<br>Max% | S<br>Max% | Yield<br>Strength<br>MPa | Tensile<br>Strength<br>MPa | Elongation min (%) |           |
|          |                      |            |            |           |           |                          |                            | t ≤ 5 min          | t > 5 min |
| SSC400   | 0.25                 | -          | -          | 0.050     | 0.050     | 245                      | 400-540                    | 21                 | 17        |

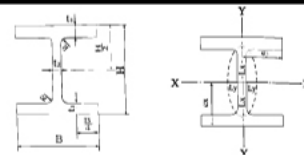
| Dimension<br>HxAxC<br>mm. | Thickness<br>t<br>mm. | Calculate<br>Weight<br>kg./m. | Cross<br>section<br>area<br>cm <sup>2</sup> | Center<br>of Gravity |           | Secondary<br>Moment of Area |                       | Radius of<br>Gyration of Area |           | Modulus of<br>Section |                       | Center of<br>Shear |           | Pieces<br>per<br>Bundle |
|---------------------------|-----------------------|-------------------------------|---------------------------------------------|----------------------|-----------|-----------------------------|-----------------------|-------------------------------|-----------|-----------------------|-----------------------|--------------------|-----------|-------------------------|
|                           |                       |                               |                                             | Cx<br>cm.            | Cy<br>cm. | Ix<br>cm <sup>4</sup>       | Iy<br>cm <sup>4</sup> | ix<br>cm.                     | iy<br>cm. | Zx<br>cm <sup>3</sup> | Zy<br>cm <sup>3</sup> | Sx<br>cm.          | Sy<br>cm. |                         |
| 75x45x15                  | 1.6                   | 2.32                          | 2.952                                       | 0                    | 1.72      | 27.10                       | 8.71                  | 3.03                          | 1.72      | 7.24                  | 3.13                  | 4.1                | 0         | 100                     |
|                           | 2.0                   | 2.86                          | 3.637                                       | 0                    | 1.72      | 33.00                       | 10.50                 | 3.01                          | 1.70      | 8.79                  | 3.76                  | 4.0                | 0         | 100                     |
|                           | 2.3                   | 3.25                          | 4.137                                       | 0                    | 1.72      | 37.10                       | 11.80                 | 3.00                          | 1.69      | 9.90                  | 4.24                  | 4.0                | 0         | 100                     |
| 100x50x20                 | 1.6                   | 2.88                          | 3.672                                       | 0                    | 1.87      | 58.40                       | 14.00                 | 3.99                          | 1.95      | 11.70                 | 4.47                  | 4.5                | 0         | 80                      |
|                           | 2.0                   | 3.56                          | 4.537                                       | 0                    | 1.86      | 71.40                       | 16.90                 | 3.97                          | 1.93      | 14.30                 | 5.40                  | 4.4                | 0         | 80                      |
|                           | 2.3                   | 4.06                          | 5.172                                       | 0                    | 1.86      | 80.70                       | 19.00                 | 3.95                          | 1.92      | 16.10                 | 6.06                  | 4.4                | 0         | 80                      |
|                           | 2.8                   | 4.87                          | 6.205                                       | 0                    | 1.88      | 99.80                       | 23.20                 | 3.96                          | 1.91      | 20.00                 | 7.44                  | 4.3                | 0         | 80                      |
|                           | 3.2                   | 5.50                          | 7.007                                       | 0                    | 1.86      | 107                         | 24.50                 | 3.90                          | 1.87      | 21.30                 | 7.81                  | 4.4                | 0         | 80                      |
| 125x50x20                 | 2.3                   | 4.51                          | 5.747                                       | 0                    | 1.69      | 137                         | 20.60                 | 4.88                          | 1.89      | 21.90                 | 6.22                  | 4.1                | 0         | 60                      |
|                           | 3.2                   | 6.13                          | 7.807                                       | 0                    | 1.68      | 181                         | 26.60                 | 4.82                          | 1.85      | 29.00                 | 8.02                  | 4.0                | 0         | 60                      |
| 150x50x20                 | 2.3                   | 4.96                          | 6.322                                       | 0                    | 1.55      | 210                         | 21.90                 | 5.77                          | 1.86      | 28.00                 | 6.33                  | 3.8                | 0         | 60                      |
|                           | 3.2                   | 6.76                          | 8.607                                       | 0                    | 1.54      | 280                         | 28.30                 | 5.71                          | 1.81      | 37.40                 | 8.19                  | 3.8                | 0         | 60                      |

| เกณฑ์ความคลาดเคลื่อน (DIMENTION TOLERANCE) |              |                         |
|--------------------------------------------|--------------|-------------------------|
|                                            |              | เกณฑ์คลาดเคลื่อน        |
| A หรือ B                                   |              | ± 1.5 mm.               |
| H                                          | น้อยกว่า 150 | ± 1.5 mm.               |
|                                            | 150 ถึง 300  | ± 2.0 mm.               |
| C                                          |              | ± 2.0 mm.               |
| ความหนา                                    | 2.0 และ 2.3  | ± 0.25 mm.              |
| t                                          | 2.8          | ± 0.28 mm.              |
|                                            | 3.2          | ± 0.30 mm.              |
| ความโค้งของด้านประชิด                      |              | ± 1.5 °                 |
| ความโค้ง                                   |              | ไม่เกิน 0.2% ของความยาว |
| ความยาว ไม่เกิน 7 m.                       |              | + 40 mm. , - 0          |
| มวลต่อเมตรน้อยกว่า 600 กก.                 |              | ± 10 %                  |



# เหล็ก H Beam

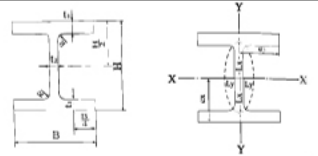
STANDARDS - TIS 1227 : 2539 / JIS G3192 : 1990



| Nominal Size | Weight | Sectional Dimension |     |      |    |    | Sectional Area  | Moment of Inertia |                 | Radius of Gyration |      | Modulus of Section |                 |
|--------------|--------|---------------------|-----|------|----|----|-----------------|-------------------|-----------------|--------------------|------|--------------------|-----------------|
| mm           | kg/m   | H                   | B   | t1   | t2 | r  | cm <sup>2</sup> | Ix                | Iy              | ix                 | iy   | Zx                 | Zy              |
|              |        | mm                  | mm  | mm   | mm | mm |                 | cm <sup>4</sup>   | cm <sup>4</sup> | cm                 | cm   | cm <sup>3</sup>    | cm <sup>3</sup> |
| 100x100      | 17.20  | 100                 | 100 | 6.0  | 8  | 10 | 21.90           | 383               | 134             | 4.2                | 2.47 | 77                 | 27              |
| 125x125      | 23.80  | 125                 | 125 | 6.5  | 9  | 10 | 30.31           | 847               | 293             | 5.3                | 3.11 | 136                | 47              |
| 150x75       | 14.00  | 150                 | 75  | 5.0  | 7  | 8  | 17.85           | 666               | 50              | 6.1                | 1.66 | 89                 | 13              |
| 150x100      | 21.10  | 148                 | 100 | 6.0  | 9  | 11 | 26.84           | 1,020             | 151             | 6.2                | 2.37 | 138                | 30              |
| 150x150      | 31.50  | 150                 | 150 | 7.0  | 10 | 11 | 40.14           | 1,640             | 563             | 6.4                | 3.75 | 219                | 75              |
| 175x175      | 40.20  | 175                 | 175 | 7.5  | 11 | 12 | 51.21           | 2,880             | 984             | 7.5                | 4.38 | 330                | 112             |
| 200x100      | 18.20  | 198                 | 99  | 4.5  | 7  | 11 | 23.18           | 1,580             | 114             | 8.3                | 2.21 | 160                | 23              |
|              | 21.30  | 200                 | 100 | 5.5  | 8  | 11 | 27.16           | 1,840             | 134             | 8.2                | 2.22 | 184                | 27              |
| 200x150      | 30.60  | 194                 | 150 | 6.0  | 9  | 13 | 39.01           | 2,690             | 507             | 8.3                | 3.61 | 277                | 68              |
| 200x200      | 49.90  | 200                 | 200 | 8.0  | 12 | 13 | 63.53           | 4,720             | 1,600           | 8.6                | 5.02 | 472                | 160             |
|              | 56.20  | 200                 | 204 | 12.0 | 12 | 13 | 71.53           | 4,980             | 1,700           | 8.4                | 4.88 | 498                | 167             |
|              | 65.70  | 208                 | 202 | 10.0 | 16 | 13 | 83.69           | 6,530             | 2,200           | 8.8                | 5.13 | 628                | 218             |
| 250x125      | 25.70  | 248                 | 124 | 5.0  | 8  | 12 | 32.68           | 3,540             | 255             | 10.4               | 2.79 | 285                | 41              |
|              | 29.60  | 250                 | 125 | 6.0  | 9  | 12 | 37.66           | 4,050             | 294             | 10.4               | 2.79 | 324                | 47              |
| 250x175      | 44.10  | 244                 | 175 | 7.0  | 11 | 16 | 56.24           | 6,120             | 984             | 10.4               | 4.18 | 502                | 113             |
| 250x250      | 64.40  | 244                 | 252 | 11.0 | 11 | 16 | 82.06           | 8,790             | 2,940           | 10.3               | 5.98 | 720                | 233             |
|              | 66.50  | 248                 | 249 | 8.0  | 13 | 16 | 84.70           | 9,930             | 3,350           | 10.8               | 6.29 | 801                | 269             |
|              | 72.40  | 250                 | 250 | 9.0  | 14 | 16 | 92.18           | 10,800            | 3,650           | 10.8               | 6.29 | 867                | 292             |
|              | 82.20  | 250                 | 255 | 14.0 | 14 | 16 | 104.70          | 11,500            | 3,880           | 10.5               | 6.09 | 919                | 304             |
| 300x150      | 32.00  | 298                 | 149 | 5.5  | 8  | 13 | 40.80           | 6,320             | 442             | 12.4               | 3.29 | 424                | 59              |
|              | 36.70  | 300                 | 150 | 6.5  | 9  | 13 | 46.78           | 7,210             | 508             | 12.4               | 3.29 | 481                | 68              |
| 300x200      | 56.80  | 294                 | 200 | 8.0  | 12 | 18 | 72.38           | 11,300            | 1,600           | 12.5               | 4.71 | 771                | 160             |
|              | 65.40  | 298                 | 201 | 9.0  | 14 | 18 | 83.36           | 13,300            | 1,900           | 12.6               | 4.77 | 893                | 189             |
| 300x300      | 84.50  | 294                 | 302 | 12.0 | 12 | 18 | 107.70          | 16,900            | 5,520           | 12.5               | 7.16 | 1,150              | 365             |
|              | 87.00  | 298                 | 299 | 9.0  | 14 | 18 | 110.80          | 18,800            | 6,240           | 13.0               | 7.51 | 1,270              | 417             |
|              | 94.00  | 300                 | 300 | 10.0 | 15 | 18 | 119.80          | 20,400            | 6,750           | 13.1               | 7.51 | 1,360              | 450             |
|              | 106.00 | 300                 | 305 | 15.0 | 15 | 18 | 134.80          | 21,500            | 7,100           | 12.6               | 7.26 | 1,440              | 466             |
|              | 106.00 | 304                 | 301 | 11.0 | 17 | 18 | 134.80          | 23,400            | 7,730           | 13.2               | 7.57 | 1,540              | 514             |
| 350x175      | 41.40  | 346                 | 174 | 6.0  | 9  | 14 | 52.68           | 11,100            | 792             | 14.5               | 3.88 | 641                | 91              |
|              | 49.60  | 350                 | 175 | 7.0  | 11 | 14 | 63.14           | 13,600            | 984             | 14.7               | 3.95 | 775                | 112             |
|              | 57.80  | 354                 | 176 | 8.0  | 13 | 14 | 73.68           | 16,100            | 1,180           | 14.8               | 4.01 | 909                | 134             |
| 350x250      | 69.20  | 336                 | 249 | 8.0  | 12 | 20 | 88.15           | 18,500            | 3,090           | 14.5               | 5.92 | 1,100              | 248             |
|              | 79.70  | 340                 | 250 | 9.0  | 14 | 20 | 101.50          | 21,700            | 3,650           | 14.6               | 6.00 | 1,280              | 292             |

# เหล็ก H Beam

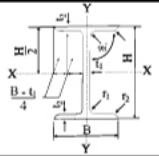
STANDARDS - TIS 1227 : 2539 / JIS G3192 : 1990 (H Beam)



| Nominal Size | Weight | Sectional Dimension |     |      |    |    | Sectional Area  | Moment of Inertia |                 | Radius of Gyration |       | Modulus of Section |                 |
|--------------|--------|---------------------|-----|------|----|----|-----------------|-------------------|-----------------|--------------------|-------|--------------------|-----------------|
| mm           | kg/m   | H                   | B   | t1   | t2 | r  | cm <sup>2</sup> | Ix                | Iy              | ix                 | iy    | Zx                 | Zy              |
|              |        | mm                  | mm  | mm   | mm | mm |                 | cm <sup>4</sup>   | cm <sup>4</sup> | cm                 | cm    | cm <sup>3</sup>    | cm <sup>3</sup> |
| 350x350      | 106.00 | 338                 | 351 | 13.0 | 13 | 20 | 135.30          | 28,200            | 9,380           | 14.4               | 8.33  | 1,670              | 534             |
|              | 115.00 | 344                 | 348 | 10.0 | 16 | 20 | 146.00          | 33,300            | 11,200          | 15.1               | 8.78  | 1,940              | 646             |
|              | 131.00 | 344                 | 354 | 16.0 | 16 | 20 | 166.60          | 35,300            | 11,800          | 14.6               | 8.43  | 2,050              | 669             |
|              | 137.00 | 350                 | 350 | 12.0 | 19 | 20 | 173.90          | 40,300            | 13,600          | 15.2               | 8.84  | 2,300              | 776             |
|              | 156.00 | 350                 | 357 | 19.0 | 19 | 20 | 198.40          | 42,800            | 14,400          | 14.7               | 8.53  | 2,450              | 809             |
| 400x200      | 56.60  | 396                 | 199 | 7.0  | 11 | 16 | 72.16           | 20,000            | 1,450           | 16.7               | 4.48  | 1,010              | 145             |
|              | 66.00  | 400                 | 200 | 8.0  | 13 | 16 | 84.12           | 23,700            | 1,740           | 16.8               | 4.54  | 1,190              | 174             |
|              | 75.50  | 404                 | 201 | 9.0  | 15 | 16 | 96.16           | 27,500            | 2,030           | 16.9               | 4.60  | 1,360              | 202             |
| 400x300      | 94.30  | 386                 | 299 | 9.0  | 14 | 22 | 120.10          | 33,700            | 6,240           | 16.7               | 7.21  | 1,740              | 418             |
|              | 107.00 | 390                 | 300 | 10.0 | 16 | 22 | 136.00          | 38,700            | 7,210           | 16.9               | 7.28  | 1,980              | 481             |
| 400x400      | 140.00 | 388                 | 402 | 15.0 | 15 | 22 | 178.50          | 49,000            | 16,300          | 16.6               | 9.54  | 2,520              | 809             |
|              | 147.00 | 394                 | 398 | 11.0 | 18 | 22 | 186.80          | 56,100            | 18,900          | 17.3               | 10.10 | 2,850              | 951             |
|              | 172.00 | 400                 | 400 | 13.0 | 21 | 22 | 218.70          | 66,600            | 22,400          | 17.5               | 10.10 | 3,330              | 1,120           |
|              | 197.00 | 400                 | 408 | 21.0 | 21 | 22 | 250.70          | 70,900            | 23,800          | 16.8               | 9.75  | 3,540              | 1,170           |
|              | 232.00 | 414                 | 405 | 18.0 | 28 | 22 | 295.40          | 92,800            | 31,000          | 17.7               | 10.20 | 4,480              | 1,530           |
| 450x200      | 66.20  | 446                 | 199 | 8.0  | 12 | 18 | 84.30           | 28,700            | 1,580           | 18.5               | 4.33  | 1,290              | 159             |
|              | 76.00  | 450                 | 200 | 9.0  | 14 | 18 | 96.76           | 33,500            | 1,870           | 18.6               | 4.40  | 1,490              | 187             |
|              | 88.90  | 456                 | 201 | 10.0 | 17 | 18 | 113.30          | 40,400            | 2,310           | 18.9               | 4.51  | 1,770              | 230             |
| 450x300      | 106.00 | 434                 | 299 | 10.0 | 15 | 24 | 135.00          | 46,800            | 6,690           | 18.6               | 7.04  | 2,160              | 448             |
|              | 124.00 | 440                 | 300 | 11.0 | 18 | 24 | 157.40          | 56,100            | 8,110           | 18.9               | 7.18  | 2,550              | 541             |
|              | 145.00 | 446                 | 302 | 13.0 | 21 | 24 | 184.30          | 66,400            | 9,660           | 19.0               | 7.24  | 2,980              | 639             |
| 500x200      | 79.50  | 496                 | 199 | 9.0  | 14 | 20 | 101.30          | 41,900            | 1,840           | 20.3               | 4.27  | 1,690              | 185             |
|              | 89.60  | 500                 | 200 | 10.0 | 16 | 20 | 114.20          | 47,800            | 2,140           | 20.5               | 4.33  | 1,910              | 214             |
|              | 103.00 | 506                 | 201 | 11.0 | 19 | 20 | 131.30          | 56,500            | 2,580           | 20.7               | 4.43  | 2,230              | 257             |
| 500x300      | 114.00 | 482                 | 300 | 11.0 | 15 | 26 | 145.50          | 60,400            | 6,760           | 20.4               | 6.82  | 2,500              | 451             |
|              | 128.00 | 488                 | 300 | 11.0 | 18 | 26 | 163.50          | 71,000            | 8,110           | 20.8               | 7.04  | 2,910              | 541             |
|              | 150.00 | 494                 | 302 | 13.0 | 21 | 26 | 191.40          | 83,800            | 9,660           | 20.9               | 7.10  | 3,390              | 640             |
| 600x200      | 94.60  | 596                 | 199 | 10.0 | 15 | 22 | 120.50          | 68,700            | 1,980           | 23.9               | 4.05  | 2,310              | 199             |
|              | 106.00 | 600                 | 200 | 11.0 | 17 | 22 | 134.40          | 77,600            | 2,280           | 24.0               | 4.12  | 2,590              | 228             |
|              | 120.00 | 606                 | 201 | 12.0 | 20 | 22 | 152.50          | 90,400            | 2,720           | 24.3               | 4.22  | 2,980              | 271             |
|              | 134.00 | 612                 | 202 | 13.0 | 23 | 22 | 170.70          | 103,000           | 3,180           | 24.6               | 4.31  | 3,380              | 314             |
| 600x300      | 137.00 | 582                 | 300 | 12.0 | 17 | 28 | 174.50          | 103,000           | 7,670           | 24.3               | 6.63  | 3,530              | 511             |
|              | 151.00 | 588                 | 300 | 12.0 | 20 | 28 | 192.50          | 118,000           | 9,020           | 24.8               | 6.85  | 4,020              | 601             |
|              | 175.00 | 594                 | 302 | 14.0 | 23 | 28 | 222.40          | 137,000           | 10,600          | 24.9               | 6.90  | 4,620              | 701             |
| 700x300      | 166.00 | 692                 | 300 | 13.0 | 20 | 28 | 211.50          | 172,000           | 9,020           | 28.6               | 6.53  | 4,980              | 602             |
|              | 185.00 | 700                 | 300 | 13.0 | 24 | 28 | 235.50          | 201,000           | 10,800          | 29.3               | 6.78  | 5,760              | 722             |
| 800x300      | 191.00 | 792                 | 300 | 14.0 | 22 | 28 | 243.40          | 254,000           | 9,930           | 32.3               | 6.39  | 6,410              | 662             |
|              | 210.00 | 800                 | 300 | 14.0 | 26 | 28 | 267.40          | 292,000           | 11,700          | 33.0               | 6.62  | 7,290              | 782             |

# เหล็ก I Beam

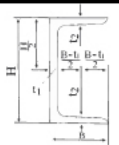
STANDARDS - TIS 1227 : 2539 / JIS G3192 : 1990 (I Beam)



| Standard Sectional Dimension |      |      |      |      | Sectional          | Weight | Moment of Inertia  |                    | Radius of Gyration |      | Modulus of Section |                    |
|------------------------------|------|------|------|------|--------------------|--------|--------------------|--------------------|--------------------|------|--------------------|--------------------|
| HxB                          | t1   | t2   | r1   | t2   | Area               | kg/m   | Ix                 | Iy                 | ix                 | iy   | Zx                 | Zy                 |
| (mm)                         | (mm) | (mm) | (mm) | (mm) | (cm <sup>2</sup> ) |        | (cm <sup>4</sup> ) | (cm <sup>4</sup> ) | (cm)               | (cm) | (cm <sup>3</sup> ) | (cm <sup>3</sup> ) |
| 150x75                       | 5.5  | 9.5  | 9    | 4.5  | 21.83              | 17.1   | 819                | 57.5               | 6.12               | 1.62 | 109                | 15.3               |
| 200x100                      | 7.0  | 10.0 | 10   | 5.0  | 33.06              | 26.0   | 2,170              | 138                | 8.11               | 2.05 | 217                | 27.7               |
| 200x150                      | 9.0  | 16.0 | 15   | 7.5  | 64.16              | 50.4   | 4,460              | 753                | 8.34               | 3.43 | 446                | 100.0              |
| 250x125                      | 7.5  | 12.5 | 12   | 6.0  | 48.79              | 38.3   | 5,180              | 337                | 10.30              | 2.63 | 414                | 53.9               |
|                              | 10.0 | 19.0 | 21   | 10.5 | 70.73              | 55.5   | 7,310              | 538                | 10.20              | 2.76 | 585                | 86.0               |
| 300x150                      | 8.0  | 13.0 | 12   | 6.0  | 61.58              | 48.3   | 9,480              | 588                | 12.40              | 3.09 | 632                | 78.4               |
|                              | 10.0 | 18.5 | 19   | 9.5  | 83.47              | 65.5   | 12,700             | 866                | 12.30              | 3.26 | 849                | 118.0              |
|                              | 11.5 | 22.0 | 23   | 11.5 | 97.88              | 76.8   | 14,700             | 1,080              | 12.20              | 3.32 | 978                | 143.0              |
| 350x150                      | 9.0  | 15.0 | 13   | 6.5  | 74.58              | 58.5   | 15,200             | 702                | 14.30              | 3.07 | 870                | 93.5               |
|                              | 12.0 | 24.0 | 25   | 12.5 | 111.10             | 87.2   | 22,400             | 1,180              | 14.20              | 3.26 | 1,280              | 158.0              |
| 400x150                      | 10.0 | 18.0 | 17   | 8.5  | 91.73              | 72.0   | 24,100             | 864                | 16.20              | 3.07 | 1,200              | 115.0              |
|                              | 12.5 | 25.0 | 27   | 13.5 | 122.10             | 95.8   | 31,700             | 1,240              | 16.10              | 3.18 | 1,580              | 165.0              |
| 450x175                      | 11.0 | 20.0 | 19   | 9.5  | 116.80             | 91.7   | 39,200             | 1,510              | 18.30              | 3.60 | 1,740              | 173.0              |
|                              | 13.0 | 26.0 | 27   | 13.5 | 146.10             | 115.0  | 48,800             | 2,020              | 18.30              | 3.72 | 2,170              | 231.0              |
| 600x190                      | 13.0 | 25.0 | 25   | 12.5 | 169.40             | 133.0  | 98,400             | 2,460              | 24.10              | 3.81 | 3,280              | 259.0              |
|                              | 16.0 | 35.0 | 38   | 19.0 | 224.50             | 176.0  | 130,000            | 3,540              | 24.10              | 3.97 | 4,330              | 373.0              |

## เหล็กรางน้ำ (Channel Steel)

STANDARDS - TIS 1227 : 2539 / JIS G3192 : 1990



| Standard Sectional Dimension |       |       |      |       | Sectional | Weight | Position of Center of Gravity |      | Moment of Inertia  |                    | Radius of Gyration |      | Modulus of Section |                    |
|------------------------------|-------|-------|------|-------|-----------|--------|-------------------------------|------|--------------------|--------------------|--------------------|------|--------------------|--------------------|
| HxB                          | t1    | t2    | r1   | t2    | Area      | kg/m   | cx                            | cy   | Ix                 | Iy                 | ix                 | iy   | Zx                 | Zy                 |
| (mm)                         | (mm)  | (mm)  | (mm) | (mm)  |           |        | (cm)                          | (cm) | (cm <sup>4</sup> ) | (cm <sup>4</sup> ) | (cm)               | (cm) | (cm <sup>3</sup> ) | (cm <sup>3</sup> ) |
| 75x40                        | 5.00  | 7.00  | 8    | 4.00  | 8.818     | 6.92   | 0                             | 1.28 | 75.30              | 12.20              | 2.92               | 1.17 | 20.10              | 4.47               |
| 100x50                       | 5.00  | 7.50  | 8    | 4.00  | 11.920    | 9.36   | 0                             | 1.54 | 188                | 26.00              | 3.97               | 1.48 | 37.60              | 7.52               |
| 125x65                       | 6.00  | 8.00  | 8    | 4.00  | 17.110    | 13.40  | 0                             | 1.90 | 424                | 61.80              | 4.98               | 1.90 | 67.80              | 13.40              |
| 150x75                       | 6.50  | 10.00 | 10   | 5.00  | 23.710    | 18.60  | 0                             | 2.28 | 861                | 117.00             | 6.03               | 2.22 | 115.00             | 22.40              |
| 150x75                       | 9.00  | 12.50 | 15   | 7.50  | 30.590    | 24.00  | 0                             | 2.31 | 1,050              | 147.00             | 5.86               | 2.19 | 140.00             | 28.30              |
| 180x75                       | 7.00  | 10.50 | 11   | 5.50  | 27.200    | 21.40  | 0                             | 2.13 | 1,380              | 131.00             | 7.12               | 2.19 | 153.00             | 24.30              |
| 200x80                       | 7.50  | 11.00 | 12   | 6.00  | 31.330    | 24.60  | 0                             | 2.21 | 1,950              | 168.00             | 7.88               | 2.32 | 195.00             | 29.10              |
| 200x90                       | 8.00  | 13.50 | 14   | 7.00  | 38.650    | 30.30  | 0                             | 2.74 | 2,490              | 277.00             | 8.02               | 2.68 | 249.00             | 44.20              |
| 250x90                       | 9.00  | 13.00 | 14   | 7.00  | 44.070    | 34.60  | 0                             | 2.40 | 4,180              | 294.00             | 9.74               | 2.58 | 334.00             | 44.50              |
|                              | 11.00 | 14.50 | 17   | 8.50  | 51.170    | 40.20  | 0                             | 2.40 | 4,680              | 329.00             | 9.56               | 2.54 | 374.00             | 49.90              |
| 300x90                       | 9.00  | 13.00 | 14   | 7.00  | 48.570    | 38.10  | 0                             | 2.22 | 6,440              | 309.00             | 11.50              | 2.52 | 429.00             | 45.70              |
|                              | 10.00 | 15.50 | 19   | 9.50  | 55.740    | 43.80  | 0                             | 2.34 | 7,410              | 360.00             | 11.50              | 2.54 | 494.00             | 54.10              |
|                              | 12.00 | 16.00 | 19   | 9.50  | 61.900    | 48.60  | 0                             | 2.28 | 7,870              | 379.00             | 11.30              | 2.48 | 525.00             | 56.40              |
| 380x100                      | 10.50 | 16.00 | 18   | 9.00  | 63.390    | 54.50  | 0                             | 2.41 | 14,500             | 535.00             | 14.50              | 2.78 | 763.00             | 70.50              |
|                              | 13.00 | 16.50 | 18   | 9.00  | 78.960    | 62.00  | 0                             | 2.33 | 15,600             | 565.00             | 14.10              | 2.67 | 823.00             | 73.60              |
|                              | 13.00 | 20.00 | 24   | 12.00 | 85.710    | 67.30  | 0                             | 2.54 | 17,600             | 655.00             | 14.30              | 2.76 | 926.00             | 87.80              |



# เหล็กแผ่นดำ (Black Steel Sheet)

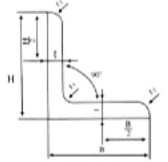
STANDARDS - TIS 1479 - 2541



| HOT ROLLED STEEL PLATES AND SHEETS |                                 |         |          |                                  |         |          |
|------------------------------------|---------------------------------|---------|----------|----------------------------------|---------|----------|
| Thickness<br>mm.                   | Calculate Weight                |         |          |                                  |         |          |
|                                    | Width x Length                  |         |          | Width x Length                   |         |          |
|                                    | 4' x 8' (1,219 mm. x 2,438 mm.) |         |          | 5' x 10' (1,524 mm. x 3,048 mm.) |         |          |
|                                    | kgs./pc.                        | lb./pc. | pcs./MT. | kgs./pc.                         | lb./pc. | pcs./MT. |
| 1.20                               | 27.996                          | 61.719  | 35.70    | 43.757                           | 96.467  | 22.90    |
| 1.40                               | 32.661                          | 72.005  | 30.60    | 51.050                           | 112.545 | 19.60    |
| 1.50                               | 34.994                          | 77.149  | 28.60    | 54.697                           | 120.584 | 18.30    |
| 1.60                               | 37.327                          | 82.292  | 26.80    | 58.343                           | 128.623 | 17.10    |
| 1.80                               | 41.993                          | 92.578  | 23.80    | 65.636                           | 144.701 | 15.20    |
| 1.90                               | 44.326                          | 97.722  | 22.60    | 69.282                           | 152.740 | 14.40    |
| 2.00                               | 46.659                          | 102.865 | 21.40    | 72.929                           | 160.779 | 13.70    |
| 2.20                               | 51.325                          | 113.151 | 19.50    | 80.222                           | 176.587 | 12.50    |
| 2.30                               | 53.658                          | 118.295 | 18.60    | 83.868                           | 184.896 | 11.90    |
| 2.50                               | 58.324                          | 128.581 | 17.10    | 91.161                           | 200.974 | 11.00    |
| 2.80                               | 65.323                          | 144.011 | 15.30    | 102.100                          | 225.091 | 9.80     |
| 2.90                               | 67.656                          | 149.154 | 14.80    | 105.747                          | 233.130 | 9.50     |
| 3.00                               | 69.989                          | 154.297 | 14.30    | 109.393                          | 241.169 | 9.10     |
| 3.20                               | 74.655                          | 164.584 | 13.40    | 116.686                          | 257.246 | 8.60     |
| 3.80                               | 88.652                          | 195.443 | 11.30    | 138.565                          | 305.480 | 7.20     |
| 4.00                               | 93.318                          | 205.730 | 10.70    | 145.858                          | 321.558 | 6.90     |
| 4.30                               | 100.317                         | 221.159 | 10.00    | 156.797                          | 345.675 | 6.40     |
| 4.50                               | 104.983                         | 231.446 | 9.50     | 164.090                          | 361.753 | 6.10     |
| 5.00                               | 116.648                         | 257.162 | 8.60     | 182.322                          | 401.948 | 5.50     |
| 5.80                               | 135.312                         | 298.308 | 7.40     | 211.494                          | 466.259 | 4.70     |
| 6.00                               | 139.978                         | 308.594 | 7.10     | 218.787                          | 482.337 | 4.60     |
| 7.50                               | 174.972                         | 385.743 | 5.70     | 273.483                          | 602.921 | 3.70     |
| 8.00                               | 186.637                         | 411.459 | 5.40     | 291.716                          | 643.116 | 3.40     |
| 9.00                               | 209.966                         | 462.892 | 4.80     | 328.180                          | 723.506 | 3.00     |
| 10.00                              | 233.296                         | 514.324 | 4.30     | 364.644                          | 803.895 | 2.70     |
| 11.00                              | 256.625                         | 565.756 | 3.90     | 401.109                          | 884.285 | 2.50     |
| 12.00                              | 279.955                         | 617.189 | 3.60     | 437.573                          | 964.674 | 2.30     |

# เหล็กฉาก (Angle Steel)

STANDARDS - TIS 1227 : 2539 / JIS G3192 : 1990



| Standard Sectional Dimension(mm.) |          |           |           | Sectional Area<br>cm <sup>2</sup> | Weight<br>(kg./m.) | Position of Center of Gravity (cm.) |       | Moment of Inertia (cm <sup>4</sup> ) |          |        |       | Radius of Gyration of Area (cm.) |      |     |      | Modulus of Section (cm <sup>3</sup> ) |        |
|-----------------------------------|----------|-----------|-----------|-----------------------------------|--------------------|-------------------------------------|-------|--------------------------------------|----------|--------|-------|----------------------------------|------|-----|------|---------------------------------------|--------|
| AxB                               | t<br>mm. | r1<br>mm. | r2<br>mm. |                                   |                    | Cx                                  | Cy    | Ix                                   | Iy       | Ix     | Iy    | ix                               | iy   | ix  | iy   | Zx                                    | Zy     |
| 25x25                             | 3        | 4         | 2         | 1.427                             | 1.12               | 0.719                               | 0.719 | 0.797                                | 0.797    | 1.26   | 0.332 | 0.75                             | 0.75 | 0.9 | 0.48 | 0.45                                  | 0.45   |
|                                   | 5        | 3.5       | 2.4       | 2.26                              | 1.77               | 0.80                                | 0.80  | 1.20                                 | 1.20     | 1.89   | 0.52  | 0.73                             | 0.73 | 0.9 | 0.48 | 0.71                                  | 0.71   |
| 30x30                             | 3        | 4         | 2         | 1.727                             | 1.36               | 0.844                               | 0.844 | 1.42                                 | 1.42     | 2.26   | 0.59  | 0.91                             | 0.91 | 1.1 | 0.59 | 0.66                                  | 0.66   |
|                                   | 5        | 5         | 2.4       | 2.78                              | 2.18               | 0.92                                | 0.92  | 2.16                                 | 2.16     | 3.41   | 0.92  | 0.88                             | 0.88 | 1.1 | 0.57 | 1.04                                  | 1.04   |
| 40x40                             | 3        | 4.5       | 2         | 2.336                             | 1.83               | 1.09                                | 1.09  | 3.53                                 | 3.53     | 5.6    | 1.46  | 1.23                             | 1.23 | 1.6 | 0.79 | 1.21                                  | 1.21   |
|                                   | 4        | 6         | 2.4       | 3.08                              | 2.42               | 1.12                                | 1.12  | 4.47                                 | 4.47     | 7.09   | 1.85  | 1.21                             | 1.21 | 1.5 | 0.78 | 1.55                                  | 1.55   |
|                                   | 5        | 4.5       | 3         | 3.755                             | 2.95               | 1.17                                | 1.17  | 5.42                                 | 5.42     | 8.59   | 2.25  | 1.20                             | 1.20 | 1.5 | 0.77 | 1.91                                  | 1.91   |
|                                   | 6        | 6         | 2.4       | 4.48                              | 3.52               | 1.20                                | 1.20  | 6.31                                 | 6.31     | 9.98   | 2.65  | 1.19                             | 1.19 | 1.5 | 0.77 | 2.26                                  | 2.26   |
| 45x45                             | 4.5      | 6.5       | 3         | 3.492                             | 2.74               | 1.24                                | 1.24  | 6.50                                 | 6.50     | 10.3   | 2.7   | 1.36                             | 1.36 | 1.7 | 0.88 | 2.00                                  | 2.00   |
|                                   | 5        | 6.5       | 3         | 4.302                             | 3.38               | 1.28                                | 1.28  | 7.91                                 | 7.91     | 12.5   | 3.29  | 1.36                             | 1.36 | 1.7 | 0.87 | 2.46                                  | 2.46   |
| 50x50                             | 3        | 7         | 2.4       | 2.96                              | 2.33               | 1.31                                | 1.31  | 6.86                                 | 6.86     | 10.8   | 2.88  | 1.52                             | 1.52 | 1.9 | 0.99 | 1.86                                  | 1.86   |
|                                   | 4        | 6.5       | 3         | 3.892                             | 3.06               | 1.37                                | 1.37  | 9.06                                 | 9.06     | 14.4   | 3.76  | 1.53                             | 1.53 | 1.9 | 0.98 | 2.49                                  | 2.49   |
|                                   | 5        | 6.5       | 3         | 4.802                             | 3.77               | 1.41                                | 1.41  | 11.10                                | 11.10    | 17.5   | 4.58  | 1.52                             | 1.52 | 1.9 | 0.98 | 3.08                                  | 3.08   |
|                                   | 6        | 6.5       | 4.5       | 5.644                             | 4.43               | 1.44                                | 1.44  | 12.60                                | 12.60    | 20     | 5.23  | 1.50                             | 1.50 | 1.9 | 0.96 | 3.55                                  | 3.55   |
| 60x60                             | 4        | 6.5       | 3         | 4.692                             | 3.68               | 1.61                                | 1.61  | 16.00                                | 16.00    | 25.4   | 6.62  | 1.85                             | 1.85 | 2.3 | 1.19 | 3.66                                  | 3.66   |
|                                   | 5        | 6.5       | 3         | 5.802                             | 4.55               | 1.66                                | 1.66  | 19.60                                | 19.60    | 31.2   | 8.09  | 1.84                             | 1.84 | 2.3 | 1.18 | 4.52                                  | 4.52   |
| 65x65                             | 5        | 8.5       | 3         | 6.367                             | 5.00               | 1.77                                | 1.77  | 25.30                                | 25.30    | 40.1   | 10.5  | 1.99                             | 1.99 | 2.5 | 1.28 | 5.35                                  | 5.35   |
|                                   | 6        | 8.5       | 4         | 7.527                             | 5.91               | 1.81                                | 1.81  | 29.40                                | 29.40    | 46.6   | 12.2  | 1.98                             | 1.98 | 2.5 | 1.27 | 6.26                                  | 6.26   |
|                                   | 8        | 8.5       | 6         | 9.761                             | 7.66               | 1.88                                | 1.88  | 36.80                                | 36.80    | 58.3   | 15.3  | 1.94                             | 1.94 | 2.4 | 1.25 | 7.96                                  | 7.96   |
| 70x70                             | 6        | 8.5       | 4         | 8.127                             | 6.38               | 1.93                                | 1.93  | 37.10                                | 37.10    | 58.9   | 15.3  | 2.14                             | 2.14 | 2.7 | 1.37 | 7.33                                  | 7.33   |
| 75x75                             | 6        | 8.5       | 4         | 8.727                             | 6.85               | 2.06                                | 2.06  | 46.10                                | 46.10    | 73.2   | 19    | 2.30                             | 2.30 | 2.9 | 1.48 | 8.47                                  | 8.47   |
|                                   | 9        | 8.5       | 6         | 12.69                             | 9.96               | 2.17                                | 2.17  | 64.40                                | 64.40    | 102    | 26.7  | 2.25                             | 2.25 | 2.8 | 1.45 | 12.10                                 | 12.10  |
|                                   | 12       | 8.5       | 6         | 16.56                             | 13.00              | 2.29                                | 2.29  | 81.90                                | 81.90    | 129    | 34.5  | 2.22                             | 2.22 | 2.8 | 1.44 | 15.70                                 | 15.70  |
| 80x80                             | 6        | 8.5       | 4         | 9.327                             | 7.32               | 2.18                                | 2.18  | 56.40                                | 56.40    | 89.6   | 23.2  | 2.46                             | 2.46 | 3.1 | 1.58 | 9.70                                  | 9.70   |
| 90x90                             | 6        | 10        | 5         | 10.55                             | 8.28               | 2.42                                | 2.42  | 80.70                                | 80.70    | 128    | 33.4  | 2.77                             | 2.77 | 3.5 | 1.78 | 12.30                                 | 12.30  |
|                                   | 7        | 10        | 5         | 12.22                             | 9.59               | 2.46                                | 2.46  | 93.00                                | 93.00    | 148    | 38.3  | 2.76                             | 2.76 | 3.5 | 1.77 | 14.20                                 | 14.20  |
|                                   | 10       | 10        | 7         | 17.00                             | 13.30              | 2.57                                | 2.57  | 125.00                               | 125.00   | 199    | 51.7  | 2.71                             | 2.71 | 3.4 | 1.74 | 19.50                                 | 19.50  |
|                                   | 12       | 11        | 4.8       | 20.30                             | 15.90              | 2.66                                | 2.66  | 148.00                               | 148.00   | 234    | 61.7  | 2.70                             | 2.70 | 3.4 | 1.75 | 23.30                                 | 23.30  |
|                                   | 13       | 10        | 7         | 21.71                             | 17.00              | 2.69                                | 2.69  | 156.00                               | 156.00   | 248    | 65.3  | 2.68                             | 2.68 | 3.4 | 1.73 | 24.80                                 | 24.80  |
| 100x100                           | 7        | 10        | 5         | 13.62                             | 10.70              | 2.71                                | 2.71  | 129.00                               | 129.00   | 205    | 53.2  | 3.08                             | 3.08 | 3.9 | 1.98 | 17.70                                 | 17.70  |
|                                   | 10       | 10        | 7         | 19.00                             | 14.90              | 2.82                                | 2.82  | 175.00                               | 175.00   | 278    | 72    | 3.04                             | 3.04 | 3.8 | 1.95 | 24.40                                 | 24.40  |
|                                   | 12       | 12        | 4.8       | 22.70                             | 17.80              | 2.90                                | 2.90  | 207.00                               | 207.00   | 328    | 85.7  | 3.02                             | 3.02 | 3.8 | 1.94 | 29.10                                 | 29.10  |
| 120x120                           | 8        | 12        | 5         | 18.76                             | 14.70              | 3.24                                | 3.24  | 258.00                               | 258.00   | 410    | 106   | 3.71                             | 3.71 | 4.7 | 2.38 | 29.50                                 | 29.50  |
| 130x130                           | 9        | 12        | 6         | 22.74                             | 17.90              | 3.53                                | 3.53  | 366.00                               | 366.00   | 583    | 150   | 4.01                             | 4.01 | 5.1 | 2.57 | 38.70                                 | 38.70  |
|                                   | 12       | 12        | 8.5       | 29.76                             | 23.40              | 3.64                                | 3.64  | 467.00                               | 467.00   | 743    | 192   | 3.96                             | 3.96 | 5   | 2.54 | 49.90                                 | 49.90  |
|                                   | 15       | 12        | 8.5       | 36.75                             | 28.80              | 3.76                                | 3.76  | 568.00                               | 568.00   | 902    | 234   | 3.93                             | 3.93 | 5   | 2.53 | 61.50                                 | 61.50  |
| 150x150                           | 12       | 14        | 7         | 34.77                             | 27.30              | 4.14                                | 4.14  | 740.00                               | 740.00   | 1,180  | 304   | 4.61                             | 4.61 | 5.8 | 2.96 | 68.10                                 | 68.10  |
|                                   | 15       | 14        | 10        | 42.74                             | 33.60              | 4.24                                | 4.24  | 888.00                               | 888.00   | 1,410  | 365   | 4.56                             | 4.56 | 5.8 | 2.92 | 82.60                                 | 82.60  |
|                                   | 19       | 14        | 10        | 53.38                             | 41.90              | 4.40                                | 4.40  | 1,090.00                             | 1,090.00 | 1,370  | 451   | 4.52                             | 4.52 | 5.7 | 2.91 | 103.00                                | 103.00 |
| 175x175                           | 12       | 15        | 11        | 40.52                             | 31.80              | 4.73                                | 4.73  | 1,170.00                             | 1,170.00 | 1,860  | 480   | 5.38                             | 5.38 | 6.8 | 3.44 | 91.80                                 | 91.80  |
|                                   | 15       | 15        | 11        | 50.21                             | 39.40              | 4.85                                | 4.85  | 1,440.00                             | 1,440.00 | 2,260  | 589   | 5.35                             | 5.35 | 6.8 | 3.42 | 114.00                                | 114.00 |
|                                   | 15       | 17        | 12        | 57.75                             | 45.30              | 5.46                                | 5.46  | 2,180.00                             | 2,180.00 | 3,470  | 891   | 6.14                             | 6.14 | 7.8 | 3.92 | 150.00                                | 150.00 |
|                                   | 20       | 17        | 12        | 76.00                             | 59.70              | 5.67                                | 5.67  | 2,820.00                             | 2,820.00 | 4,490  | 1,160 | 6.09                             | 6.09 | 7.7 | 3.90 | 197.00                                | 197.00 |
|                                   | 25       | 17        | 12        | 93.75                             | 73.60              | 5.86                                | 5.86  | 3,420.00                             | 3,420.00 | 5,420  | 1,410 | 6.04                             | 6.04 | 7.6 | 3.88 | 242.00                                | 242.00 |
| 250x250                           | 25       | 24        | 12        | 119.40                            | 93.70              | 7.10                                | 7.10  | 6,950.00                             | 6,950.00 | 11,000 | 2,860 | 7.63                             | 7.63 | 9.6 | 4.90 | 388.00                                | 388.00 |
|                                   | 35       | 24        | 18        | 162.60                            | 128.00             | 7.45                                | 7.45  | 9,110.00                             | 9,110.00 | 14,400 | 3,790 | 7.49                             | 7.49 | 9.4 | 4.83 | 519.00                                | 519.00 |



# ท่อน้ำ (Round Pipes)

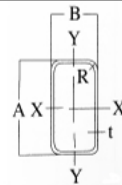
STANDARD - TIS 107 : 2533 

| STANDARD | CHEMICAL COMPOSITION |            |            |           |           | MECHANICAL PROPERTIES    |                            |                          |
|----------|----------------------|------------|------------|-----------|-----------|--------------------------|----------------------------|--------------------------|
|          | C<br>Max%            | Si<br>Max% | Mn<br>Max% | P<br>Max% | S<br>Max% | Yield<br>Strength<br>MPa | Tensile<br>Strength<br>MPa | Elongation<br>min<br>(%) |
| HS 41    | 0.28                 | -          | -          | 0.048     | 0.048     | 235                      | 402                        | 23                       |
| HS 50    | 0.21                 | 0.57       | 1.53       | 0.048     | 0.048     | 314                      | 490                        | 23                       |
| HS 51    | 0.33                 | 0.37       | 0.33-1.03  | 0.048     | 0.048     | 353                      | 500                        | 15                       |

| Outside diameter |       | Wall<br>thickness<br>(t)<br>mm. | Unit<br>mass<br>kg/m | Informative reference                  |                                                     |         |                                          |        |                                     |       |
|------------------|-------|---------------------------------|----------------------|----------------------------------------|-----------------------------------------------------|---------|------------------------------------------|--------|-------------------------------------|-------|
|                  |       |                                 |                      | Crossection<br>area<br>cm <sup>2</sup> | Geometrical<br>moment of inertia<br>cm <sup>4</sup> |         | Modulus<br>of section<br>cm <sup>3</sup> |        | Radius of<br>gyration of area<br>cm |       |
| in               | mm.   |                                 |                      |                                        | Ix                                                  | Iy      | Zx                                       | Zy     | ix                                  | iy    |
| 1/2"             | 21.7  | 2.0                             | 0.972                | 1.238                                  | 0.607                                               | 0.607   | 0.560                                    | 0.560  | 0.700                               | 0.700 |
| 3/4"             | 27.2  | 2.3                             | 1.41                 | 1.799                                  | 1.41                                                | 1.41    | 1.03                                     | 1.03   | 0.880                               | 0.880 |
| 1"               | 34.0  | 2.3                             | 1.80                 | 2.291                                  | 2.89                                                | 2.89    | 1.70                                     | 1.70   | 1.12                                | 1.12  |
| 1 1/4"           | 42.7  | 2.3                             | 2.29                 | 2.919                                  | 5.97                                                | 5.97    | 2.80                                     | 2.80   | 1.43                                | 1.43  |
| 1 1/2"           | 48.6  | 2.3                             | 2.63                 | 3.345                                  | 8.99                                                | 8.99    | 3.70                                     | 3.70   | 1.64                                | 1.64  |
|                  |       | 3.2                             | 3.58                 | 4.564                                  | 11.80                                               | 11.80   | 4.86                                     | 4.86   | 1.61                                | 1.61  |
| 2"               | 60.5  | 3.2                             | 4.52                 | 5.760                                  | 23.70                                               | 23.70   | 7.84                                     | 7.84   | 2.03                                | 2.03  |
|                  |       | 4.0                             | 5.57                 | 7.100                                  | 28.50                                               | 28.50   | 9.41                                     | 9.41   | 2.00                                | 2.00  |
| 2 1/2"           | 76.3  | 3.2                             | 5.77                 | 7.349                                  | 49.20                                               | 49.20   | 12.90                                    | 12.90  | 2.59                                | 2.59  |
|                  |       | 4.0                             | 7.13                 | 9.086                                  | 59.50                                               | 59.50   | 15.60                                    | 15.60  | 2.56                                | 2.56  |
| 3"               | 89.1  | 3.2                             | 6.78                 | 8.636                                  | 79.80                                               | 79.80   | 17.90                                    | 17.90  | 3.04                                | 3.04  |
|                  |       | 4.0                             | 8.39                 | 10.69                                  | 97.00                                               | 97.00   | 21.80                                    | 21.80  | 3.01                                | 3.01  |
| 3 1/2"           | 101.6 | 3.2                             | 7.76                 | 9.892                                  | 120.00                                              | 120.00  | 23.60                                    | 23.60  | 3.48                                | 3.48  |
|                  |       | 4.0                             | 9.63                 | 12.26                                  | 146.00                                              | 146.00  | 28.80                                    | 28.80  | 3.45                                | 3.45  |
| 4"               | 114.3 | 3.2                             | 8.77                 | 11.17                                  | 172.00                                              | 172.00  | 30.20                                    | 30.20  | 3.93                                | 3.93  |
|                  |       | 4.5                             | 12.20                | 15.52                                  | 234.00                                              | 234.00  | 41.00                                    | 41.00  | 3.89                                | 3.89  |
|                  |       | 5.6                             | 15.00                | 19.12                                  | 283.00                                              | 283.00  | 49.60                                    | 49.60  | 3.85                                | 3.85  |
| 5"               | 139.8 | 4.5                             | 15.00                | 19.13                                  | 438.00                                              | 438.00  | 62.70                                    | 62.70  | 4.79                                | 4.79  |
|                  |       | 6.0                             | 19.80                | 25.22                                  | 566.00                                              | 566.00  | 80.90                                    | 80.90  | 4.74                                | 4.74  |
| 6"               | 165.2 | 4.5                             | 17.80                | 22.72                                  | 734.00                                              | 734.00  | 88.90                                    | 88.90  | 5.68                                | 5.68  |
|                  |       | 6.0                             | 23.60                | 30.01                                  | 952.00                                              | 952.00  | 115.00                                   | 115.00 | 5.63                                | 5.63  |
| 8"               | 216.3 | 6.0                             | 31.10                | 39.61                                  | 2190.00                                             | 2190.00 | 203.00                                   | 203.00 | 7.44                                | 7.44  |
|                  |       | 8.0                             | 41.10                | 52.35                                  | 2840.00                                             | 2840.00 | 263.00                                   | 263.00 | 7.37                                | 7.37  |

# ท่อสี่เหลี่ยมผืนผ้า (Rectangular Pipes)

STANDARD - TIS 107 : 2533

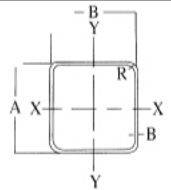


| STANDARD | CHEMICAL COMPOSITION |            |            |           |           | MECHANICAL PROPERTIES    |                            |                          |
|----------|----------------------|------------|------------|-----------|-----------|--------------------------|----------------------------|--------------------------|
|          | C<br>Max%            | Si<br>Max% | Mn<br>Max% | P<br>Max% | S<br>Max% | Yield<br>Strength<br>MPa | Tensile<br>Strength<br>MPa | Elongation<br>min<br>(%) |
| HS 41    | 0.28                 | -          | -          | 0.048     | 0.048     | 235                      | 402                        | 23                       |
| HS 50    | 0.21                 | 0.57       | 1.53       | 0.048     | 0.048     | 314                      | 490                        | 23                       |

| Side<br>length<br>AxB<br>mm. | Wall<br>thickness<br>(t)<br>mm. | Unit<br>mass<br>kg/m | Informative reference                  |                                                     |        |                                          |        |                                     |       |
|------------------------------|---------------------------------|----------------------|----------------------------------------|-----------------------------------------------------|--------|------------------------------------------|--------|-------------------------------------|-------|
|                              |                                 |                      | Crossection<br>area<br>cm <sup>2</sup> | Geometrical<br>moment of inertia<br>cm <sup>4</sup> |        | Modulus<br>of section<br>cm <sup>3</sup> |        | Radius of<br>gyration of area<br>cm |       |
|                              |                                 |                      |                                        | Ix                                                  | Iy     | Zx                                       | Zy     | ix                                  | iy    |
| 50x25                        | 2.30                            | 2.44                 | 3.102                                  | 9.31                                                | 3.10   | 3.72                                     | 2.48   | 1.73                                | 1.00  |
|                              | 3.20                            | 3.24                 | 4.127                                  | 11.60                                               | 3.80   | 4.65                                     | 3.04   | 1.68                                | 0.960 |
| 60x30                        | 2.30                            | 2.98                 | 3.792                                  | 16.80                                               | 5.65   | 5.61                                     | 3.76   | 2.11                                | 1.22  |
|                              | 3.20                            | 3.99                 | 5.087                                  | 21.40                                               | 7.08   | 7.15                                     | 4.72   | 2.05                                | 1.18  |
| 75x38                        | 2.30                            | 3.81                 | 4.850                                  | 34.60                                               | 12.00  | 9.23                                     | 6.30   | 2.67                                | 1.57  |
|                              | 3.20                            | 5.15                 | 6.559                                  | 45.00                                               | 15.40  | 12.00                                    | 8.09   | 2.62                                | 1.53  |
| 75x45                        | 2.30                            | 4.06                 | 5.172                                  | 38.90                                               | 17.60  | 10.40                                    | 7.82   | 2.74                                | 1.84  |
|                              | 3.20                            | 5.50                 | 7.007                                  | 50.80                                               | 22.80  | 13.50                                    | 10.10  | 2.69                                | 1.80  |
| 90x45                        | 2.30                            | 4.60                 | 5.862                                  | 61.00                                               | 20.80  | 13.60                                    | 9.22   | 3.23                                | 1.88  |
|                              | 3.20                            | 6.25                 | 7.967                                  | 80.20                                               | 27.00  | 17.80                                    | 12.00  | 3.17                                | 1.84  |
| 100x50                       | 3.20                            | 7.01                 | 8.927                                  | 112.00                                              | 38.00  | 22.50                                    | 15.20  | 3.55                                | 2.06  |
|                              | 4.00                            | 8.59                 | 10.95                                  | 142.00                                              | 46.70  | 28.40                                    | 18.70  | 3.55                                | 2.03  |
|                              | 4.50                            | 9.55                 | 12.17                                  | 147.00                                              | 48.90  | 29.30                                    | 19.50  | 3.47                                | 2.00  |
| 125x50                       | 3.20                            | 8.26                 | 10.53                                  | 198.00                                              | 46.70  | 31.60                                    | 18.70  | 4.33                                | 2.11  |
|                              | 4.00                            | 10.20                | 12.95                                  | 238.00                                              | 55.60  | 38.00                                    | 22.00  | 4.28                                | 2.07  |
|                              | 4.50                            | 11.30                | 14.42                                  | 261.00                                              | 60.60  | 41.70                                    | 24.20  | 4.25                                | 2.05  |
| 125x75                       | 3.20                            | 9.52                 | 12.13                                  | 257.00                                              | 117.00 | 41.10                                    | 31.10  | 4.60                                | 3.10  |
|                              | 4.00                            | 11.70                | 14.95                                  | 311.00                                              | 141.00 | 49.70                                    | 37.50  | 4.56                                | 3.07  |
|                              | 4.50                            | 13.10                | 16.67                                  | 342.00                                              | 155.00 | 54.80                                    | 41.20  | 4.53                                | 3.04  |
| 150x80                       | 4.50                            | 15.20                | 19.37                                  | 563.00                                              | 211.00 | 75.00                                    | 52.90  | 5.39                                | 3.30  |
|                              | 6.00                            | 19.80                | 25.23                                  | 710.00                                              | 264.00 | 94.70                                    | 66.10  | 5.31                                | 3.24  |
| 150x100                      | 4.50                            | 16.60                | 21.17                                  | 658.00                                              | 352.00 | 87.70                                    | 70.40  | 5.58                                | 4.08  |
|                              | 6.00                            | 21.70                | 27.63                                  | 835.00                                              | 444.00 | 111.00                                   | 88.80  | 5.50                                | 4.01  |
| 200x100                      | 4.50                            | 20.10                | 25.67                                  | 1330.00                                             | 455.00 | 133.00                                   | 90.90  | 7.20                                | 4.21  |
|                              | 6.00                            | 26.40                | 33.63                                  | 1700.00                                             | 577.00 | 170.00                                   | 115.00 | 7.12                                | 4.14  |

# ท่อสี่เหลี่ยมจัตุรัส (Square Pipes)

STANDARD - TIS 107 : 2533



| STANDARD | CHEMICAL COMPOSITION |            |            |           |           | MECHANICAL PROPERTIES    |                            |                       |
|----------|----------------------|------------|------------|-----------|-----------|--------------------------|----------------------------|-----------------------|
|          | C<br>Max%            | Si<br>Max% | Mn<br>Max% | P<br>Max% | S<br>Max% | Yield<br>Strength<br>MPa | Tensile<br>Strength<br>MPa | Elongation<br>min (%) |
| HS 41    | 0.28                 | -          | -          | 0.048     | 0.048     | 235                      | 402                        | 23                    |
| HS 50    | 0.21                 | 0.57       | 1.53       | 0.048     | 0.048     | 314                      | 490                        | 23                    |

| Side<br>length<br>AxB<br>mm. | Wall<br>thickness<br>(t)<br>mm. | Unit<br>mass<br>kg/m | Informative reference                  |                                                     |          |                                          |         |                                     |       |
|------------------------------|---------------------------------|----------------------|----------------------------------------|-----------------------------------------------------|----------|------------------------------------------|---------|-------------------------------------|-------|
|                              |                                 |                      | Crossection<br>area<br>cm <sup>2</sup> | Geometrical<br>moment of inertia<br>cm <sup>4</sup> |          | Modulus<br>of section<br>cm <sup>3</sup> |         | Radius of<br>gyration of area<br>cm |       |
|                              |                                 |                      |                                        | Ix                                                  | Iy       | Zx                                       | Zy      | ix                                  | iy    |
| 25x25                        | 2.0                             | 1.36                 | 1.737                                  | 1.48                                                | 1.48     | 1.19                                     | 1.19    | 0.924                               | 0.924 |
|                              | 2.3                             | 1.53                 | 1.737                                  | 1.61                                                | 1.61     | 1.29                                     | 1.29    | 0.904                               | 0.904 |
| 32x32                        | 2.3                             | 2.04                 | 2.596                                  | 3.71                                                | 3.71     | 2.32                                     | 2.32    | 1.20                                | 1.20  |
|                              | 3.2                             | 2.69                 | 3.423                                  | 4.54                                                | 4.54     | 2.84                                     | 2.84    | 1.15                                | 1.15  |
| 38x38                        | 2.3                             | 2.47                 | 3.148                                  | 6.54                                                | 6.54     | 3.44                                     | 3.44    | 1.44                                | 1.44  |
|                              | 3.2                             | 3.29                 | 4.191                                  | 8.18                                                | 8.18     | 4.30                                     | 4.30    | 1.40                                | 1.40  |
| 50x50                        | 2.3                             | 3.34                 | 4.252                                  | 15.90                                               | 15.90    | 6.34                                     | 6.34    | 1.93                                | 1.93  |
|                              | 3.2                             | 4.50                 | 5.727                                  | 20.40                                               | 20.40    | 8.16                                     | 8.16    | 1.86                                | 1.86  |
| 60x60                        | 2.3                             | 4.06                 | 5.172                                  | 28.30                                               | 28.30    | 9.44                                     | 9.44    | 2.34                                | 2.34  |
|                              | 3.2                             | 5.50                 | 7.007                                  | 36.90                                               | 36.90    | 12.30                                    | 12.30   | 2.30                                | 2.30  |
|                              | 4.0                             | 6.71                 | 8.548                                  | 43.60                                               | 43.60    | 14.50                                    | 14.50   | 2.26                                | 2.26  |
| 75x75                        | 3.2                             | 7.01                 | 8.927                                  | 75.50                                               | 75.50    | 20.10                                    | 20.10   | 2.91                                | 2.91  |
|                              | 4.0                             | 8.59                 | 10.948                                 | 90.20                                               | 90.20    | 24.10                                    | 24.10   | 2.87                                | 2.87  |
| 90x90                        | 3.2                             | 8.51                 | 10.85                                  | 135.00                                              | 135.00   | 29.90                                    | 29.90   | 3.52                                | 3.52  |
|                              | 4.0                             | 10.48                | 13.35                                  | 162.00                                              | 162.00   | 36.00                                    | 36.00   | 3.48                                | 3.48  |
|                              | 4.5                             | 11.67                | 14.87                                  | 178.00                                              | 178.00   | 39.50                                    | 39.50   | 3.46                                | 3.46  |
| 100x100                      | 3.2                             | 9.52                 | 12.13                                  | 187.00                                              | 187.00   | 37.50                                    | 37.50   | 3.93                                | 3.93  |
|                              | 4.0                             | 11.70                | 14.95                                  | 226.00                                              | 226.00   | 45.30                                    | 45.30   | 3.89                                | 3.89  |
|                              | 4.5                             | 13.10                | 16.67                                  | 249.00                                              | 249.00   | 49.90                                    | 49.90   | 3.87                                | 3.87  |
| 150x150                      | 4.5                             | 20.10                | 25.67                                  | 896.00                                              | 896.00   | 120.00                                   | 120.00  | 5.91                                | 5.91  |
|                              | 6.0                             | 26.40                | 33.63                                  | 1150.00                                             | 1150.00  | 153.00                                   | 153.00  | 5.84                                | 5.84  |
| 175x175                      | 4.5                             | 23.70                | 30.17                                  | 1450.00                                             | 1450.00  | 166.00                                   | 166.00  | 6.93                                | 6.93  |
|                              | 6.0                             | 31.10                | 39.63                                  | 1860.00                                             | 1860.00  | 213.00                                   | 213.00  | 6.86                                | 6.86  |
| 200x200                      | 6.0                             | 35.80                | 45.63                                  | 2830.00                                             | 2830.00  | 283.00                                   | 283.00  | 7.88                                | 7.88  |
|                              | 8.0                             | 46.90                | 59.79                                  | 3620.00                                             | 3620.00  | 362.00                                   | 362.00  | 7.78                                | 7.78  |
|                              | 9.0                             | 52.30                | 66.67                                  | 3990.00                                             | 3990.00  | 399.00                                   | 399.00  | 7.73                                | 7.73  |
| 250x250                      | 6.0                             | 45.20                | 57.63                                  | 5670.00                                             | 5670.00  | 454.00                                   | 454.00  | 9.92                                | 9.92  |
|                              | 8.0                             | 59.20                | 75.79                                  | 7320.00                                             | 7320.00  | 585.00                                   | 585.00  | 9.82                                | 9.82  |
|                              | 9.0                             | 66.50                | 84.67                                  | 8090.00                                             | 8090.00  | 647.00                                   | 647.00  | 9.78                                | 9.78  |
| 300x300                      | 6.0                             | 54.70                | 69.63                                  | 9960.00                                             | 9960.00  | 664.00                                   | 664.00  | 12.00                               | 12.00 |
|                              | 9.0                             | 80.60                | 102.70                                 | 14300.00                                            | 14300.00 | 956.00                                   | 956.00  | 11.80                               | 11.80 |
|                              | 12.0                            | 106.00               | 134.50                                 | 18300.00                                            | 18300.00 | 1220.00                                  | 1220.00 | 11.70                               | 11.70 |
| 350x350                      | 9.0                             | 94.70                | 120.70                                 | 23200.00                                            | 23200.00 | 1320.00                                  | 1320.00 | 13.90                               | 13.90 |
|                              | 12.0                            | 124.00               | 158.50                                 | 29800.00                                            | 29800.00 | 1700.00                                  | 1700.00 | 13.70                               | 13.70 |



# เหล็กเส้น (Round Bars)

STANDARDS - TIS 1227 : 2539 / JIS G3192 : 1990 

| CHEMICAL COMPOSITION (%) |         |         |           |            |         |
|--------------------------|---------|---------|-----------|------------|---------|
| Grade                    | Carbon  | Silicon | Manganese | Phosphorus | Sulphur |
|                          | Max (%) | Max (%) | Max (%)   | Max (%)    | Max (%) |
| SR24                     | 0.280   | -       | -         | 0.058      | 0.058   |

| MECHANICAL PROPERTIES |                |                  |            |
|-----------------------|----------------|------------------|------------|
| Grade                 | Yield strength | Tensile strength | Elongation |
|                       | Min (MPa)      | Min (MPa)        | Min (%)    |
| SR24                  | 385            | 235              | 21         |

| NOMINAL SIZES AND UNIT WEIGHT |                |             |                 |
|-------------------------------|----------------|-------------|-----------------|
| Designation                   | Designation    | Unit Weight | Cross Sectional |
|                               | Diameter (mm.) | (kg./m.)    | mm <sup>2</sup> |
| RB 6                          | 6              | 0.222       | 28.30           |
| RB 8                          | 8              | 0.395       | 50.30           |
| RB 9                          | 9              | 0.499       | 63.60           |
| RB 12                         | 12             | 0.616       | 78.50           |
| RB 15                         | 15             | 0.888       | 113.10          |
| RB 19                         | 19             | 1.387       | 176.70          |
| RB 22                         | 22             | 2.226       | 283.50          |
| RB 25                         | 25             | 2.984       | 380.10          |

# เหล็กข้ออ้อย (Deformed Bars)

STANDARD - TIS 1227 : 2539 / JIS G3192 : 1990



| CHEMICAL COMPOSITION (%) |         |           |            |         |                      |
|--------------------------|---------|-----------|------------|---------|----------------------|
| Grade                    | Carbon  | Manganese | Phosphorus | Sulphur | Carbon+(Manganese/6) |
|                          | Max (%) | Max (%)   | Max (%)    | Max (%) | Max (%)              |
| SD 30                    | 0.27    | -         | 0.05       | 0.05    | 0.50                 |
| SD 40                    | -       | 1.85      | 0.05       | 0.05    | 0.55                 |
| SD 50                    | -       | 1.85      | 0.05       | 0.05    | 0.60                 |

| CHEMICAL COMPOSITION (%) |                |                  |            |
|--------------------------|----------------|------------------|------------|
| Grade                    | Yield strength | Tensile strength | Elongation |
|                          | Min (MPa)      | Min (MPa)        | Min (%)    |
| SD 30                    | 480            | 295              | 17         |
| SD 40                    | 560            | 390              | 15         |
| SD 50                    | 620            | 490              | 13         |

| NOMINAL SIZES AND UNIT WEIGHT |                |             |                 |
|-------------------------------|----------------|-------------|-----------------|
| Designation                   | Designation    | Unit Weight | Cross Sectional |
|                               | Diameter (mm.) | (kg./m.)    | mm <sup>2</sup> |
| DB 6                          | 6              | 0.222       | 28.30           |
| DB 8                          | 8              | 0.395       | 50.30           |
| DB 10                         | 10             | 0.616       | 78.50           |
| DB 12                         | 12             | 0.888       | 113.10          |
| DB 16                         | 16             | 1.578       | 201.10          |
| DB 20                         | 20             | 2.466       | 314.20          |
| DB 25                         | 25             | 3.853       | 380.10          |
| DB 28                         | 28             | 4.834       | 490.90          |
| DB 32                         | 32             | 6.313       | 804.20          |
| DB 36                         | 36             | 7.99        | 1017.90         |
| DB 40                         | 40             | 9.865       | 1256.60         |

สำนักงานกรุงเทพฯ

บริษัท รวมกิจ อินเตอร์เนชั่นแนล จำกัด  
138/27 อาคารเวลเลอร์ เซ็นเตอร์  
ชั้น 12C ถนนนเรศ แขวงสีพระยา  
เขตบางรัก กรุงเทพมหานคร 10500  
โทร. 0-2267-3365-76  
แฟกซ์. 0-2267-3248-9

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อำเภอบางพลี สมุทรปราการ 10540  
โทร. 0-2752-0389-92, 0-2752-0995-6  
แฟกซ์. 0-2752-0393, 0-2752-0997



คลังสินค้า บางบ่อ

55/5 หมู่ที่ 9 ตำบลเปิ้ง  
อำเภอบางบ่อ สมุทรปราการ 10560  
โทร. 0-2770-4900



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รถที่มารับ-ส่งสินค้าเมื่อเข้าซอยวัดกาหลงกรุณาขึ้นช้าๆ