Australian Government
Department of Industry, Science, Energy and Resources

Anti-Dumping Commission

# Response of Trader Questionnaire – LAVA Corporation –

**Case number:** AR 600

**Product:** Steel reinforcing bar

**From:** The Republic of Korea

**Accelerated Review period:** 1 January 2021 to 31 December 2021 (the period)

**Date of Submission:** 4 April 2022

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# CHECKLIST

This section is an aid to ensure that you have completed all sections of this questionnaire.

| **Section** | Please tick if you have responded to all questions |
|---|---|
| Section A<br>Company information | √ |
| Section B<br>Export sales to Australia | √ |
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| Section D<br>Third country sales | √ |
| Section E<br>Cost to sell | √ |
| Company Declaration | √ |
| Non-confidential version of this response | √ |

| **Attachments** | Please tick if you have provided spreadsheet |
|---|---|
| B-2 Australian sales | √ |
| B-4 Upwards sales | √ |
| B-5 Upwards selling expenses | √ |
| D-2 Third country sales | ☐ |
| E-3.1 SG&A listing | √ |
| E-3.2 SG&A calculation | √ |

# SECTION A
# COMPANY INFORMATION

## A-1 Company representative and location

1. Please nominate a contact person within your company:

| | |
|---|---|
| Name: | **Stefan Nam** |
| Position in the company: | **President** |
| Telephone: | **+82 2 3666 4345** |
| E-mail address: | **stefan.nam@lavacorp.co.kr** |

2. If you have appointed a representative, provide the their contact details:

**Not applicable. LAVA CORPORATION (hereafter 'LAVA') has not appointed a repsesentative.**

3. Please provide the location of the where the company's financial records are held.

**LAVA is located at B-1115, 152 Magokseo-ro, Gangseo-gu, Seoul, Korea.**

**LAVA manages its financial records [ ]**

**To make an entry in a ledger, LAVA [ ]**

**The financial records are located at [ ]**

4. Please provide the location of the where the company's production records are held.

**Not applicable. LAVA is a trading company.**

## A-2 Company information

1. What is the legal name of your business?

**The legal name is LAVA CORPORATION. LAVA was incorporated on November 12, 2015 under the Commercial Code of the Republic of Korea.**

2. Does your company trade under a different name and/or brand? If yes, provide details.

**Not applicable. LAVA does not trade under a different name and/or brand.**

3. Was your company ever known by a different legal and/or trading name? If yes, provide details

**Not applicable. LAVA was not known by a different legal and/or trading name.**

4. Provide a list of your current board of directors and any changes in the last two years.

**Stenfan Nam as the president of LAVA is only executive member of the board. There have been no changes in the last two years.**

5. Is your company part of a group (e.g. parent company with subsidiaries, common ownership, joint-ventures)? If yes, provide:

   (a) A diagram showing the complete ownership structure; and
   (b) A list of all related companies and its functions

**LAVA does not have any parent company and/or any subsidiary. LAVA is 100% owned by the president Stefan Nam.**

6. Is your company or parent company publically listed?
   If yes, please provide:

   (a) The stock exchange where it is listed; and
   (b) Any principle shareholders[1]

   If no, please provide:

   (a) A list of all principal shareholders and the shareholding percentages.

**LAVA does not have any parent company. LAVA has not been publically listed and 100% owned by the president Stefan Nam.**

7. What is the overall nature of your company's business? Include details of the products that your company manufacture and sell and the market your company sells into.

**LAVA ,as a trading company, has mainly exported [ ]**

8. If your business does not perform all of the following functions in relation to the goods under consideration, then please provide names and addresses of the companies which perform each function:
   (a) produce or manufacture;
   (b) sell in the domestic market;

[1] Principal shareholders are those who are able to cast, or control the casting of, 5% or more of the maximum amount of votes that could be cast at a general meeting of your company.

(c) export to Australia; and
(d) export to countries other than Australia.

**LAVA only performs a fuction (c) export to Australia in relation to GUC.**

**LAVA exports GUC that produced by [ ] to Australia during the period.**

**[ ]**

9. Provide your company's internal organisation chart.

**LAVA provides its internal organisation chart in Exhibit A-2.9**

10. Describe the functions performed by each group within the organisation.

**Not applicable. LAVA does not have any parent company and/or any subsidiary.**

11. Does your company produce brochures, pamphlets or other promotional material? If yes, please provide them.

**LAVA provides its company brochure in Exhibit A-2.11.**

## A-3 General accounting information

1. What is your financial accounting period?

**LAVA's accounting fiscal year is based on the calendar year, that is, January 1 to December 31.**

2. Are your financial accounts audited? If yes, who is the auditor?

**LAVA is not a company subject to external audit in accordance with Article 4 (Companies Subject to to External Audit) of Act on External Audit of Stock Companies.**

3. What currency are your accounts kept in?

**LAVA's accounts are kept in the Korean Won.**

4. What is the name of your financial accounting system?

**As described in A-1.3, LAVA manages [ ]**

5. What is the name of your sales system?

**LAVA, as a small trading company, [ ]**

6. What is the name of your production system?

**Not applicable. LAVA is a trading company.**

7. If your financial accounting, sales and production systems are different, how do the systems interact? Is it electronically or manual? Please provide a detailed explanation and include diagrams.

**Not applicable. [ ]**

8. Do your accounting practices differ in any way from the generally accepted accounting principles in your country? If yes, please provide details.

**LAVA's financial accounting practices are in accordance with the Korean Accounting Standards for small and medium-sized entities.**

9. Have there been any changes to your accounting practices and/or policies over the last two years? If yes, please provide details.

**There have been no changes in the last two years.**

## A-4 Financial documents

1. Please provide the two most recently completed annual reports and/or financial statements for your company and any other related companies involved in the production and sale of the goods.

**LAVA provides its financial statements covering the two most recent financial years in Exhibit A-4.1.**

2. If the financial statements in A-4.1 are unaudited, provide for each company:

   (a) the tax returns relating to the same period; and
   (b) reconciliation of the revenue, cost of goods sold, and net profit before tax between the financial statements and tax returns.

**LAVA provides its tax returns relating to the two most recent business years and the worksheets to show the linkage between financial statements and tax returns in Exhibit A-4.2.**

3. Does your company maintain different profit centres? If yes, provide profit & loss statements for the profit centre that the goods falls into for:

   (a) the most recent financial year; and

(b) the period.

**LAVA, as a small trading company, [ ]**

4. If the period is different to your financial period, please provide:

   (a) Income statements directly from your accounting information system covering the most recent financial period and the period; or
   (b) Quarterly or half yearly income statements directly from your accounting system covering the most recent financial period and the period.

**Not applicable. the period is the same as LAVA's financial period.**

5. Please provide a copy of your company's trial balance (in Excel) covering the period and the most recent financial year.

**LAVA provides its trial balance for the period in Exhibit A-4.5.**

6. Please provide your company's chart of accounts (in Excel).

**LAVA provides its chart of accounts in Exhibit A-4.6.**

*If any of the documents are not in English, please provide a complete translation of the documents.*

# SECTION B
# EXPORT SALES TO AUSTRALIA

## B-1 Australian export sales process

1. Provide details (and diagrams if appropriate) of the export sales process of your company and any entities (e.g. agents) including:

   (a) Marketing and advertising activities
   (b) Price determination and/or negotiation process
   (c) Order placement process
   (d) Order fulfilment process and lead time
   (e) Delivery terms and process
   (f) Invoicing process
   (g) Payment terms and process

**For Australian sales of the GUC, an Australian customer inquires for a purchase to LAVA. LAVA and the Australian customer negotiate the price and quantity through telephone or e-mail. After the negotiation, LAVA makes a sales contract with the Autralian customer.**

**LAVA places an order after negotiations with a manufacturer. According to the manufacturer's production schedule, the goods are produced under the order.**

**Once production is completed, the manufacturer ships the goods to the location according to a delivery term and issues commercial invoice and a zero VAT invoice to LAVA, which indicates that the sale is for export.**

**LAVA organises the shipping of the merchandise under a delivery term as agreed with the Australian customer and prepares shipping documents such as commercial invoice, packing list, etc. After that, LAVA issues them to the Australian customer.**

**Then, LAVA collects a payment from the Australian customer through [ ] and makes a payment to the manufacturer through [ ]**

**LAVA provides the diagram of sales process in Exhibit B-1.1.**

2. What is the function of your company in the export sales process for the goods? Is your company involved in the negotiation of prices to end customers?

**LAVA directly contacts to an Australian end customer and negotiates the price and quantity with the customer. Regarding the function which LAVA performs, please refer to response in Question B-1.1.**

3. In what currency do you invoice your customers for goods exported to Australia? If it is not in your local currency:

   (a) Do your customers pay you into a foreign currency denominated account? If yes, provide details;
   (b) Do you use forward contracts to lock in the foreign exchange rate relating to the export sales? If yes, provide details;
   (c) How is the exchange rate determined in your accounting system and how often is it updated?

**LAVA makes invoicing to the customer relating the exports to Australia in [ ] and the customer normally make payments in [ ].**

**[ ], this question is not applicable**

**LAVA manage its financial records [ ]**

4. Are there any customers of the goods exported to Australia related to your company? If yes, please provide a list of each related customer and provide details on how the selling price is set.

**Not applicable. LAVA does not have any related customer.**

5. If sales are in accordance with price lists or price extras list, provide copies of these lists.

**Prices are negotiated individually with a customer for each order.**

6. Do your export selling prices vary according to the distribution channel identified? If yes, provide details. Real differences in trade levels are characterised by consistent and distinct differences in functions and prices.

**Not applicable. [ ]**

7. Did you provide on-invoice discounts and/or off-invoice rebates to any customer or an associate of the customer in relation to the sale of the goods exported to Australia during the period? If yes, provide a description and explain the terms and conditions that must be met by the customer to obtain the discount.

**Not applicable. LAVA did not provide discounts and/or rebates to any customer or associate of the customer in relation to the sale of the GUC exported to Australia during the period.**

8. Did you issue any credit or debit notes (directly or indirectly) to the customer or associate of the customer in relation to the sale of the goods exported to Australia during the period? If yes, provide details of the credit/debit notes including the reasons the credit/debit notes were issued.

**Not applicable. LAVA did not issue any credit or debit notes to the customer or associate of the customer in relation the the sale of the GUC exported to Autralia during the period.**

9. The invoice date will normally be taken to be the date of sale. If you are making a claim that a different date should be taken as the date of sale:

   (a) What date are you claiming as the date of sale?
   (b) Why does this date best reflect the material terms of sale?

**LAVA reports the shipment date as date of sale which is the same with the invoice date in "B-2 Australian Sales".**

## B-2 Australian sales listing

1. Complete the worksheet named "**B-2 Australian sales**"

- This worksheet lists all sales (i.e. transaction by transaction) exported to Australia of the goods invoiced within the period. This includes exports to Australia sold through a domestic customer.
- If you have claimed in B-1.8 that the date of sale is one other than the invoice date, then add the sales within your claimed date of sale.
- You must provide this list in electronic format using the template provided.
- If you have used formulas to complete this worksheet, these formulas must be retained.
- If there are any direct selling expenses incurred in respect of the exports to Australia not listed in the spreadsheet, add a column. For example, if the delivery terms make you responsible for arrival of the goods at an agreed point within Australia (e.g. delivered duty paid), insert additional columns in the spreadsheet for all other costs incurred.

**LAVA provides the "B-2 Australian Sales" as instructed.**

2. Provide a table listing the source of the data for each column in the "B-2 Australian sales" listing.

**LAVA provides the worksheet named "B-2.2 source data for B-2 Australian sales".**

## B-3 Sample export documents

1. Select the two largest transactions and provide the following documentation (in relation to the purchase and sale):

- Contracts
- Purchase order and order confirmation
- Commercial invoice and packing list
- Proof of payment and accounts receivable ledger
- Documents showing bank charges
- Invoices for any selling fees incurred by your company
- Bill of lading
- Invoices for ocean freight and marine insurance (if applicable)

- Country of origin certificates (if applicable)

*If the documents are not in English, please provide a translation of the documents.*

**LAVA provides the supporting documents for two largest sample in export sales to Australia in Exhibit B-3.1.**

2. For each document, please annotate the documents or provide a table reconciling the details in the "B-2 Australian sales" listing to the source documents in B-2.2.

**LAVA provides the worksheets to show how it links to "B-2 Australian Sales" for two largest samples in Exhibit B-3.2.**

## B-4 Reconciliation of sales to financial accounts

1. Please complete the worksheet named "**B-4 Upwards sales**" to demonstrate that the sales listings in B-2 and D-2 are complete.

   - You must provide this list in electronic format using the template provided.
   - Please use the currency that your accounts are kept in.
   - If you have used formulas to complete this worksheet, these formulas must be retained.

   Sales Reconciliation

**LAVA provides the "B-4 Upwards sales" as instructed.**

2. Please provide all documents, other than those in A-4 and B-2, required to complete the "B-4 Upwards sales" worksheet. If the documents include spreadsheets, all formulas used must be retained.

**LAVA provides the documents to support "B-4 Upwards sales" in Exhibit B-4.2.**

3. For any amount in the "B-4 Upwards sales" worksheet that is hard coded (i.e. not a formula), please cross-reference by providing:

   - the name of the source document, including the relevant page number, in column D of the worksheet; <u>and</u>
   - highlight or annotate the amount shown in the source document.

**As described in "B-4 Upwards sales", LAVA used financial statements, sales accounting ledger, and commercial invoices, as sourcing data.**

## B-5 Reconciliation of direct selling expenses to financial accounts

1. Please complete the worksheet named "**B-5 Upwards selling expense**" to demonstrate that the direct selling expenses (e.g. Inland transport) in B-2 is complete.

   - You must provide this list in electronic format using the template provided.
   - Please use the currency that your accounts are kept in.
   - If you have used formulas to complete this worksheet, these formulas must be retained.

   **LAVA provides the worksheet named "B-5 Upwards selling expense".**

2. Please provide all documents, other than those in A-4 and B-2, required to complete the "B-5 Upwards selling expense" worksheet. If the documents include spreadsheets, all formulas used must be retained.

   **LAVA provides the supporting documents to show how it reports selling expenses in Exhibit B-5.2.**

3. For any amount in the "B-5 Upwards selling expense" worksheet that is hard coded (i.e. not a formula), please cross-reference by providing:

   - the name of the source document, including the relevant page number, in column C of the worksheet; and
   - highlight or annotate the amount shown in the source document.
   - provide the account code and sub-account code (if applicable) at column D of the worksheet.

   **As instructed, LAVA explains the source document and the account in each column of "B-5 Upwards Selling Expenses".**

# SECTION C
# EXPORTED GOODS AND LIKE GOODS

The commission considers the MCC structure in and of itself is not likely to be commercially sensitive information. Any claim that disclosing the MCC information is confidential or would adversely affect your business or commercial interests must be raised by lodging a submission as soon as practicable, but no later than the time this questionnaire is due.

## C-1 Models exported to Australia

1. Fully describe all of the goods your company exported to Australia during the period. Include specification details and any technical and illustrative material that may be helpful in identifying, or classifying, the goods exported to Australia.

**LAVA, as a trading company, exported rebar in coil form to Australia during the period. Regarding exports of GUC to Australia, LAVA followed the Australia/Newzaland standard [ ].**

2. Provide a list of MCCs of the goods exported to Australia. This must cover all MCCs listed in the Australian sales listing in B-2.

- This list must be disclosed in the public record version of the response.

**LAVA has only one MCC, P-C-C-B-C-N of the goods exported Australia.**

## C-2 Internal product codes

1. Does your company use product codes or stock keeping unit (SKU) codes?

If yes:

(a) Provide details of the product or SKU coding system for the goods, such as a legend or key of the meaning for each code within the product or SKU code.
(b) Provide details on how you mapped the product or SKU codes to the MCC for the purpose of completing this questionnaire.
(c) Provide a table of showing the product or SKU codes for each MCC.

If no:
(a) Provide details on the method used to identify the MCC in the sales and cost spreadsheets.

**[ ]**

**LAVA identified the MCC by using product description on invoices.**

## C-3 Delivery

1. What are the delivery terms of export sales of the goods to Australia?

**During the period, LAVA's Australian sales were made in [ ]**

2. If the delivery terms of the Australian sales include delivery to the port, how were the inland transport and port charges calculated in the Australian sales listing in B-2?

**LAVA was not responsible for [ ]. But, LAVA paid for [ ]**

**Regarding the calculation methodology, LAVA divided total amount on the invoice for expenses by total quantity on the invoice for expenses, multiplied that unit expense by reported sales quantity.**

3. If the delivery terms of the Australian sales include ocean freight, how was the ocean freight cost calculated in the Australian sales listing in B-2?

**The ocean freight is incurred on a B/L No. basis. Thus, LAVA divided the ocean freight by total quantity on a B/L, multiplied that unit ocean freight by reported sales quantity.**

4. If the delivery terms of the Australian sales include marine insurance, how was the marine insurance calculated in the Australian sales listing in B-2?

**Not applicable. The marine insurance was covered [ ]**

5. If the delivery terms of the Australian sales include delivered duty paid, how were the Australian importation and delivery costs calculated in the Australian sales listing in B-2?

**Not applicable. Delivery terms of Australian sales [ ]**

## C-4 Direct selling expenses

1. Describe all costs that are incurred post by your company in relation to the sales of the goods (export or import costs);

**LAVA was not responsible for [ ]**

**LAVA reports direct selling expenses described below;**

- [ ]
- [ ]
- [ ]
- [ ]
- [ ]
- [ ]

- [ ]
- [ ]
- [ ]

**Meanwhile, [ ]**

**Regarding [ ] in "B-2 Australian sales". Because [ ]**

**Also, [ ] was incurred, when LAVA collected a payment though [ ].**

**LAVA reports [ ] of "B-2 Australian sales".**

2. Are there any other direct selling expenses incurred by your company in relation to export sales of the goods to Australia? These direct selling expenses must be included in the reconciliation of direct selling expenses in B-5; and

**Reported all direct selling expenses [ ] are included in "B-5 Upwards Selling Expense Reconciliation".**

3. For any costs incurred, describe whether the company is reimbursed for these expenses.

**All direct selling expenses [ ]**

# SECTION D
# THIRD COUNTRY SALES

## D-1 Third country sales process

1. Are your sales processes to any third country (i.e. exports to countries other than Australia) different to the sales process described in B-1.1? If yes, provide details of the differences.

| |
|---|
| **Not applicable.** [ ] |

2. Are there any third country customers related to your company? If yes, please provide a list of each related customer and provide details on how the selling price is set.

| |
|---|
| **Not applicable.** [ ] |

3. The invoice date will normally be taken to be the date of sale. If you are making a claim that a different date should be taken as the date of sale:
   (a) What date are you claiming as the date of sale?
   (b) Why does this date best reflects the material terms of sale?

| |
|---|
| **Not applicable.** [ ] |

## D-2 Third country sales listing

1. Complete the worksheet named "**D-2 Third country sales**"
   - This worksheet lists all export sales, summarised by country and customer, to third countries of like goods invoiced within the period.
   - If you have claimed in D-1.3 that the date of sale is one other than the invoice date, then add sales with your claimed date of sale.
   - You must provide this list in electronic format using the template provided.
   - If you have used formulas to complete this worksheet, these formulas must be retained.

| |
|---|
| **Not applicable.** [ ] |

## D-3 Differences in sales to third countries

1. Are there any differences in sales to third countries which may affect their comparison to export sales to Australia? If yes, provide details.

| |
|---|
| **Not applicable.** [ ] |

# SECTION E
# COST TO SELL

## E-1 Purchase process from suppliers

1. Please describe your company's purchasing processes from your suppliers of the goods, including the roles of all parties involved in the ordering of the goods from your suppliers.

**LAVA places an order after negotiations with a manufacturer and makes sales contract. According to the manufacturer's production schedule, the goods are produced under the order.**

**Once production is completed, the manufacturer ships the goods to the location according to a delivery term and issues commercial invoice and a zero VAT invoice to LAVA, which indicates that the sale is for export.**

**Then, LAVA makes a payment to the manufacturer through [ ]**

2. For each supplier from who supplied the goods during the investigation period, please list:
   a. The name of the supplier;
   b. Is the supplier the manufacturer of the goods: Yes/No;
   c. Is the supplier related to your company? If yes, provide details including the product or services supplied by the related company.

**During the period, LAVA purchased GUC from [ ] which is the unrelated manufacturer.**

3. What terms of trade are provided to you by your suppliers, including:
   (a) shipping terms
   (b) any credit terms provided; and/or
   (c) financing arrangements made.

**The supplier sold GUC to LAVA in [ ] terms.**

**LAVA make payments to the supplier through [ ].**

**LAVA [ ] financing arrangement with the supplier.**

4. Are there any rebate programs and discounts received from your suppliers and how are they determined and paid, including any relevant eligibility requirements; and

**Not applicable. [ ]**

5. Describe all costs incurred by your company in relation to the exports of the goods (e.g. selling expenses, importation costs).

**As explained in C-4.1, LAVA reports [ ] in [ ] of "B-2 Australian sales".**

## E-2 Accounting practices

1. Do you have different cost centres in your company's cost accounting system? If yes, list the cost centres, provide a description of each cost centre and the allocation methodology used in your accounting system.

**LAVA, as a small trading company, does not maintain cost centres.**

2. Are any management fees/corporate allocations charged to your company by your parent or a related company? If yes, provide details.

**Not applicable. LAVA does not have any parent company and/or any subsidiary.**

## E-3 Selling, General & Administration expenses

1. Complete the worksheet named "**E-3.1 SG&A listing**".
   - This worksheet lists all selling, general and administration expenses by account code for the most recent accounting period and the period.
   - You must provide this list in electronic format using the template provided.
   - If you have used formulas to complete this worksheet, these formulas must be retained.

**LAVA provides the worksheet named "E-3.1 SG&A listing" as instructed.**

2. Complete the worksheet named "**E-3.2 Domestic SG&A calculation**".
   - This worksheet calculates the unit domestic SG&A for each MCC.
   - You must provide this list in electronic format using the template provided.
   - Please use the formulas provided.

**LAVA provides the worksheet named "E-3.2 SG&A calculation".**

**LAVA understands that "E-3.2 SG&A calculation" is related to "B-2 Australian sales", not domestic sales, as instructed in "AR 600 Trader questionnaire - LAVA Corporation (spreadsheet)".**

PUBLIC RECORD

# COMPANY DECLARATION

I hereby declare that LAVA CORPORATION have completed the attached questionnaire and, having made due inquiry, certify that the information contained in this submission is complete and correct to the best of my knowledge and belief.

**Name** : **Stefan Nam**

**Signature** : 남 종 현.

**Position in Company** : President

**Date** : **4 April 2022**

# List of Attachments and Exhibits

| Section | Attachment or Exhibit No. | Name of Contents | Format | Confidential/ or Non-Confidential |
|---|---|---|---|---|
| Section A | Exhibit A-2.9. | Internal Organisation Chart | PDF | Confidential |
| Section A | Exhibit A-2.11. | Company Brochure | PDF | Non-Confidential |
| Section A | Exhibit A-4.1. (1) | Financial Statements (in Korean) | PDF | Confidential |
| Section A | Exhibit A-4.1. (2) | Financial Statements (in English) | PDF | Confidential |
| Section A | Exhibit A-4.2. (1) | 2021 Tax Return | PDF | Confidential |
| Section A | Exhibit A-4.2. (2) | 2020 Tax Return | PDF | Confidential |
| Section A | Exhibit A-4.2. (3) | Reconciliation between Financial Statements and Tax Returns | PDF | Confidential |
| Section A | Exhibit A-4.5. (1) | 2021 Trial Balance (in Korean) | Excel | Confidential |
| Section A | Exhibit A-4.5. (2) | 2021 Trial Balance (in English) | Excel | Confidential |
| Section A | Exhibit A-4.6. | Chart of Accounts | Excel | Confidential |
| Section B | Exhibit B-1.1. | Sales Process for Exports to Australia | PDF | Confidential |
| Section B | Attachment B-2 | Australian Sales | Excel | Confidential |
| Section B | Attachment B-2.2 | Source Data for B-2 Australia Sales | Excel | Confidential |
| Section B | Exhibit B-3.1. (1) | The Two Largest Samples of Export Sales to Australia -Sample 1 | PDF | Confidential |
| Section B | Exhibit B-3.1. (2) | The Two Largest Samples of Export Sales to Australia -Sample 2 | PDF | Confidential |
| Section B | Exhibit B-3.2. | Linkage of Samples to B-2 Australia Sales | PDF | Confidential |
| Section B | Attachment B-4 | Upwards Sales | Excel | Confidential |
| Section B | Exhibit B-4.2. | Upwards Sales Reconciliation | PDF | Confidential |
| Section B | Attachment B-5 | Upward Selling Expenses | Excel | Confidential |
| Section B | Exhibit B-5.2. | Reconciliation of Direct Selling Expense | PDF | Confidential |
| Section E | Attachment E-3.1. | SG&A Listing | Excel | Confidential |
| Section E | Attachment E-3.2. | SG&A Calculation | Excel | Confidential |

PUBLIC RECORD

# Exhibit A-2.9
# Internal Organisation Chart

# Internal Organisation Chart

**LAVA Corporation**

(As of December 31, 2021)

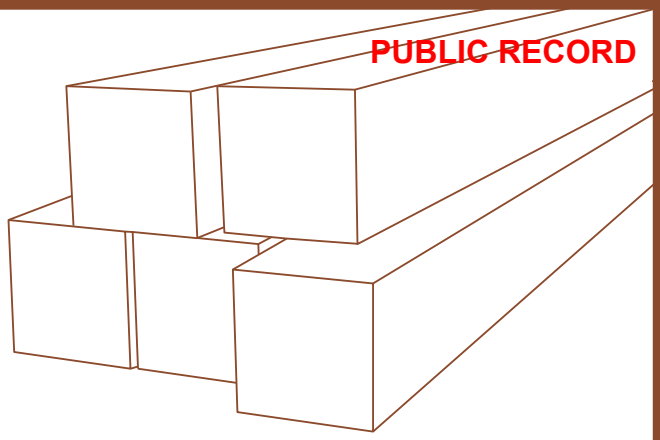
***Non-Confidential Rationale***

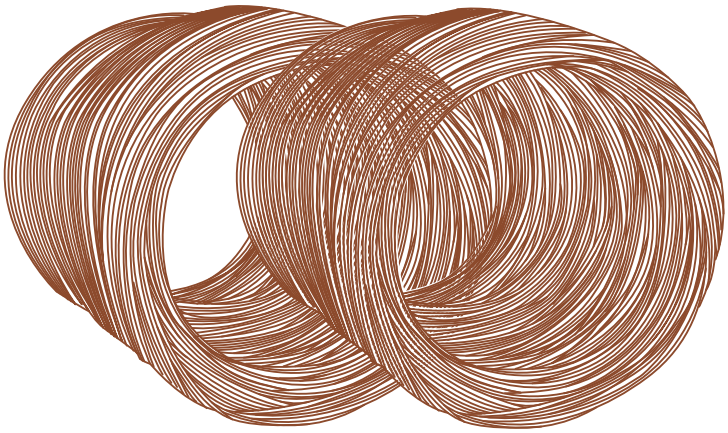
***The CONFIDENTIAL document(s) contain commercially sensitive confidential business. We request that this information be treated as strictly confidential, as it would be harmful to LAVA CORPORATION and/or its members if it were disclosed or otherwise made available to the competitors of same.***
***As such, the contents of this exhibit are not included in the public record (non-confidential).***

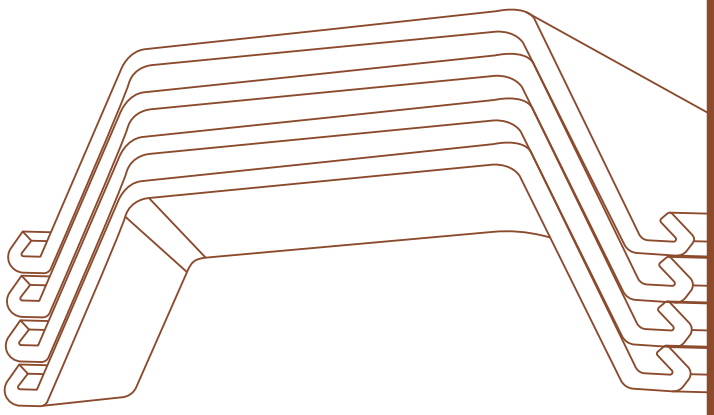
PUBLIC RECORD

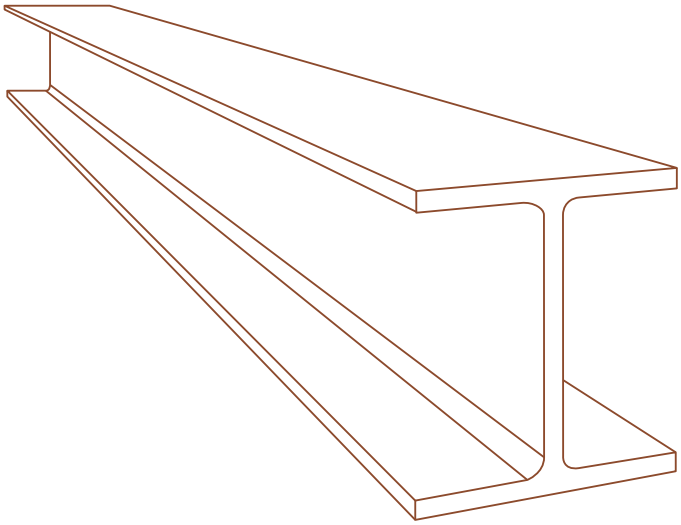
# Exhibit A-2.11
# Company Brochure

PUBLIC RECORD



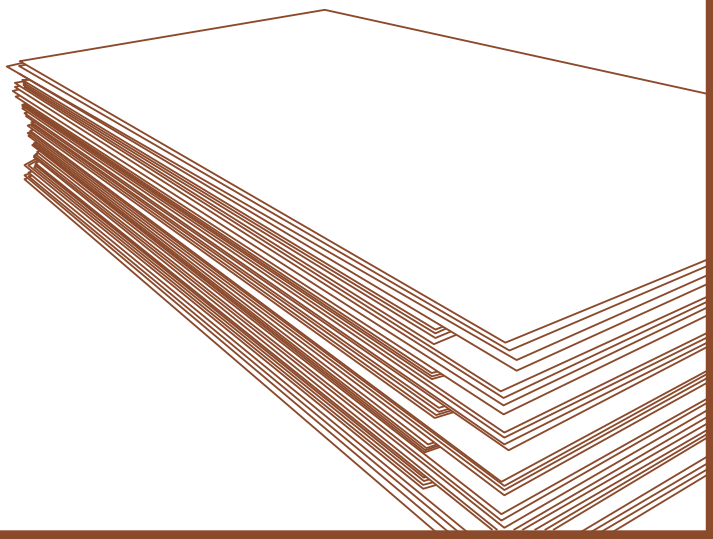






# LAVA

# COMPANY CATALOGUE



PUBLIC RECORD

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PUBLIC RECORD

# LAVA

PUBLIC RECORD

# “STEEL IS EVERYTHING”

Connecting the dots is a key business objective for LAVA in respect of its customer support ethos.

LAVA Corporation is based in Seoul, Korea, and is dedicated and capable of supporting your needs to find suitable buyers and suppliers of steel products within the Republic of Korea.

A timely and appropriate response is the most important element to starting a new business opportunity and options when working in South Korea. So all LAVA Corporation staff are dedicated to supporting your objectives. We see all challenges as opportunities for successful collaboration.

We are ready to work with you to secure your business objectives and help you transition beyond the barriers of cultural and language differences.

Let's start talking!

Yours sincerely
President

Mr. Stefan Nam

PUBLIC RECORD

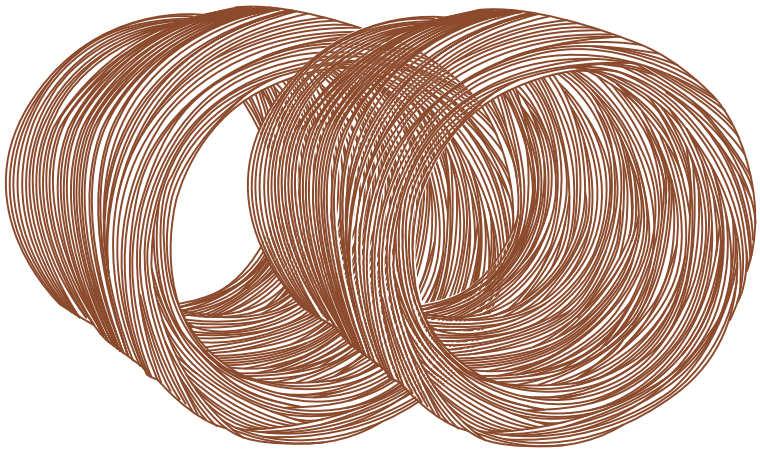
manufacturer

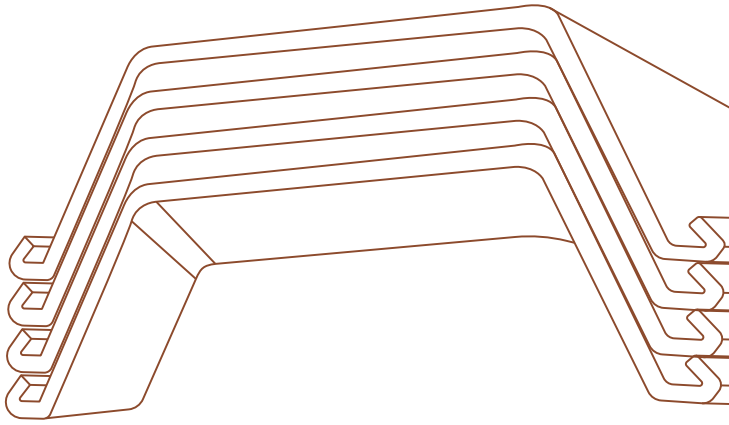
HYUNDAI STEEL

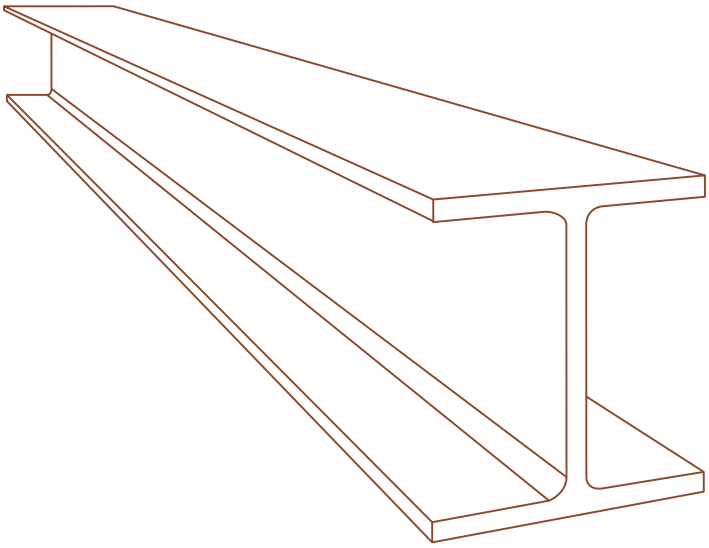
SěAH CSS

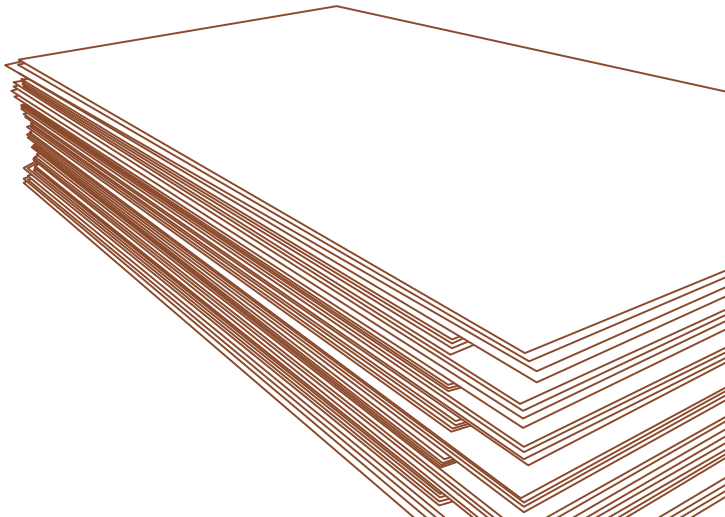
KOSCO
KOREA STEEL SHAPES CO., LTD.

posco









PUBLIC RECORD

# Steel solution provider

**LAVA Corporation is able to provide a value added services beyond a trading house.**

- Visual inspection at load port prior to vessel departure.
- Formula pricing based on LME SCRAP settlement.
- Service provider including notching/cutting/galvanising/slitting etc.
- Financial support by open account based on credit insurance

## Visual Inspection

LAVA do a visual inspection for the parcel up on request of customer.

PRODUCTION COMPLETE

VISIT LOAD PORT

INSPECTION

SAIL OUT

## Formula pricing

Based on Turkish scrap buying price, reported by world reputed Platts and LME Metal exchange, LAVA is able to fix the contract price for min 3 months to 12 months.
When market price drops comparing to the time of contract made, then LAVA will pay it back to customer as per LME Metal exchange settlement price.

CONTRACT SIGN

LME PRICE FIX

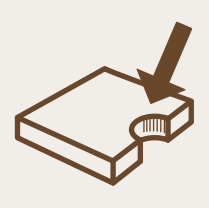
CLEARING

PROFIT/LOSS ASSESSMENT

PUBLIC RECORD

## Service provider

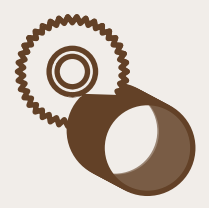
Steel product usually need to be processed. With quality processing partuer, we are able to provide



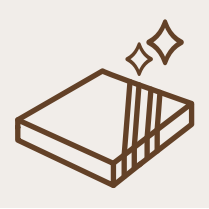
NOTCHING

CUTTING

GALVANISING



SLITTING



PRIMER COATING

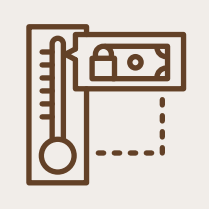
## Financial support

LAVA is able to provide open account or deferred payment term such as (D/A or D/P) against bill of lading

CUSTOMER SURVEY

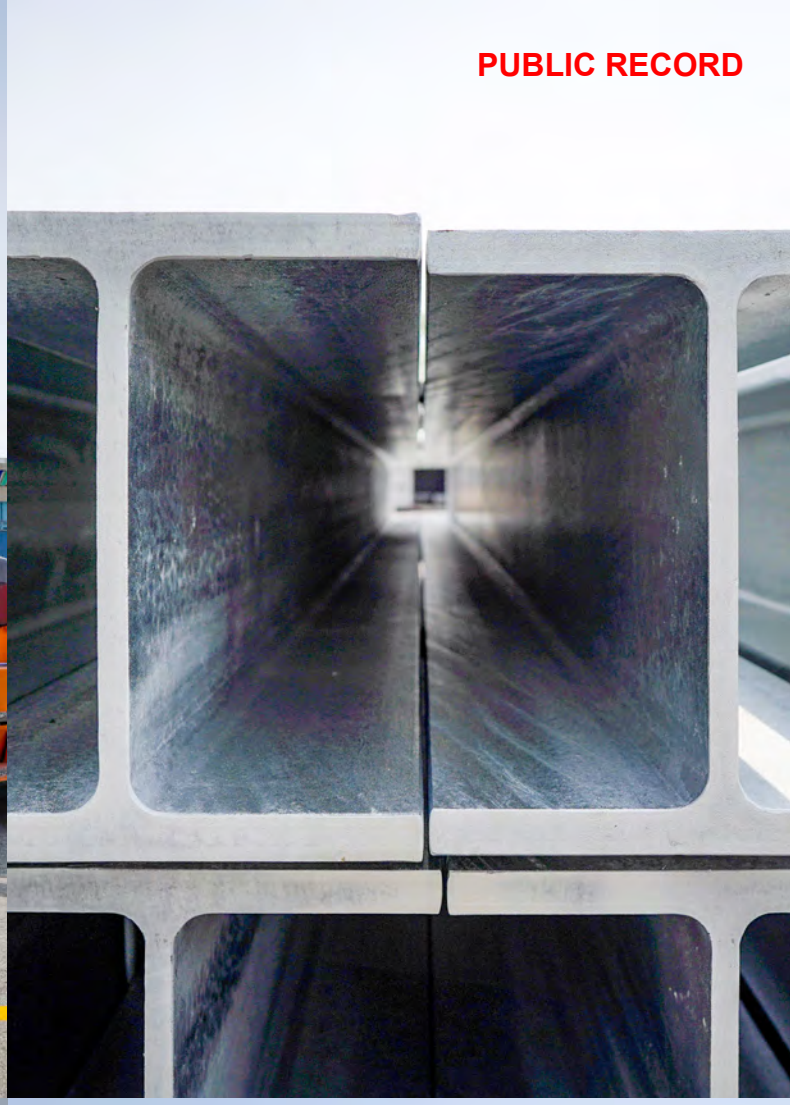
CREDIT INSURANCE REVIEW

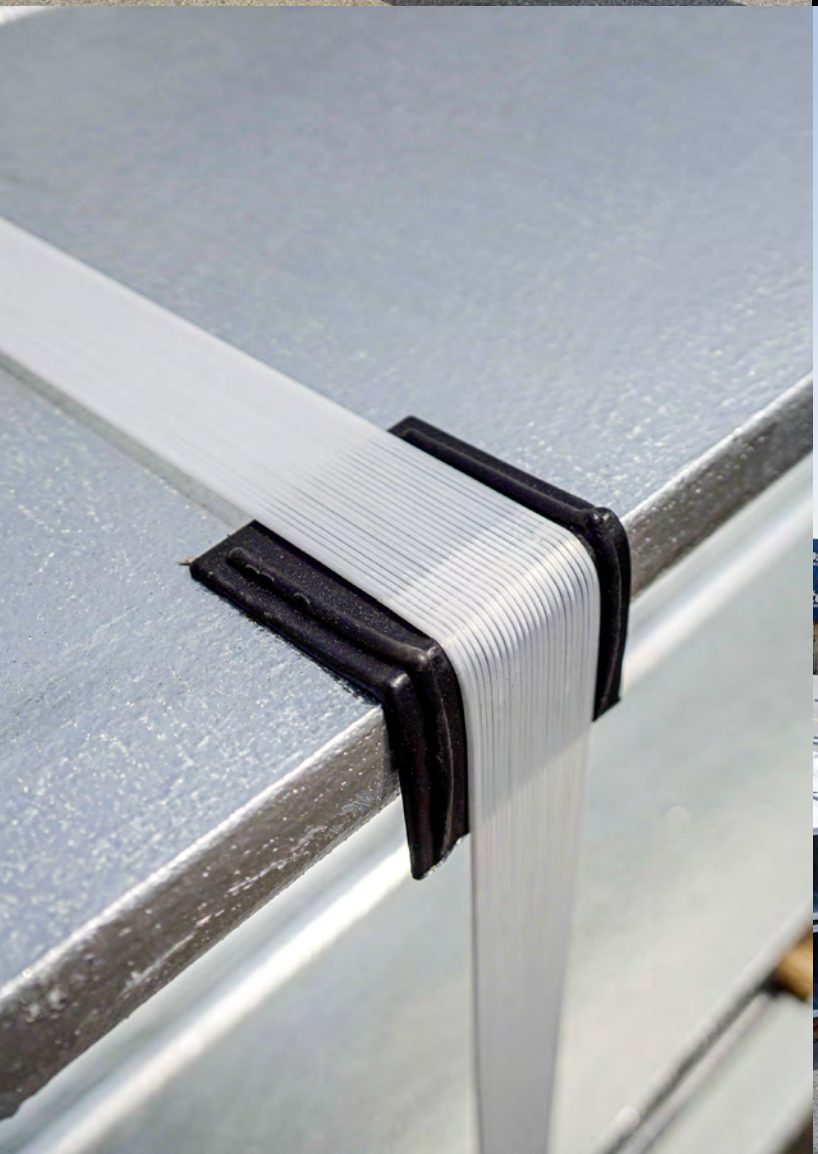
RATING CUSTOMER CREDIT



CREDIT LINE APPROVED

PUBLIC RECORD





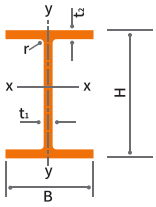
PUBLIC RECORD

# PRODUCT DETAIL

PUBLIC RECORD

# 01. H– BEAM

## Dimensions and Sectional Properties




### (1) Metric Series - KS, JIS '90

| Division (depth x width) | Unit Weight (kg/m) | Standard Sectional Dimension (mm) | | | | | Sectional Area ($cm^2$) | Moment of Inertia ($cm^4$) | |
|---|---|---|---|---|---|---|---|---|---|
| | W | H | B | $t_1$ | $t_2$ | r | A | Ix | Iy |
| 100 × 100 | 17.2 | 100 | 100 | 6 | 8 | 10 | 21.90 | 383 | 134 |
| 125 × 125 | 23.8 | 125 | 125 | 6.5 | 9 | 10 | 30.31 | 847 | 293 |
| 150 × 75 | 14.0 | 150 | 75 | 5 | 7 | 8 | 17.85 | 666 | 49.5 |
| 150 × 100 | 21.1 | 148 | 100 | 6 | 9 | 11 | 26.84 | 1,020 | 151 |
| 150 × 150 | 31.5 | 150 | 150 | 7 | 10 | 11 | 40.14 | 1,640 | 563 |
| 200 × 100 | 18.2 | 198 | 99 | 4.5 | 7 | 11 | 23.18 | 1,580 | 114 |
| | 21.3 | 200 | 100 | 5.5 | 8 | 11 | 27.16 | 1,840 | 134 |
| 200 × 150 | 30.6 | 194 | 150 | 6 | 9 | 13 | 39.01 | 2,690 | 507 |
| 200 × 200 | 49.9 | 200 | 200 | 8 | 12 | 13 | 63.53 | 4,720 | 1,600 |
| | 56.2 | 200 | 204 | 12 | 12 | 13 | 71.53 | 4,980 | 1,700 |
| | 65.7 | 208 | 202 | 10 | 16 | 13 | 83.69 | 6,530 | 2,200 |
| 250 × 125 | 25.7 | 248 | 124 | 5 | 8 | 12 | 32.68 | 3,540 | 255 |
| | 29.6 | 250 | 125 | 6 | 9 | 12 | 37.66 | 4,050 | 294 |
| 250 × 175 | 44.1 | 244 | 175 | 7 | 11 | 16 | 56.24 | 6,120 | 985 |
| 250 × 250 | 64.4 | 244 | 252 | 11 | 11 | 16 | 82.06 | 8,790 | 2,940 |
| | 66.5 | 248 | 249 | 8 | 13 | 16 | 84.70 | 9,930 | 3,350 |
| | 72.4 | 250 | 250 | 9 | 14 | 16 | 92.18 | 10,800 | 3,650 |
| | 82.2 | 250 | 255 | 14 | 14 | 16 | 104.7 | 11,500 | 3,880 |
| 300 × 150 | 32.0 | 298 | 149 | 5.5 | 8 | 13 | 40.80 | 6,320 | 442 |
| | 36.7 | 300 | 150 | 6.5 | 9 | 13 | 46.78 | 7,210 | 508 |
| 300 × 200 | 56.8 | 294 | 200 | 8 | 12 | 18 | 72.38 | 11,300 | 1,600 |
| | 65.4 | 298 | 201 | 9 | 14 | 18 | 83.36 | 13,300 | 1,900 |
| 300 × 300 | 84.5 | 294 | 302 | 12 | 12 | 18 | 107.7 | 16,900 | 5,520 |
| | 87.0 | 298 | 299 | 9 | 14 | 18 | 110.8 | 18,800 | 6,240 |
| | 94.0 | 300 | 300 | 10 | 15 | 18 | 119.8 | 20,400 | 6,750 |
| | 106 | 300 | 305 | 15 | 15 | 18 | 134.8 | 21,500 | 7,100 |
| | 106 | 304 | 301 | 11 | 17 | 18 | 134.8 | 23,400 | 7,730 |
| | 130 | 310 | 305 | 15 | 20 | 18 | 165.3 | 28,600 | 9,470 |
| | 142 | 310 | 310 | 20 | 20 | 18 | 180.8 | 29,900 | 10,000 |

PUBLIC RECORD



Dimension : KS D 3502:2016 JIS G 3192:1990
Dimensional Tolerance : KS D 3502:2016 JIS G 3192:1990
Surface Condition : KS D 3502:2016 JIS G 3192:1990

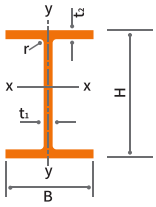
M

| Radius of Gyration (cm) | | Modulus of Section ($cm^3$) | | Plastic Modulus ($cm^3$) | | Warping Constant ($cm^6$,x$10^3$) | Torsional Constant ($cm^4$) | Division (depth x width) |
|---|---|---|---|---|---|---|---|---|
| ix | iy | Sx | Sy | Zx | Zy | Cw | J | |
| 4.18 | 2.47 | 76.5 | 26.7 | 87.6 | 41.2 | 2.83 | 5.17 | 100 × 100 |
| 5.29 | 3.11 | 136 | 46.9 | 154 | 71.9 | 9.87 | 8.43 | 125 × 125 |
| 6.11 | 1.66 | 88.8 | 13.2 | 102 | 20.8 | 2.53 | 2.81 | 150 × 75 |
| 6.17 | 2.37 | 138 | 30.1 | 157 | 46.7 | 7.28 | 7.37 | 150 × 100 |
| 6.39 | 3.75 | 219 | 75.1 | 246 | 115 | 27.6 | 13.5 | 150 × 150 |
| 8.26 | 2.21 | 160 | 23.0 | 180 | 35.7 | 10.4 | 3.86 | 200 × 100 |
| 8.24 | 2.22 | 184 | 26.8 | 209 | 41.9 | 12.3 | 5.77 | |
| 8.30 | 3.61 | 277 | 67.6 | 309 | 104 | 43.4 | 10.9 | 200 × 150 |
| 8.62 | 5.02 | 472 | 160 | 525 | 244 | 142 | 29.8 | 200 × 200 |
| 8.35 | 4.88 | 498 | 167 | 565 | 257 | 150 | 39.6 | |
| 8.83 | 5.13 | 628 | 218 | 710 | 332 | 203 | 66.7 | |
| 10.4 | 2.79 | 285 | 41.1 | 319 | 63.6 | 36.7 | 6.74 | 250 × 125 |
| 10.4 | 2.79 | 324 | 47.0 | 366 | 73.1 | 42.7 | 9.68 | |
| 10.4 | 4.18 | 502 | 113 | 558 | 173 | 134 | 23.2 | 250 × 175 |
| 10.3 | 5.98 | 720 | 233 | 805 | 358 | 399 | 39.5 | 250 × 250 |
| 10.8 | 6.29 | 801 | 269 | 883 | 408 | 462 | 46.7 | |
| 10.8 | 6.29 | 867 | 292 | 960 | 444 | 508 | 58.7 | |
| 10.5 | 6.09 | 919 | 304 | 1,040 | 468 | 540 | 79.0 | |
| 12.4 | 3.29 | 424 | 59.3 | 475 | 91.8 | 92.9 | 8.65 | 300 × 150 |
| 12.4 | 3.29 | 481 | 67.7 | 542 | 105 | 107 | 12.4 | |
| 12.5 | 4.71 | 771 | 160 | 859 | 247 | 319 | 35.8 | 300 × 200 |
| 12.6 | 4.77 | 893 | 189 | 1,000 | 291 | 383 | 53.4 | |
| 12.5 | 7.16 | 1,150 | 365 | 1,280 | 560 | 1,097 | 61.4 | 300 × 300 |
| 13.0 | 7.50 | 1,270 | 417 | 1,390 | 634 | 1,258 | 71.3 | |
| 13.1 | 7.51 | 1,360 | 450 | 1,500 | 684 | 1,372 | 88.1 | |
| 12.6 | 7.26 | 1,440 | 466 | 1,610 | 716 | 1,443 | 116 | |
| 13.2 | 7.57 | 1,540 | 514 | 1,710 | 781 | 1,592 | 125 | |
| 13.2 | 7.57 | 1,850 | 621 | 2,080 | 949 | 1,991 | 215 | |
| 12.9 | 7.44 | 1,930 | 645 | 2,200 | 992 | 2,093 | 271 | |

PUBLIC RECORD

# 01. H– BEAM

## Dimensions and Sectional Properties




### (1) Metric Series - KS, JIS '90

| Division (depth x width) | Unit Weight (kg/m) | Standard Sectional Dimension (mm) | | | | | Sectional Area ($cm^2$) | Moment of Inertia ($cm^4$) | |
|---|---|---|---|---|---|---|---|---|---|
| | W | H | B | $t_1$ | $t_2$ | r | A | Ix | Iy |
| 350 × 175 | 41.4 | 346 | 174 | 6 | 9 | 14 | 52.68 | 11,100 | 792 |
| | 49.6 | 350 | 175 | 7 | 11 | 14 | 63.14 | 13,600 | 984 |
| | 57.8 | 354 | 176 | 8 | 13 | 14 | 73.68 | 16,100 | 1,180 |
| 350 × 250 | 69.2 | 336 | 249 | 8 | 12 | 20 | 88.15 | 18,500 | 3,090 |
| | 79.7 | 340 | 250 | 9 | 14 | 20 | 101.5 | 21,700 | 3,650 |
| 350 × 350 | 106 | 338 | 351 | 13 | 13 | 20 | 135.3 | 28,200 | 9,380 |
| | 115 | 344 | 348 | 10 | 16 | 20 | 146.0 | 33,300 | 11,200 |
| | 131 | 344 | 354 | 16 | 16 | 20 | 166.6 | 35,300 | 11,800 |
| | 137 | 350 | 350 | 12 | 19 | 20 | 173.9 | 40,300 | 13,600 |
| | 156 | 350 | 357 | 19 | 19 | 20 | 198.4 | 42,800 | 14,400 |
| 400 × 200 | 56.6 | 396 | 199 | 7 | 11 | 16 | 72.16 | 20,000 | 1,450 |
| | 66.0 | 400 | 200 | 8 | 13 | 16 | 84.12 | 23,700 | 1,740 |
| | *75.5 | 404 | 201 | 9 | 15 | 16 | 96.16 | 27,500 | 2,030 |
| 400 × 300 | *94.3 | 386 | 299 | 9 | 14 | 22 | 120.1 | 33,700 | 6,240 |
| | 107 | 390 | 300 | 10 | 16 | 22 | 136.0 | 38,700 | 7,210 |
| 400 × 400 | 140 | 388 | 402 | 15 | 15 | 22 | 178.5 | 49,000 | 16,300 |
| | 147 | 394 | 398 | 11 | 18 | 22 | 186.8 | 56,100 | 18,900 |
| | 168 | 394 | 405 | 18 | 18 | 22 | 214.4 | 59,700 | 20,000 |
| | 172 | 400 | 400 | 13 | 21 | 22 | 218.7 | 66,600 | 22,400 |
| | 197 | 400 | 408 | 21 | 21 | 22 | 250.7 | 70,900 | 23,800 |
| | 200 | 406 | 403 | 16 | 24 | 22 | 254.9 | 78,000 | 26,200 |
| | 232 | 414 | 405 | 18 | 28 | 22 | 295.4 | 92,800 | 31,000 |
| | 283 | 428 | 407 | 20 | 35 | 22 | 360.7 | 119,000 | 39,400 |
| | 415 | 458 | 417 | 30 | 50 | 22 | 528.6 | 187,000 | 60,500 |
| | 605 | 498 | 432 | 45 | 70 | 22 | 770.1 | 298,000 | 94,400 |
| 450 × 200 | 66.2 | 446 | 199 | 8 | 12 | 18 | 84.30 | 28,700 | 1,580 |
| | 76.0 | 450 | 200 | 9 | 14 | 18 | 96.76 | 33,500 | 1,870 |
| 450 × 300 | 106 | 434 | 299 | 10 | 15 | 24 | 135.0 | 46,800 | 6,690 |
| | 124 | 440 | 300 | 11 | 18 | 24 | 157.4 | 56,100 | 8,110 |
| 500 × 200 | 79.5 | 496 | 199 | 9 | 14 | 20 | 101.3 | 41,900 | 1,840 |
| | 89.6 | 500 | 200 | 10 | 16 | 20 | 114.2 | 47,800 | 2,140 |
| | 103 | 506 | 201 | 11 | 19 | 20 | 131.3 | 56,500 | 2,580 |

PUBLIC RECORD



Dimension : KS D 3502:2016 JIS G 3192:1990
Dimensional Tolerance : KS D 3502:2016 JIS G 3192:1990
Surface Condition : KS D 3502:2016 JIS G 3192:1990

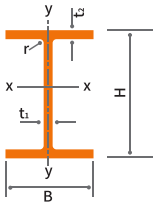
# M

| Radius of Gyration (cm) | | Modulus of Section ($cm^3$) | | Plastic Modulus ($cm^3$) | | Warping Constant ($cm^6$,x$10^3$) | Torsional Constant ($cm^4$) | Division (depth x width) |
|---|---|---|---|---|---|---|---|---|
| ix | iy | Sx | Sy | Zx | Zy | Cw | J | |
| 14.5 | 3.88 | 641 | 91,0 | 716 | 140 | 225 | 13.6 | 350 × 175 |
| 14.7 | 3.95 | 775 | 112 | 868 | 174 | 283 | 23.0 | |
| 14.8 | 4.01 | 909 | 135 | 1,020 | 208 | 344 | 36.1 | |
| 14.5 | 5.92 | 1,100 | 248 | 1,210 | 380 | 812 | 44.6 | 340 × 250 |
| 14.6 | 6.00 | 1,280 | 292 | 1,410 | 447 | 970 | 66.3 | |
| 14.4 | 8.33 | 1,670 | 534 | 1,850 | 818 | 2,477 | 90.3 | 350 × 350 |
| 15.1 | 8.78 | 1,940 | 646 | 2,120 | 980 | 3,024 | 121 | |
| 14.6 | 8.43 | 2,050 | 669 | 2,300 | 1,030 | 3,186 | 164 | |
| 15.2 | 8.84 | 2,300 | 777 | 2,550 | 1,180 | 3,721 | 199 | |
| 14.7 | 8.53 | 2,450 | 809 | 2,760 | 1,240 | 3,953 | 270 | |
| 16.7 | 4.48 | 1,010 | 145 | 1,130 | 224 | 536 | 27.1 | 400 × 200 |
| 16.8 | 4.54 | 1,190 | 174 | 1,330 | 268 | 650 | 42.2 | |
| 16.9 | 4.60 | 1,360 | 202 | 1,530 | 312 | 770 | 62.3 | |
| 16.7 | 7.21 | 1,750 | 418 | 1,920 | 637 | 2,160 | 79.9 | 400 × 300 |
| 16.9 | 7.28 | 1,980 | 481 | 2,190 | 733 | 2,521 | 114 | |
| 16.6 | 9.54 | 2,530 | 809 | 2,800 | 1,240 | 5,655 | 156 | 400 × 400 |
| 17.3 | 10.1 | 2,850 | 951 | 3,120 | 1,440 | 6,688 | 194 | |
| 16.7 | 9.65 | 3,030 | 985 | 3,390 | 1,510 | 7,053 | 264 | |
| 17.5 | 10.1 | 3,330 | 1,120 | 3,670 | 1,700 | 8,048 | 303 | |
| 16.8 | 9.75 | 3,540 | 1,170 | 3,990 | 1,790 | 8,550 | 415 | |
| 17.5 | 10.1 | 3,840 | 1,300 | 4,280 | 1,980 | 9,558 | 462 | |
| 17.7 | 10.2 | 4,480 | 1,530 | 5,030 | 2,330 | 11,557 | 714 | |
| 18.2 | 10.4 | 5,570 | 1,930 | 6,310 | 2,940 | 15,198 | 1,317 | |
| 18.8 | 10.7 | 8,170 | 2,900 | 9,540 | 4,440 | 25,188 | 3,885 | |
| 19.7 | 11.1 | 12,000 | 4,370 | 14,500 | 6,720 | 43,214 | 11,063 | |
| 18.5 | 4.33 | 1,290 | 159 | 1,450 | 247 | 744 | 38.3 | 450 × 200 |
| 18.6 | 4.40 | 1,490 | 187 | 1,680 | 291 | 890 | 56.9 | |
| 18.6 | 7.04 | 2,160 | 448 | 2,380 | 686 | 2,937 | 104 | 450 × 300 |
| 18.9 | 7.18 | 2,550 | 541 | 2,820 | 828 | 3,611 | 163 | |
| 20.3 | 4.27 | 1,690 | 185 | 1,910 | 290 | 1,072 | 60.8 | 500 × 200 |
| 20.5 | 4.33 | 1,910 | 214 | 2,180 | 335 | 1,254 | 85.9 | |
| 20.7 | 4.43 | 2,230 | 257 | 2,540 | 401 | 1,530 | 132 | |

PUBLIC RECORD

# 01. H– BEAM

## Dimensions and Sectional Properties




### (1) Metric Series - KS, JIS '90

| Division (depth x width) | Unit Weight (kg/m) | Standard Sectional Dimension (mm) | | | | | Sectional Area ($cm^2$) | Moment of Inertia ($cm^4$) | |
|---|---|---|---|---|---|---|---|---|---|
| | W | H | B | $t_1$ | $t_2$ | r | A | Ix | Iy |
| 500 × 300 | 114 | 482 | 300 | 11 | 15 | 26 | 145.5 | 60,400 | 6,760 |
| | 128 | 488 | 300 | 11 | 18 | 26 | 163.5 | 71,000 | 8,110 |
| 600 × 200 | 94.6 | 596 | 199 | 10 | 15 | 22 | 120.5 | 68,700 | 1,980 |
| | 106 | 600 | 200 | 11 | 17 | 22 | 134.4 | 77,600 | 2,280 |
| | 120 | 606 | 201 | 12 | 20 | 22 | 152.5 | 90,400 | 2,720 |
| | 134 | 612 | 202 | 13 | 23 | 22 | 170.7 | 103,000 | 3,180 |
| 600 × 300 | 137 | 582 | 300 | 12 | 17 | 28 | 174.5 | 103,000 | 7,670 |
| | 151 | 588 | 300 | 12 | 20 | 28 | 192.5 | 118,000 | 9,020 |
| | 175 | 594 | 302 | 14 | 23 | 28 | 222.4 | 137,000 | 10,600 |
| 700 × 300 | 166 | 692 | 300 | 13 | 20 | 28 | 211.5 | 172,000 | 9,020 |
| | 185 | 700 | 300 | 13 | 24 | 28 | 235.5 | 210,000 | 10,800 |
| | 215 | 708 | 302 | 15 | 28 | 28 | 273.6 | 237,000 | 12,900 |
| 800 × 300 | 191 | 792 | 300 | 14 | 22 | 28 | 243.4 | 254,000 | 9,930 |
| | 210 | 800 | 300 | 14 | 26 | 28 | 267.4 | 292,000 | 11,700 |
| | 241 | 808 | 302 | 16 | 30 | 28 | 307.6 | 339,000 | 13,800 |
| 900 × 300 | 213 | 890 | 299 | 15 | 23 | 28 | 270.9 | 345,000 | 10,300 |
| | 243 | 900 | 300 | 16 | 28 | 28 | 309.8 | 411,000 | 12,600 |
| | 286 | 912 | 302 | 18 | 34 | 28 | 364.0 | 498,000 | 15,700 |
| | 307 | 918 | 303 | 19 | 37 | 28 | 391.3 | 542,000 | 17,200 |

PUBLIC RECORD



Dimension : KS D 3502:2016 JIS G 3192:1990
Dimensional Tolerance : KS D 3502:2016 JIS G 3192:1990
Surface Condition : KS D 3502:2016 JIS G 3192:1990

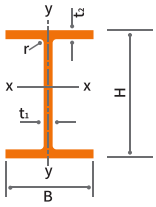
# M

| Radius of Gyration (cm) | | Modulus of Section ($cm^3$) | | Plastic Modulus ($cm^3$) | | Warping Constant ($cm^6$,x$10^3$) | Torsional Constant ($cm^4$) | Division (depth x width) |
|---|---|---|---|---|---|---|---|---|
| ix | iy | Sx | Sy | Zx | Zy | Cw | J | |
| 20.4 | 6.82 | 2,500 | 451 | 2,790 | 695 | 3,688 | 118 | 500 × 300 |
| 20.8 | 7.04 | 2,910 | 541 | 3,230 | 830 | 4,481 | 172 | |
| 23.9 | 4.05 | 2,310 | 199 | 2,650 | 315 | 1,671 | 82.4 | 600 × 200 |
| 24.0 | 4.12 | 2,590 | 228 | 2,980 | 361 | 1,936 | 113 | |
| 24.3 | 4.22 | 2,980 | 271 | 3,430 | 429 | 2,336 | 167 | |
| 24.6 | 4.31 | 3,380 | 314 | 3,890 | 498 | 2,755 | 237 | |
| 24.3 | 6.63 | 3,530 | 511 | 3,960 | 793 | 6,121 | 173 | 600 × 300 |
| 24.8 | 6.85 | 4,020 | 601 | 4,490 | 928 | 7,275 | 241 | |
| 24.9 | 6.90 | 4,620 | 701 | 5,200 | 1,080 | 8,628 | 356 | |
| 28.6 | 6.53 | 4,970 | 601 | 5,630 | 936 | 10,189 | 260 | 700 × 300 |
| 29.3 | 6.78 | 5,760 | 722 | 6,460 | 1,120 | 12,367 | 383 | |
| 29.4 | 6.86 | 6,700 | 853 | 7,560 | 1,320 | 14,897 | 588 | |
| 32.3 | 6.39 | 6,410 | 662 | 7,290 | 1,040 | 14,720 | 341 | 800 × 300 |
| 33.0 | 6.62 | 7,290 | 782 | 8,240 | 1,220 | 17,569 | 486 | |
| 33.2 | 6.70 | 8,400 | 915 | 9,530 | 1,430 | 20,902 | 726 | |
| 35.7 | 6.16 | 7,760 | 688 | 8,910 | 1,080 | 19,308 | 403 | 900 × 300 |
| 36.4 | 6.39 | 9,140 | 843 | 10,500 | 1,320 | 24,015 | 633 | |
| 37.0 | 6.56 | 10,900 | 1,040 | 12,500 | 1,630 | 30,169 | 1,050 | |
| 37.2 | 6.63 | 11,800 | 1,140 | 13,500 | 1,790 | 33,391 | 1,316 | |

PUBLIC RECORD

# 01. H– BEAM

## Dimensions and Sectional Properties




### (1) Metric Series - JIS '94, '08

| Division (depth x width) | Unit Weight (kg/m) | Standard Sectional Dimension (mm) | | | | | Sectional Area ($cm^2$) | Moment of Inertia ($cm^4$) | |
|---|---|---|---|---|---|---|---|---|---|
| | W | H | B | $t_1$ | $t_2$ | r | A | Ix | Iy |
| 100 × 100 | 16.9 | 100 | 100 | 6 | 8 | 8 | 21.59 | 378 | 134 |
| 125 × 125 | 23.6 | 125 | 125 | 6.5 | 9 | 8 | 30.00 | 840 | 293 |
| 150 × 75 | 14.0 | 150 | 75 | 5 | 7 | 8 | 17.85 | 666 | 49.5 |
| 150 × 100 | 20.7 | 148 | 100 | 6 | 9 | 8 | 26.35 | 1,000 | 150 |
| 150 × 150 | 31.1 | 150 | 150 | 7 | 10 | 8 | 39.65 | 1,620 | 563 |
| 200 × 100 | 17.8 | 198 | 99 | 4.5 | 7 | 8 | 22.69 | 1,540 | 113 |
| | 20.9 | 200 | 100 | 5.55 | 8 | 8 | 26.67 | 1,810 | 134 |
| 200 × 150 | 29.9 | 194 | 150 | 6 | 9 | 8 | 38.11 | 2,630 | 507 |
| 200 × 200 | 49.9 | 200 | 200 | 8 | 12 | 13 | 63.53 | 4,720 | 1,600 |
| 250 × 125 | 25.1 | 248 | 124 | 5 | 8 | 8 | 31.99 | 3,450 | 255 |
| | 29.0 | 250 | 125 | 6 | 9 | 8 | 36.97 | 3,960 | 294 |
| 250 × 175 | 43.6 | 244 | 175 | 7 | 11 | 13 | 55.49 | 6,040 | 984 |
| 250 × 250 | 71.8 | 250 | 250 | 9 | 14 | 13 | 91.43 | 10,700 | 3,650 |
| 300 × 150 | 32.0 | 298 | 149 | 5.5 | 8 | 13 | 40.80 | 6,320 | 442 |
| | 36.7 | 300 | 150 | 6.5 | 9 | 13 | 46.78 | 7,210 | 508 |
| 300 × 200 | 55.8 | 294 | 200 | 8 | 12 | 13 | 71.05 | 11,100 | 1,600 |
| 300 × 300 | 93.0 | 300 | 300 | 10 | 15 | 13 | 118.5 | 20,200 | 6,750 |
| 350 × 175 | 41.2 | 346 | 174 | 6 | 9 | 13 | 52.45 | 11,000 | 791 |
| | 49.4 | 350 | 175 | 7 | 11 | 13 | 62.91 | 13,500 | 984 |
| 350 × 250 | 78.1 | 340 | 250 | 9 | 14 | 13 | 99.53 | 21,200 | 3,650 |
| 350 × 350 | 135 | 350 | 350 | 12 | 19 | 13 | 171.9 | 39,800 | 13,600 |
| 400 × 200 | 56.1 | 396 | 199 | 7 | 11 | 13 | 71.41 | 19,800 | 1,450 |
| | 65.4 | 400 | 200 | 8 | 13 | 13 | 83.37 | 23,500 | 1,740 |
| 400 × 300 | 105 | 390 | 300 | 10 | 16 | 13 | 133.3 | 37,900 | 7,200 |
| 400 × 400 | 172 | 400 | 400 | 13 | 21 | 22 | 218.7 | 66,600 | 22,400 |
| | 232 | 414 | 405 | 18 | 28 | 22 | 295.4 | 92,800 | 31,000 |
| | 283 | 428 | 407 | 20 | 35 | 22 | 360.7 | 119,000 | 39,400 |
| | 415 | 458 | 417 | 30 | 50 | 22 | 528.6 | 187,000 | 60,500 |
| | 605 | 498 | 432 | 45 | 70 | 22 | 770.1 | 298,000 | 94,400 |
| 450 × 200 | 65.1 | 446 | 199 | 8 | 12 | 13 | 82.97 | 28,100 | 1,580 |
| | 74.9 | 450 | 200 | 9 | 14 | 13 | 95.43 | 32,900 | 1,870 |

PUBLIC RECORD



Dimension : JIS G 3192:1994 JIS G 3192:2008 JIS G 3136:2008
Dimensional Tolerance : JIS G 3192:1994 JIS G 3192:2008 JIS G 3136:2008
Surface Condition : JIS G 3192:1994 JIS G 3192:2008 JIS G 3136:2008

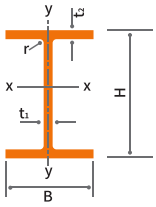
M

| Radius of Gyration (cm) | | Modulus of Section ($cm^3$) | | Plastic Modulus ($cm^3$) | | Warping Constant ($cm^6$,x$10^3$) | Torsional Constant ($cm^4$) | Division (depth x width) |
|---|---|---|---|---|---|---|---|---|
| ix | iy | Sx | Sy | Zx | Zy | Cw | J | |
| 4.18 | 2.49 | 75.6 | 26.7 | 86.4 | 41.0 | 2.82 | 4.91 | 100 × 100 |
| 5.29 | 3.13 | 134 | 46.9 | 152 | 71.7 | 9.86 | 8.10 | 125 × 125 |
| 6.11 | 1.67 | 88.8 | 13.2 | 102 | 20.8 | 2.52 | 2.90 | 150 × 75 |
| 6.16 | 2.39 | 135 | 30.1 | 154 | 46.4 | 7.25 | 6.66 | 150 × 100 |
| 6.39 | 3.77 | 216 | 75.1 | 243 | 114 | 27.6 | 12.7 | 150 × 150 |
| 8.24 | 2.24 | 156 | 22.9 | 175 | 35.5 | 10.3 | 3.32 | 200 × 100 |
| 8.24 | 2.24 | 181 | 26.7 | 205 | 41.6 | 12.3 | 5.17 | |
| 8.31 | 3.65 | 271 | 67.6 | 301 | 103 | 43.3 | 9.43 | 200 × 150 |
| 8.62 | 5.02 | 472 | 160 | 526 | 244 | 141 | 30.2 | 200 × 200 |
| 10.4 | 2.82 | 278 | 41.1 | 312 | 63.2 | 36.6 | 5.80 | 250 × 125 |
| 10.3 | 2.82 | 317 | 47.0 | 358 | 72.7 | 42.5 | 8.61 | |
| 10.4 | 4.21 | 495 | 112 | 551 | 172 | 133 | 21.3 | 250 × 175 |
| 10.8 | 6.32 | 856 | 292 | 953 | 443 | 508 | 56.2 | 250 × 250 |
| 12.4 | 3.29 | 424 | 59.3 | 475 | 91.8 | 92.7 | 8.79 | 300 × 150 |
| 12.4 | 3.29 | 481 | 67.7 | 542 | 105 | 107 | 12.7 | |
| 12.5 | 4.75 | 755 | 160 | 842 | 245 | 318 | 31.8 | 300 × 200 |
| 13.1 | 7.55 | 1,350 | 450 | 1,480 | 683 | 1,370 | 82.9 | 300 × 300 |
| 14.5 | 3.88 | 636 | 91.0 | 713 | 140 | 224 | 13.3 | 350 × 175 |
| 14.6 | 3.96 | 771 | 113 | 865 | 173 | 282 | 22.5 | |
| 14.6 | 6.06 | 1,250 | 292 | 1,380 | 445 | 969 | 58.4 | 350 × 250 |
| 15.2 | 8.89 | 2,270 | 777 | 2,520 | 1,180 | 3,720 | 187 | 350 × 350 |
| 16.7 | 4.51 | 1,000 | 146 | 1,110 | 223 | 535 | 25.1 | 400 × 200 |
| 16.8 | 4.57 | 1,180 | 174 | 1,310 | 267 | 649 | 39.7 | |
| 16.9 | 7.35 | 1,940 | 480 | 2,140 | 730 | 2,520 | 100 | 400 × 300 |
| 17.5 | 10.1 | 3,330 | 1,120 | 3,670 | 1,700 | 8,040 | 304 | 400 × 400 |
| 17.7 | 10.2 | 4,480 | 1,530 | 5,030 | 2,330 | 11,500 | 721 | |
| 18.2 | 10.5 | 5,560 | 1,940 | 6,310 | 2,940 | 15,200 | 1,320 | |
| 18.8 | 10.7 | 8,170 | 2,900 | 9,540 | 4,440 | 25,100 | 3,930 | |
| 19.7 | 11.1 | 12,000 | 4,370 | 14,500 | 6,720 | 43,100 | 11,300 | |
| 18.4 | 4.36 | 1,260 | 159 | 1,420 | 245 | 742 | 34.3 | 450 × 200 |
| 18.6 | 4.43 | 1,460 | 187 | 1,650 | 290 | 887 | 52.0 | |

PUBLIC RECORD

# 01. H– BEAM

## Dimensions and Sectional Properties




### (1) Metric Series - JIS '94, '08

| Division (depth x width) | Unit Weight (kg/m) | Standard Sectional Dimension (mm) | | | | | Sectional Area ($cm^2$) | Moment of Inertia ($cm^4$) | |
|---|---|---|---|---|---|---|---|---|---|
| | W | H | B | $t_1$ | $t_2$ | r | A | Ix | Iy |
| 450 × 300 | 121 | 440 | 300 | 11 | 18 | 13 | 153.9 | 54,700 | 8,110 |
| 500 × 200 | 77.9 | 496 | 199 | 9 | 14 | 13 | 99.29 | 40,800 | 1,840 |
| | 88.2 | 500 | 200 | 10 | 16 | 13 | 112.3 | 46,800 | 2,140 |
| 500 × 300 | 111 | 482 | 300 | 11 | 15 | 13 | 141.2 | 58,300 | 6,760 |
| | 125 | 488 | 300 | 11 | 18 | 13 | 159.2 | 68,900 | 8,110 |
| 600 × 200 | 92.5 | 596 | 199 | 10 | 15 | 13 | 117.8 | 66,600 | 1,980 |
| | 103 | 600 | 200 | 11 | 17 | 13 | 131.7 | 75,600 | 2,270 |
| 600 × 300 | 133 | 582 | 300 | 12 | 17 | 13 | 169.2 | 99,000 | 7,660 |
| | 147 | 588 | 300 | 12 | 20 | 13 | 187.2 | 114,000 | 9,010 |
| | 170 | 594 | 302 | 14 | 23 | 13 | 217.1 | 134,000 | 10,600 |
| 700 × 300 | 163 | 692 | 300 | 13 | 20 | 18 | 207.5 | 168,000 | 9,020 |
| | 182 | 700 | 300 | 13 | 24 | 18 | 231.5 | 197,000 | 10,800 |
| 800 × 300 | 188 | 792 | 300 | 14 | 22 | 18 | 239.5 | 248,000 | 9,920 |
| | 207 | 800 | 300 | 14 | 26 | 18 | 263.5 | 286,000 | 11,700 |
| 900 × 300 | 210 | 890 | 299 | 15 | 23 | 18 | 266.9 | 339,000 | 10,300 |
| | 240 | 900 | 300 | 16 | 28 | 18 | 305.8 | 404,000 | 12,600 |
| | 283 | 912 | 302 | 18 | 34 | 18 | 360.1 | 491,000 | 15,700 |
| | 304 | 918 | 303 | 19 | 37 | 18 | 387.4 | 545,000 | 17,200 |

PUBLIC RECORD



Dimension : JIS G 3192:1994 JIS G 3192:2008 JIS G 3136:2008
Dimensional Tolerance : JIS G 3192:1994 JIS G 3192:2008 JIS G 3136:2008
Surface Condition : JIS G 3192:1994 JIS G 3192:2008 JIS G 3136:2008

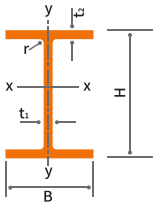
M

| Radius of Gyration (cm) | | Modulus of Section ($cm^3$) | | Plastic Modulus ($cm^3$) | | Warping Constant ($cm^6$,x$10^3$) | Torsional Constant ($cm^4$) | Division (depth x width) |
|---|---|---|---|---|---|---|---|---|
| ix | iy | Sx | Sy | Zx | Zy | Cw | J | |
| 18.9 | 7.26 | 2,490 | 541 | 2,760 | 823 | 3,610 | 142 | 450 × 300 |
| 20.3 | 4.30 | 1,650 | 185 | 1,870 | 288 | 1,070 | 52.9 | 500 × 200 |
| 20.4 | 4.37 | 1,870 | 214 | 2,130 | 333 | 1,250 | 76.4 | |
| 20.3 | 6.92 | 2,420 | 451 | 2,700 | 690 | 3,680 | 95.5 | 500 × 300 |
| 20.8 | 7.14 | 2,820 | 541 | 3,130 | 825 | 4,470 | 144 | |
| 23.8 | 4.10 | 2,230 | 199 | 2,580 | 312 | 1,660 | 70.0 | 600 × 200 |
| 24.0 | 4.15 | 2,520 | 227 | 2,900 | 358 | 1,930 | 98.2 | |
| 24.2 | 6.73 | 3,400 | 511 | 3,820 | 786 | 6,110 | 139 | 600 × 300 |
| 24.7 | 6.94 | 3,880 | 601 | 4,350 | 921 | 7,260 | 200 | |
| 24.8 | 6.99 | 4,510 | 702 | 5,060 | 1,080 | 8,610 | 306 | |
| 28.5 | 6.59 | 4,860 | 601 | 5,500 | 931 | 10,200 | 228 | 700 × 300 |
| 29.2 | 6.83 | 5,630 | 720 | 6,340 | 1,110 | 12,300 | 342 | |
| 32.2 | 6.44 | 6,260 | 661 | 7,140 | 1,030 | 14,700 | 305 | 800 × 300 |
| 32.9 | 6.66 | 7,150 | 780 | 8,100 | 1,210 | 17,500 | 440 | |
| 35.6 | 6.21 | 7,620 | 689 | 8,750 | 1,080 | 19,300 | 365 | 900 × 300 |
| 36.3 | 6.42 | 8,980 | 840 | 10,300 | 1,320 | 24,000 | 581 | |
| 36.9 | 6.60 | 10,770 | 1,040 | 12,300 | 1,620 | 30,100 | 981 | |
| 37.2 | 6.66 | 11,660 | 1,140 | 13,400 | 1,780 | 33,300 | 1,240 | |

PUBLIC RECORD

# 01. H– BEAM

## Dimensions and Sectional Properties




### (9) British Standard (BS) - Universal Bearing Pile

| Designation | | Unit Weight (kg/m) | Standard Sectional Dimension (mm) | | | | | Sectional Area ($cm^2$) | Moment of Inertia ($cm^4$) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | W | H | B | $t_1$ | $t_2$ | r | A | Ix | Iy |
| 203 × 203 | 54 | 53.9 | 204.0 | 207.7 | 11.3 | 11.4 | 10.2 | 68.72 | 5,030 | 1,710 |
| 254 × 254 | 63 | 63.0 | 247.1 | 256.6 | 10.6 | 10.7 | 12.7 | 80.22 | 8,860 | 3,020 |
| | 71 | 71.0 | 249.7 | 258.0 | 12.0 | 12.0 | 12.7 | 90.39 | 10,100 | 3,440 |
| | 85 | 85.1 | 254.3 | 260.4 | 14.4 | 14.3 | 12.7 | 108.4 | 12,300 | 4,220 |
| 305 × 305 | 79 | 79.0 | 299.2 | 306.0 | 11.1 | 11.1 | 15.2 | 100.7 | 16,400 | 5,310 |
| | 88 | 88.0 | 301.7 | 307.2 | 12.3 | 12.3 | 15.2 | 111.6 | 18,400 | 5,950 |
| | 95 | 94.9 | 303.8 | 308.3 | 13.4 | 13.4 | 15.2 | 121.7 | 20,200 | 6,550 |
| | 110 | 110.0 | 307.9 | 310.3 | 15.4 | 15.4 | 15.2 | 140.2 | 23,600 | 7,680 |
| | 126 | 126.1 | 312.4 | 312.5 | 17.7 | 17.7 | 15.2 | 161.6 | 27,500 | 9,020 |
| | 149 | 149.1 | 318.5 | 315.6 | 20.7 | 20.7 | 15.2 | 190.0 | 33,000 | 10,900 |
| | 186 | 186.0 | 328.3 | 320.9 | 25.5 | 25.6 | 15.2 | 236.9 | 42,600 | 14,100 |
| | 223 | 222.9 | 337.9 | 325.7 | 30.3 | 30.4 | 15.2 | 284.0 | 52,700 | 17,600 |
| 356 × 368 | 109 | 108.9 | 346.4 | 371.0 | 12.8 | 12.9 | 15.2 | 138.7 | 30,600 | 11,000 |
| | 133 | 133.0 | 352.0 | 373.8 | 15.6 | 15.7 | 15.2 | 169.4 | 38,000 | 13,700 |
| | 152 | 152.0 | 356.4 | 376.0 | 17.8 | 17.9 | 15.2 | 193.7 | 44,000 | 15,900 |
| | 174 | 173.9 | 361.4 | 378.5 | 20.3 | 20.4 | 15.2 | 221.5 | 51,000 | 18,500 |

PUBLIC RECORD



Dimension : BS 4:2005
Dimensional Tolerance : EN 10034:1993
Surface Condition : EN 10163-3 2004 CLASS C Subclass1

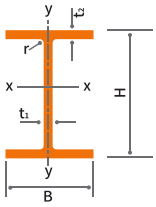
# UBP

| Radius of Gyration (cm) | | Modulus of Section ($cm^3$) | | Plastic Modulus ($cm^3$) | | Warping Constant ($cm^6$,x$10^3$) | Torsional Constant ($cm^4$) | Designation |
|---|---|---|---|---|---|---|---|---|
| ix | iy | Sx | Sy | Zx | Zy | Cw | J | |
| 8.56 | 4.99 | 493 | 165 | 557 | 252 | 158 | 35.0 | 203 × 203 |
| 10.5 | 6.14 | 717 | 235 | 799 | 360 | 421 | 37.2 | 254 × 254 |
| 10.6 | 6.17 | 809 | 267 | 904 | 409 | 485 | 52.3 | |
| 10.7 | 6.24 | 967 | 324 | 1,090 | 498 | 606 | 87.8 | |
| 12.8 | 7.26 | 1,100 | 347 | 1,220 | 530 | 1,100 | 51.9 | 305 × 305 |
| 12.8 | 7.30 | 1,220 | 387 | 1,360 | 593 | 1,240 | 69.3 | |
| 12.9 | 7.34 | 1,330 | 425 | 1,480 | 651 | 1,380 | 88.5 | |
| 13.0 | 7.40 | 1,530 | 495 | 1,720 | 760 | 1,640 | 132 | |
| 13.0 | 7.47 | 1,760 | 577 | 2,000 | 888 | 1,950 | 199 | |
| 13.2 | 7.57 | 2,070 | 691 | 2,370 | 1,060 | 2,400 | 316 | |
| 13.4 | 7.71 | 2,600 | 879 | 3,000 | 1,370 | 3,230 | 594 | |
| 13.6 | 7.87 | 3,120 | 1,080 | 3,650 | 1,680 | 4,140 | 998 | |
| 14.9 | 8.91 | 1,770 | 593 | 1,960 | 903 | 3,050 | 90.7 | 356 × 368 |
| 15.0 | 8.99 | 2,160 | 733 | 2,410 | 1,120 | 3,860 | 161 | |
| 15.1 | 9.06 | 2,470 | 846 | 2,770 | 1,290 | 4,540 | 236 | |
| 15.2 | 9.14 | 2,820 | 978 | 3,190 | 1,500 | 5,360 | 348 | |

PUBLIC RECORD

# 01. H– BEAM

## Dimensions and Sectional Properties




### (10) Australia/New Zealand Universal Beam (AS/NZS) - UB

| Designation | | Unit Weight (kg/m) | Standard Sectional Dimension (mm) | | | | | Sectional Area ($cm^2$) | Moment of Inertia ($cm^4$) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | W | H | B | $t_1$ | $t_2$ | r | A | Ix | Iy |
| 150UB | 14 | 14.0 | 150 | 75 | 5 | 7 | 8.0 | 17.85 | 666 | 50 |
| | 18 | 18.0 | 155.0 | 75.0 | 6.0 | 9.5 | 8.0 | 22.96 | 905 | 67 |
| 200UB | 18 | 18.2 | 198.0 | 99.0 | 4.5 | 7.0 | 11.0 | 23.18 | 1,580 | 114 |
| | 23 | 22.3 | 201.6 | 133.0 | 5.0 | 7.0 | 8.9 | 28.68 | 2,100 | 275 |
| | 25 | 25.4 | 203.2 | 133.0 | 5.8 | 7.8 | 8.9 | 32.31 | 2,360 | 306 |
| | 30 | 29.8 | 207.0 | 134.0 | 6.3 | 9.6 | 8.9 | 38.24 | 2,910 | 386 |
| 250UB | 26 | 25.7 | 248.0 | 124.0 | 5.0 | 8.0 | 12.0 | 32.68 | 3,540 | 255 |
| | 31 | 31.4 | 251.5 | 146.0 | 6.1 | 8.6 | 8.9 | 40.08 | 4,450 | 447 |
| | 37 | 37.3 | 256.2 | 146.0 | 6.4 | 10.9 | 8.9 | 47.51 | 5,570 | 566 |
| 310UB | 32 | 32.0 | 298.0 | 149 | 5.5 | 8 | 13.0 | 40.80 | 6,320 | 442 |
| | 41 | 40.4 | 304.0 | 165 | 6.1 | 10.2 | 11.4 | 52.08 | 8,640 | 765 |
| | 47 | 46.2 | 307.2 | 166 | 6.7 | 11.8 | 11.4 | 59.29 | 10,000 | 901 |
| 360UB | 45 | 44.7 | 352.0 | 171.0 | 6.9 | 9.7 | 11.4 | 57.24 | 12,100 | 810 |
| | 51 | 50.7 | 355.6 | 171.0 | 7.3 | 11.5 | 11.4 | 64.73 | 14,200 | 960 |
| | 57 | 56.7 | 358.6 | 172.0 | 8.0 | 13.0 | 11.4 | 72.44 | 16,100 | 1,100 |
| 410UB | 54 | 53.7 | 402.6 | 178.0 | 7.6 | 10.9 | 11.4 | 68.86 | 18,800 | 1,030 |
| | 60 | 59.7 | 406.4 | 178.0 | 7.8 | 12.8 | 11.4 | 76.39 | 21,600 | 1,210 |
| 460UB | 67 | 67.1 | 453.8 | 190.0 | 8.5 | 12.7 | 11.4 | 85.79 | 29,600 | 1,450 |
| | 75 | 74.6 | 457.4 | 190.0 | 9.1 | 14.5 | 11.4 | 95.20 | 33,500 | 1,660 |
| | 82 | 82.1 | 460.4 | 191.0 | 9.9 | 16.0 | 11.4 | 104.6 | 37,200 | 1,860 |
| 530UB | 82 | 82.0 | 528.2 | 209.0 | 9.6 | 13.2 | 14.0 | 105.0 | 47,700 | 2,010 |
| | 93 | 92.4 | 533.0 | 209.9 | 10.2 | 15.6 | 14.0 | 118.1 | 55,400 | 2,380 |
| 610UB | 102 | 101 | 602 | 228 | 10.6 | 14.8 | 14.0 | 129.8 | 76,100 | 2,930 |
| | 114 | 113 | 607 | 228 | 11.2 | 17.3 | 14.0 | 144.7 | 87,500 | 3,430 |
| | 125 | 125 | 611.6 | 229 | 11.9 | 19.6 | 14.0 | 159.6 | 98,600 | 3,930 |

PUBLIC RECORD



Dimension : AS/NZS 3679.1:2016
Dimensional Tolerance : AS/NZS 3679.1:2016
Surface Condition : AS/NZS 3679.1:2016

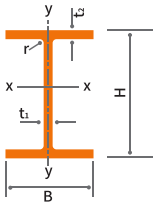
# AS/NZS

| Radius of Gyration (cm) | | Modulus of Section ($cm^3$) | | Plastic Modulus ($cm^3$) | | Warping Constant ($cm^6$,x$10^3$) | Torsional Constant ($cm^4$) | Designation |
|---|---|---|---|---|---|---|---|---|
| ix | iy | Sx | Sy | Zx | Zy | Cw | J | |
| 6.11 | 1.67 | 88.8 | 13.2 | 102 | 20.8 | 2.52 | 2.90 | 150UB |
| 6.28 | 1.71 | 117 | 17.9 | 135 | 28.2 | 3.54 | 6.12 | |
| 8.26 | 2.21 | 160 | 22.9 | 180 | 35.7 | 10.3 | 3.85 | 200UB |
| 8.56 | 3.10 | 208 | 41.3 | 231 | 63.4 | 26.0 | 4.59 | |
| 8.55 | 3.08 | 232 | 46.1 | 260 | 70.9 | 29.2 | 6.46 | |
| 8.72 | 3.18 | 381 | 57.6 | 316 | 88.4 | 37.5 | 10.7 | |
| 10.4 | 2.79 | 286 | 41.1 | 319 | 63.6 | 36.6 | 6.69 | 250UB |
| 10.5 | 3.34 | 354 | 61.2 | 397 | 94.2 | 65.8 | 9.09 | |
| 10.8 | 3.45 | 435 | 77.5 | 486 | 119 | 85.1 | 15.8 | |
| 12.4 | 3.29 | 424 | 59.3 | 475 | 91.8 | 92.7 | 8.79 | 310UB |
| 12.9 | 3.83 | 568 | 92.7 | 633 | 142 | 165 | 15.7 | |
| 13.0 | 3.90 | 651 | 109 | 729 | 166 | 196 | 23.2 | |
| 14.5 | 3.76 | 688 | 94.7 | 777 | 146 | 237 | 16.4 | 360UB |
| 14.8 | 3.85 | 799 | 112 | 897 | 173 | 284 | 24.3 | |
| 14.9 | 3.90 | 898 | 128 | 1,010 | 198 | 329 | 33.9 | |
| 16.5 | 3.87 | 934 | 116 | 1,060 | 179 | 393 | 23.8 | 410UB |
| 16.8 | 3.98 | 1,060 | 136 | 1,200 | 209 | 466 | 33.8 | |
| 18.6 | 4.11 | 1,300 | 153 | 1,480 | 238 | 706 | 38.3 | 460UB |
| 18.8 | 4.18 | 1,460 | 175 | 1,660 | 271 | 813 | 53.3 | |
| 18.9 | 4.22 | 1,620 | 195 | 1,840 | 303 | 917 | 70.6 | |
| 21.3 | 4.38 | 1,810 | 192 | 2,070 | 301 | 1,330 | 53.8 | 530UB |
| 21.7 | 4.49 | 2,080 | 228 | 2,370 | 355 | 1,590 | 78.3 | |
| 24.2 | 4.75 | 2,530 | 257 | 2,900 | 402 | 2,520 | 80.5 | 610UB |
| 24.6 | 4.87 | 2,880 | 301 | 3,290 | 469 | 2,970 | 115 | |
| 24.9 | 4.96 | 3,220 | 343 | 3,680 | 536 | 3,440 | 157 | |

PUBLIC RECORD

# 01. H– BEAM

## Dimensions and Sectional Properties




### (10) Australia/New Zealand Columns (AS/NZS) - UC

| Designation | | Unit Weight (kg/m) | Standard Sectional Dimension (mm) | | | | | Sectional Area ($cm^2$) | Moment of Inertia ($cm^4$) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | W | H | B | $t_1$ | $t_2$ | r | A | Ix | Iy |
| 100UC | 15 | 14.8 | 97.0 | 99.0 | 5.0 | 7.0 | 10.0 | 18.87 | 318 | 114 |
| 150UC | 23 | 23.4 | 152.4 | 152 | 6.1 | 6.8 | 8.9 | 29.82 | 1,260 | 399 |
| | 30 | 30.0 | 157.6 | 153 | 6.6 | 9.4 | 8.9 | 38.60 | 1,760 | 562 |
| | 37 | 37.2 | 161.8 | 154 | 8.1 | 11.5 | 8.9 | 47.34 | 2,220 | 701 |
| 200UC | 46 | 46.2 | 203.4 | 203.0 | 7.3 | 11.0 | 11.4 | 59.02 | 4,590 | 1,530 |
| | 52 | 52.2 | 206.4 | 204.0 | 8.0 | 12.5 | 11.4 | 66.63 | 5,280 | 1,770 |
| | 59 | 59.5 | 209.8 | 205.0 | 9.3 | 14.2 | 11.4 | 76.21 | 6,130 | 2,040 |
| 250UC | 73 | 72.9 | 253.8 | 254.0 | 8.6 | 14.2 | 14 | 93.20 | 11,400 | 3,880 |
| | 89 | 89.5 | 260.0 | 256.0 | 10.5 | 17.3 | 14 | 113.9 | 14,300 | 4,840 |
| 310UC | 97 | 96.8 | 308.0 | 305.0 | 9.9 | 15.4 | 16.5 | 123.7 | 22,300 | 7,290 |
| | 118 | 118 | 314.6 | 307.0 | 11.9 | 18.7 | 16.5 | 150.1 | 27,700 | 9,020 |
| | 137 | 137 | 320.6 | 309.0 | 13.8 | 21.7 | 16.5 | 174.7 | 32,900 | 10,700 |
| | 158 | 158 | 327.2 | 311.0 | 15.7 | 25.0 | 16.5 | 201.4 | 38,800 | 12,500 |

PUBLIC RECORD



Dimension : AS/NZS 3679.1:2016
Dimensional Tolerance : AS/NZS 3679.1:2016
Surface Condition : AS/NZS 3679.1:2016

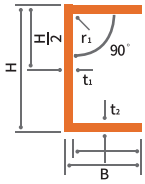
# AS/NZS

| Radius of Gyration (cm) | | Modulus of Section ($cm^3$) | | Plastic Modulus ($cm^3$) | | Warping Constant ($cm^6$,x$10^3$) | Torsional Constant (cm) | Designation |
|---|---|---|---|---|---|---|---|---|
| ix | iy | Sx | Sy | Zx | Zy | Cw | J | |
| 4.11 | 2.45 | 65.6 | 22.9 | 74.4 | 35.2 | 2.29 | 3.61 | 100UC |
| 6.50 | 3.66 | 165 | 52.4 | 185 | 80.2 | 21.1 | 5.40 | 150UC |
| 6.75 | 3.81 | 223 | 73.4 | 250 | 112 | 30.8 | 11.1 | |
| 6.85 | 3.85 | 274 | 91.0 | 310 | 139 | 39.5 | 20.1 | |
| 8.82 | 5.09 | 451 | 151 | 500 | 230 | 142 | 23.0 | 200UC |
| 8.90 | 5.15 | 512 | 174 | 570 | 264 | 166 | 32.8 | |
| 8.97 | 5.17 | 584 | 199 | 656 | 303 | 195 | 48.2 | |
| 11.1 | 6.45 | 898 | 306 | 992 | 464 | 557 | 58.6 | 250UC |
| 11.2 | 6.52 | 1,100 | 378 | 1,230 | 575 | 712 | 105 | |
| 13.4 | 7.68 | 1,450 | 478 | 1,600 | 725 | 1,560 | 93.3 | 310UC |
| 13.6 | 7.75 | 1,760 | 588 | 1,960 | 893 | 1,970 | 164 | |
| 13.7 | 7.83 | 2,050 | 693 | 2,300 | 1,050 | 2,380 | 254 | |
| 13.9 | 7.88 | 2,370 | 804 | 1,680 | 1,230 | 2,860 | 384 | |

PUBLIC RECORD

# 01. H– BEAM

## Dimensions and Sectional Properties




| Designation | | Unit Weight (kg/m) | Standard Sectional Dimension (mm) | | | | | | Sectional Area (cm²) |
|---|---|---|---|---|---|---|---|---|---|
| | | W | H | B | $t_1$ | $t_2$ | $r_1$ | $r_2$ | A |
| KS (KSD3502) | 150 × 75 | 18.2 | 150 | 75 | 6 | 10 | 10 | - | 23.2 |
| | 200 × 80 | 24.0 | 200 | 80 | 6.5 | 11.5 | 12 | - | 30.5 |
| BS (BS4-1) | 150 × 75 | 17.9 | 150 | 75 | 5.5 | 10 | 12 | - | 27.77 |
| | 200 × 75 | 23.4 | 200 | 75 | 6 | 12.5 | 12 | - | 29.87 |
| AS/NZS (AS/NZS 3679) | 150 × 75 | 17.7 | 150 | 75 | 6 | 9.5 | 10 | - | 22.5 |
| | 200 × 75 | 22.9 | 200 | 75 | 6 | 12 | 12 | - | 29.2 |
| | 230 × 75 | 25.1 | 230 | 75 | 6.5 | 12 | 12 | - | 32 |
| | 250 × 90 | 35.5 | 250 | 90 | 8 | 15 | 12 | - | 45.2 |
| | 300 × 90 | 40.1 | 300 | 90 | 8 | 16 | 14 | - | 51.1 |

PUBLIC RECORD



# PFC

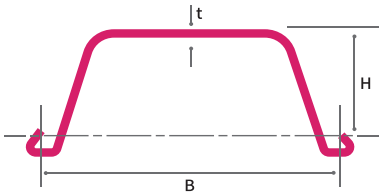
Dimension : KS D 3502:2016 BS 4-1:2005 AS/NZS 3679.1:2016
Dimensional Tolerance : KS D 3502:2016 BS 4-1:2005 AS/NZS 3679.1:2016
Surface Condition : KS D 3502:2016 EN 10163-3:2004 CLASS C Subclass 1 AS/NZS 3679.1:2016

| Center of Gravity (cm) | Moment of Inertia ($cm^4$) | | Radius of Gyration (cm) | | Modulus of Section ($cm^3$) | | Designation | |
|---|---|---|---|---|---|---|---|---|
| Cy | Ix | Iy | ix | iy | Zx | Zy | | |
| 2.54 | 864 | 131.3 | 6.1 | 2.4 | 115.1 | 26.5 | 150 × 75 | KS (KSD3502) |
| 2.55 | 1,984 | 192.5 | 8.1 | 2.5 | 198.4 | 35.3 | 200 × 80 | |
| 2.58 | 861 | 131 | 6.2 | 2.4 | 114.8 | 26.6 | 150 × 75 | BS (BS4-1) |
| 2.48 | 1,963 | 170 | 8.1 | 2.4 | 196.3 | 33.8 | 200 × 75 | |
| 2.49 | 834 | 129 | 6.1 | 2.4 | 129.0 | 46 | 150 × 75 | AS/NZS (AS/NZS 3679) |
| 2.44 | 1,910 | 165 | 8.1 | 2.4 | 221.0 | 58.9 | 200 × 75 | |
| 2.26 | 2,680 | 176 | 9.1 | 2.4 | 271.0 | 61 | 230 × 75 | |
| 2.86 | 4,510 | 364 | 10.0 | 2.8 | 421.0 | 107 | 250 × 90 | |
| 2.72 | 7,240 | 404 | 11.9 | 2.8 | 564.0 | 117 | 300 × 90 | |

PUBLIC RECORD

# 02. SHEET PILE

## Dimensions and Sectional Properties




| Section Type | Dimension | | | Unit Weight | |
|---|---|---|---|---|---|
| | B | H | t | Per Pile | Per Wall Width |
| | mm | mm | mm | kg/m | kg/m² |
| SP-II | 400 | 100 | 10.5 | 48.0 | 120 |
| SP-III | 400 | 125 | 13.0 | 60.0 | 150 |
| SP-IIIA(E) | 400 | 150 | 13.1 | 58.4 | 146 |
| SP-IIIA(D) | 400 | 150 | 13.0 | 60.0 | 150 |
| SP-IV | 400 | 170 | 15.5 | 76.1 | 190 |
| SP-VM | 500 | 175 | 16.5 | 86.0 | 172 |
| SP-VA | 500 | 200 | 19.5 | 105.0 | 210 |
| SP-IIw | 600 | 130 | 10.3 | 61.8 | 103 |
| SP-IIIw | 600 | 180 | 13.4 | 81.6 | 136 |
| SP-IVw | 600 | 210 | 18.0 | 106 | 177 |

PUBLIC RECORD



Dimension : KS F 4604 & JIS A 5528
Dimensional Tolerance : KS F 4604 & JIS A 5528
Surface Condition : KS D 3502 & JIS G 3192

# SP

| Sectional Area | | Moment of Inertia | | Modulus of Section | | Section Type |
|---|---|---|---|---|---|---|
| Per Pile | Per Wall Width | Per Pile | Per Wall Width | Per Pile | Per Wall Width | |
| $cm^2$ | $cm^2/m$ | $cm^4$ | $cm^4/m$ | $cm^3$ | $cm^3/m$ | |
| 61.2 | 153.0 | 1,240 | 8,740 | 152 | 874 | SP-II |
| 76.4 | 191.0 | 2,220 | 16,800 | 223 | 1,340 | SP-III |
| 74.4 | 186.0 | 2,790 | 22,800 | 250 | 1,520 | SP-IIIA(E) |
| 76.4 | 191.0 | 3,060 | 22,600 | 278 | 1,510 | SP-IIIA(D) |
| 96.9 | 242.5 | 4,634 | 38,610 | 360 | 2,271 | SP-IV |
| 109.6 | 219.2 | 5,345 | 40,290 | 383 | 2,310 | SP-VM |
| 133.8 | 267.6 | 8,100 | 63,000 | 520 | 3,150 | SP-VA |
| 78.7 | 131.2 | 2,445 | 13,640 | 231 | 1,018 | SP-IIw |
| 103.9 | 173.2 | 5,124 | 32,802 | 371 | 1,822 | SP-IIIw |
| 135.3 | 225.5 | 8,630 | 56,700 | 539 | 2,700 | SP-IVw |

PUBLIC RECORD

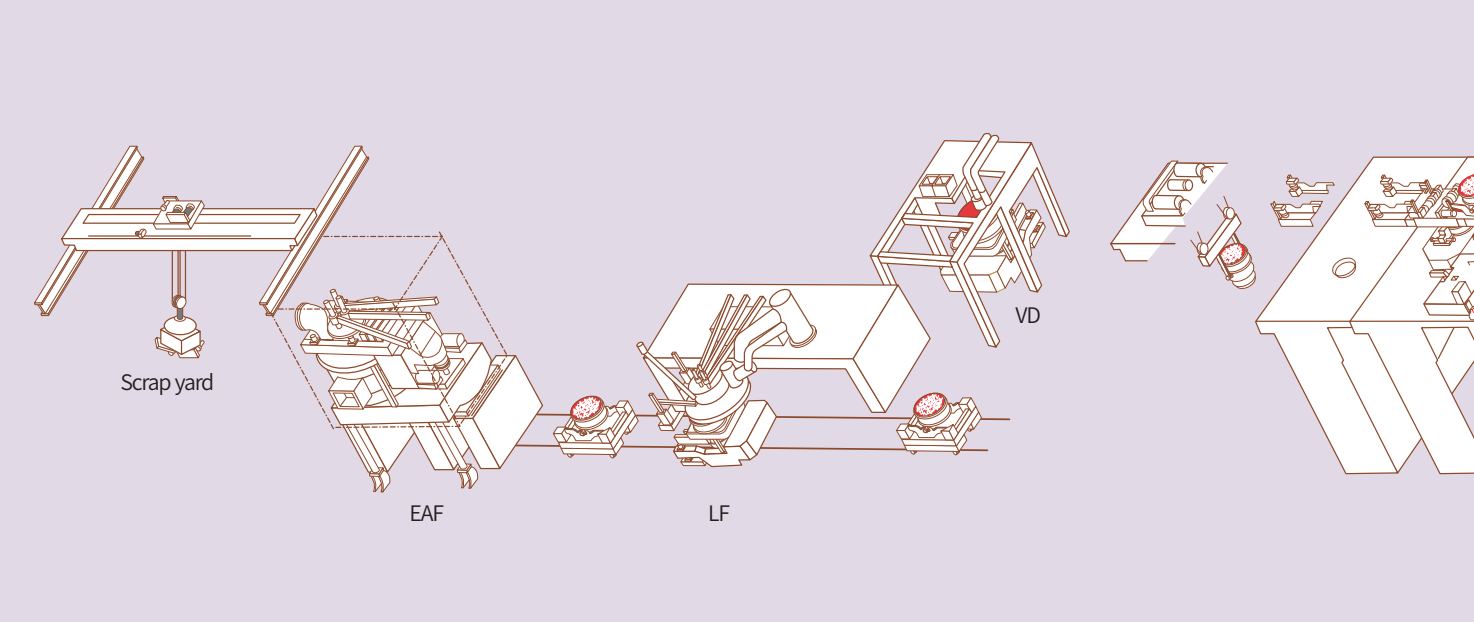
# 03. BILLET

## Dimensions and Sectional Properties

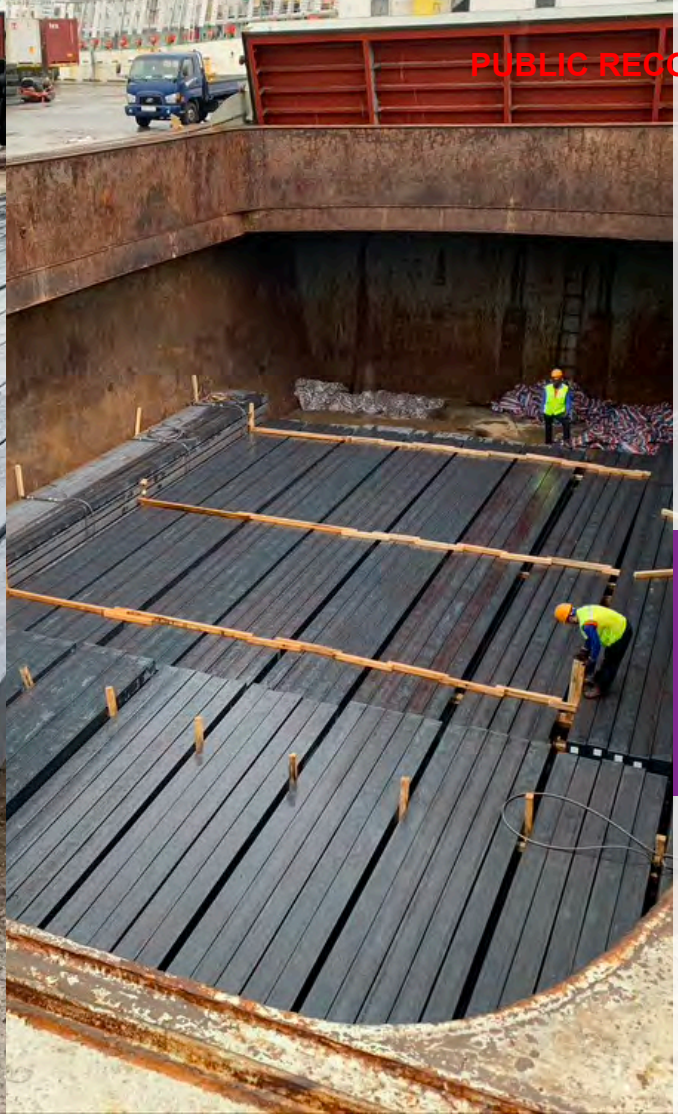
| Size | |
|---|---|
| Size | Length |
| □ 120 × 120 | 4M ~12M |
| □ 130 × 130 | 4M ~12M |
| □ 150 × 150 | 4M ~12M |
| □ 165 × 165 | 4M ~12M |
| □ 185 × 185 | 4M ~12M |
| □ 180 × 220 | 4M ~12M |
| ○ 150 | 4M ~12M |
| ○ 200 | 4M ~12M |

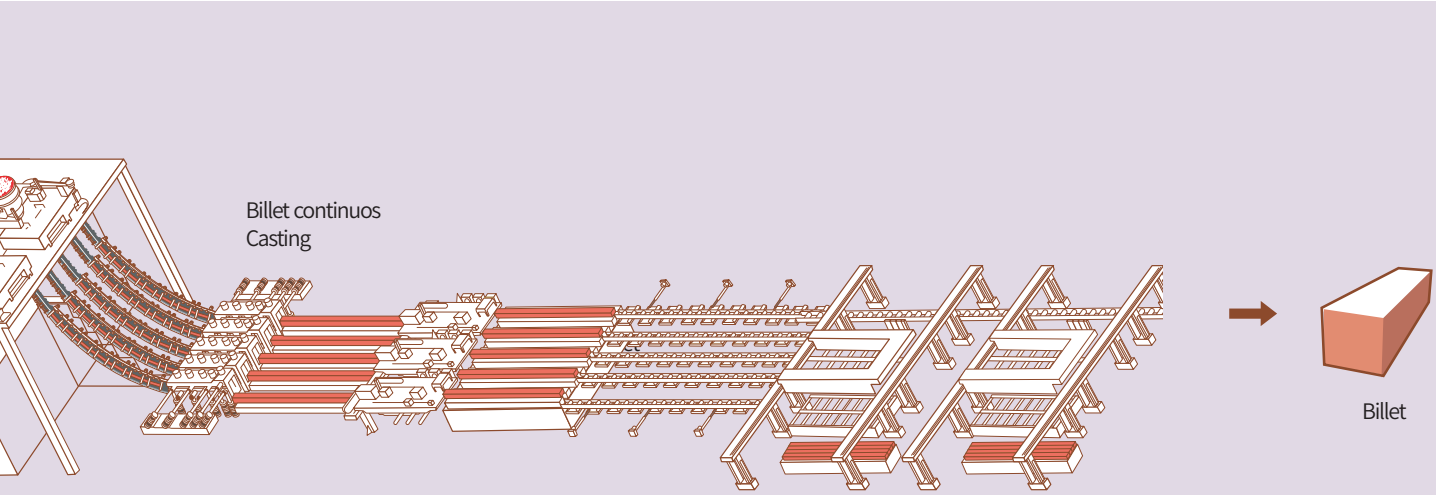
| Spec | |
|---|---|
| KOREA SPEC | SS400, SS490, SS540<br>SD300, SD400, SD500, SD400+V, SD400W, SD500W<br>SM490YA, SM490YB, SM490B, SM400B<br>SM10C, SM20C, SM30C, SM45C, 13B36Cr |
| JAPAN SPEC | SD295A, SD295B, SD390, SD390+V |
| USA SPEC | ASTM A615 (GR40, GR60, GR75), ASTM A572 (GR50) |
| RUSSIA SPEC | 3SP/PS, 4SP/PS, 5SP/PS |
| SHIP BUILT SPEC | A GRADE, AH32, AH36 |
| VD(Vacuum Degassing) SPEC | SM10C, SM20C, SM30C, SM45C, 15B36Cr<br>SM490YB, SM490B, SM400B<br>AH32, AH36 |

## Production process



PUBLIC RECORD





PUBLIC RECORD

# 04. HOT ROLLED PLATE

## Dimensions and Sectional Properties

GENERAL DESCRIPTION : Hot rolled steel plate with a nominal minimum yield strength as specified in the table below, with good ductility. Impact grades are available if required.

| Chemical Composition | Typical (wt %) | | Expected Maximum (wt %) | |
|---|---|---|---|---|
| | 6 - 32mm | 32 - 100mm | 6 - 32mm | 32 - 100mm |
| Carbon (C) | 0.16 | 0.15 | 0.22 | 0.22 |
| Silicon (Si) | 0.24 | 0.250 | 0.35 | 0.35 |
| Manganese (Mn) | 1.30 | 1.30 | 1.70 | 1.70 |
| Sulphur (S) | 0.017 | 0.016 | 0.030 | 0.030 |
| Phosphorus (P) | 0.020 | 0.012 | 0.040 | 0.040 |

| Mechanical Properties | Typical | | | Expected Minimum | | |
|---|---|---|---|---|---|---|
| | 6.0 - 12.0mm | 12.0 - 20.0mm | 20.0 - 100mm | 6.0 - 12.0mm | 12.0 - 20.0mm | 20.0 - 100mm |
| Yield strength, MPa | 350 | 340 | 320 | 310 | 300 | 280 |
| Tensile strength, MPa | 510 | 500 | 480 | 430 | 430 | 430 |
| Elongation % on $L_o$=5.65mm$\sqrt{So}$ | 32 | 28 | 27 | 21 | 21 | 21 |

PUBLIC RECORD



# HRP

Applications : Structural applications
Standard : AS/NZS 3678:2016

| Fabricating Performance<br>1 = Limited 5 = Excellent | |
|---|---|
| **Method** | **Rating** |
| Bending | 3 |
| Welding | 4 |

| Dimension Capabilities | |
|---|---|
| **Thickness (mm)** | **Width (mm)** |
| 6.00 - 100.00 | 1220-3400 |

Other dimensional combinations may be available by enquiry.

| Standard Plate Size | |
|---|---|
| **Width (mm)** | **Length (mm)** |
| 1220 - 1250 | 2400 |
| | 3600 |
| 1500 - 3400 | 6000 |
| | 18000 |

| Impact Properties (AS/NZS 3678 L15) | |
|---|---|
| **Guaranteed Minimum (average 3 tests)** | **at Temperature** |
| 27 Joules | -15°C |

PUBLIC RECORD

# 05. HOT ROLLED SHEET

## Dimensions and Sectional Properties

GENERAL DESCRIPTION : Hot Rolled HA250 steel is a structural steel with a guaranteed minimum yield strength of 250MPa with good ductility.

| Chemical Composition | Typical (wt %) | | Expected Maximum (wt %) | |
|---|---|---|---|---|
| | 3.0 - 9.0mm | 10.0 - 25.0mm | 3.0 - 9.0mm | 10.0 - 25.0mm |
| Carbon (C) | 0.050 | 0.170 | 0.100 | 0.200 |
| Silicon (Si) | 0.007 | 0.008 | 0.030 | 0.030 |
| Manganese (Mn) | 0.200 | 0.600 | 0.700 | 0.120 |
| Sulphur (S) | 0.018 | 0.018 | 0.030 | 0.030 |
| Phosphorus (P) | 0.014 | 0.016 | 0.030 | 0.040 |

| Mechanical Properties | Typical | | Expected Minimum | |
|---|---|---|---|---|
| | 3.0 - 9.0mm | 10.0 - 25.0mm | 3.0 - 9.0mm | 10.0 - 25.0mm |
| Yield strength, MPa | 280 | 290 | 250 | 250 |
| Tensile strength, MPa | 390 | 450 | 350 | 350 |
| Elongation % on $L_o$=200mm | 32 | 27 | 16 | 17 |

PUBLIC RECORD



# HRS-HA250

Applications : Structural members / Brake press forming applications / General fabrication / Galvanising

Standard : AS/NZS 1594:2002

| Dimension Capabilities | |
|---|---|
| Thickness (mm) | Width (mm) |
| 3.0 - 9.0 | 1219 - 1820 |
| 10.0 - 25.0 | 1219 - 1820 |

| Available Forms | |
|---|---|
| Dry | Picked & Oiled |
| Mill edge coil | Coil |
| Coil-Plate | Coil-Plate |

| Fabricating Performance<br>1 = Limited 5 = Excellent | |
|---|---|
| Method | Rating |
| Drawing | 2 |
| Pressing | 3 |
| Bending | 4 |
| Roll-forming | 4 |
| Welding | 5 |

| Standard Plate Sizes |
|---|
| 1220 × 2400 |
| 1520 × 3600 |
| 1820 × 6000 |

PUBLIC RECORD

# 05. HOT ROLLED SHEET

## Dimensions and Sectional Properties

GENERAL DESCRIPTION : Hot Rolled HA300 steel is a structural steel with a guaranteed minimum yield strength of 300MPa with good ductility.

| Chemical Composition | Typical (wt %) | | Expected Maximum (wt %) | |
|---|---|---|---|---|
| | 3.0 - 9.0mm | 10.0 - 25.0mm | 3.0 - 9.0mm | 10.0 - 25.0mm |
| Carbon (C) | 0.17 | 0.17 | 0.20 | 0.20 |
| Silicon (Si) | 0.007 | 0.01 | 0.03 | 0.03 |
| Manganese (Mn) | 0.60 | 1.60 | 1.00 | 1.60 |
| Sulphur (S) | 0.017 | 0.017 | 0.030 | 0.030 |
| Phosphorus (P) | 0.016 | 0.014 | 0.040 | 0.040 |

| Mechanical Properties | Typical | | Expected Minimum | |
|---|---|---|---|---|
| | 3.0 - 9.0mm | 10.0 - 25.0mm | 3.0 - 9.0mm | 10.0 - 25.0mm |
| Yield strength, MPa | 340 | 350 | 300 | 300 |
| Tensile strength, MPa | 480 | 490 | 400 | 400 |
| Elongation % on $L_o$=200mm | 28 | 26 | 16 | 16 |

Material should be used promptly (within 6 months) to avoid the possibility of storage related corrosion and degradation.
Mechanical properties are guaranteed at ambient/room temperatures.

PUBLIC RECORD



# HRS-HA300

Applications : Structural members
Standard : AS/NZS 1594:2002

| Dimension Capabilities | |
|---|---|
| Thickness (mm) | Width (mm) |
| 3.0 - 9.0 | 1219 - 1820 |
| 10.0 - 25.0 | 1219 - 1820 |

| Available Forms | |
|---|---|
| Dry | Picked & Oiled |
| Mill edge coil | N.A |
| Coil-Plate | N.A |

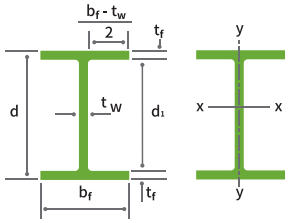
| Fabricating Performance<br>1 = Limited 5 = Excellent | |
|---|---|
| Method | Rating |
| Drawing | 2 |
| Pressing | |
| Bending | 4 |
| Roll-forming | 4 |
| Welding | |

| Standard Plate Sizes |
|---|
| 1220 × 2400 |
| 1520 × 3600 |
| 1820 × 6000 |

PUBLIC RECORD

# 06. WELDED BEAM

## Dimensions and Sectional Properties




### (1) AS/NZS 3679.2:2016 WELDED BEAMS

| Designation | | Depth of Section | Flange | | Web Thickness | Depth Between Flanges | | | Gross Area of Cross Section | About x-axis |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Width | Thickness | | | $d_1$ | $(b_f - t_w)$ | | |
| | | d | $b_f$ | $t_f$ | $t_w$ | $d_1$ | $t_w$ | $2t_f$ | $A_g$ | $I_x$ |
| kg/m | | mm | mm | mm | mm | mm | | | $mm^2$ | $10^6 mm^4$ |
| 1200WB | 455 | 1200 | 500 | 40 | 16 | 1120 | 70.0 | 6.05 | 57900 | 15300 |
| | 423 | 1192 | 500 | 36 | 16 | 1120 | 70.0 | 6.72 | 53900 | 13900 |
| | 392 | 1184 | 500 | 32 | 16 | 1120 | 70.0 | 7.56 | 49900 | 12500 |
| | 342 | 1184 | 400 | 32 | 16 | 1120 | 70.0 | 6.00 | 43500 | 10400 |
| | 317 | 1176 | 400 | 28 | 16 | 1120 | 70.0 | 6.86 | 40300 | 9250 |
| | 278 | 1170 | 350 | 25 | 16 | 1120 | 70.0 | 6.68 | 35400 | 7610 |
| | 249 | 1170 | 275 | 25 | 16 | 1120 | 70.0 | 5.18 | 31700 | 6380 |
| 1000WB | 322 | 1024 | 400 | 32 | 16 | 960 | 60.0 | 6.00 | 41000 | 7480 |
| | 296 | 1016 | 400 | 28 | 16 | 960 | 60.0 | 6.86 | 37800 | 6650 |
| | 258 | 1010 | 350 | 25 | 16 | 960 | 60.0 | 6.68 | 32900 | 5430 |
| | 215 | 1000 | 300 | 20 | 16 | 960 | 60.0 | 7.10 | 27400 | 4060 |
| 900WB | 282 | 924 | 400 | 32 | 12 | 860 | 71.7 | 6.06 | 35900 | 5730 |
| | 257 | 916 | 400 | 28 | 12 | 860 | 71.7 | 6.93 | 32700 | 5050 |
| | 218 | 910 | 350 | 25 | 12 | 860 | 71.7 | 6.76 | 27800 | 4060 |
| | 175 | 900 | 300 | 20 | 12 | 860 | 71.7 | 7.20 | 22300 | 2960 |
| 800WB | 192 | 816 | 300 | 28 | 10 | 760 | 76.0 | 5.18 | 24400 | 2970 |
| | 168 | 810 | 275 | 25 | 10 | 760 | 76.0 | 5.30 | 21400 | 2480 |
| | 146 | 800 | 275 | 20 | 10 | 760 | 76.0 | 6.63 | 18600 | 2040 |
| | 122 | 792 | 250 | 16 | 10 | 760 | 76.0 | 7.50 | 15600 | 1570 |
| 700WB | 173 | 716 | 275 | 28 | 10 | 660 | 66.0 | 4.73 | 22000 | 2060 |
| | 150 | 710 | 250 | 25 | 10 | 660 | 66.0 | 4.80 | 19100 | 1710 |
| | 130 | 700 | 250 | 20 | 10 | 660 | 66.0 | 6.00 | 16600 | 1400 |
| | 115 | 692 | 250 | 16 | 10 | 660 | 66.0 | 7.50 | 14600 | 1150 |

PUBLIC RECORD



1. All welds to AS/NZS 1554.1 Category SP.

| About x-axis | | | About y-axis | | | | Torsion Constant | Warping Constant | Designation | |
|---|---|---|---|---|---|---|---|---|---|---|
| $Z_x$ | $S_x$ | $r_x$ | $I_y$ | $Z_y$ | $S_y$ | $r_y$ | J | $I_w$ | | |
| $10^3mm^3$ | $10^3mm^3$ | mm | $10^6mm^4$ | $10^3mm^3$ | $10^3mm^3$ | mm | $10^3mm^4$ | $10^9mm^6$ | | kg/m |
| 25600 | 28200 | 515 | 834 | 3330 | 5070 | 120 | 22000 | 280000 | 1200WB | 455 |
| 23300 | 25800 | 508 | 750 | 3000 | 4570 | 118 | 16500 | 251000 | | 423 |
| 21100 | 23400 | 500 | 667 | 2670 | 4070 | 116 | 12100 | 221000 | | 392 |
| 17500 | 19800 | 488 | 342 | 1710 | 2630 | 88.6 | 9960 | 113000 | | 342 |
| 15700 | 17900 | 479 | 299 | 1500 | 2310 | 86.1 | 7230 | 98500 | | 317 |
| 13000 | 15000 | 464 | 179 | 1020 | 1600 | 71.1 | 5090 | 58700 | | 278 |
| 10900 | 12900 | 449 | 87.0 | 633 | 1020 | 52.4 | 4310 | 28500 | | 249 |
| 14600 | 16400 | 427 | 342 | 1710 | 2620 | 91.3 | 9740 | 84100 | 1000WB | 322 |
| 13100 | 14800 | 420 | 299 | 1490 | 2300 | 89.0 | 7010 | 73000 | | 296 |
| 10700 | 12300 | 406 | 179 | 1020 | 1590 | 73.8 | 4870 | 43400 | | 258 |
| 8120 | 9570 | 385 | 90.3 | 602 | 961 | 57.5 | 2890 | 21700 | | 282 |
| 12400 | 13600 | 399 | 341 | 1710 | 2590 | 97.5 | 8870 | 67900 | 900WB | 257 |
| 11000 | 12200 | 393 | 299 | 1490 | 2270 | 95.6 | 6150 | 58900 | | 215 |
| 8930 | 9960 | 282 | 179 | 1020 | 1560 | 80.2 | 4020 | 35000 | | 218 |
| 6580 | 7500 | 364 | 90.1 | 601 | 931 | 63.5 | 2060 | 17400 | | 175 |
| 7290 | 8060 | 349 | 126 | 840 | 1280 | 71.9 | 4420 | 19600 | 800WB | 192 |
| 6140 | 6840 | 341 | 86.7 | 631 | 964 | 63.7 | 2990 | 13400 | | 168 |
| 5100 | 5730 | 331 | 69.4 | 505 | 775 | 61.1 | 1670 | 10600 | | 146 |
| 3970 | 4550 | 317 | 41.7 | 334 | 519 | 51.7 | 921 | 6280 | | 122 |
| 5760 | 6390 | 306 | 97.1 | 706 | 1080 | 66.4 | 4020 | 11500 | 700WB | 173 |
| 4810 | 5370 | 299 | 65.2 | 521 | 798 | 58.4 | 2690 | 7640 | | 150 |
| 3990 | 4490 | 290 | 52.1 | 417 | 642 | 56.0 | 1510 | 6030 | | 130 |
| 3330 | 3790 | 281 | 41.7 | 334 | 516 | 53.5 | 888 | 4770 | | 115 |

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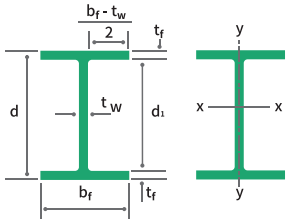
# 07. WELDED COLUMN

## Dimensions and Sectional Properties




### (1) AS/NZS 3679.2:2016 WELDED COLUMNS

| Designation | | Depth of Section | Flange | | Web Thickness | Depth Between Flanges | | | Gross Area of Cross Section | About x-axis |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Width | Thickness | | | $d_1$ | $(b_f - t_w)$ | | |
| | | d | $b_f$ | $t_f$ | $t_w$ | $d_1$ | $t_w$ | $2t_f$ | $A_g$ | $I_x$ |
| kg/m | | mm | mm | mm | mm | mm | | | $mm^2$ | $10^6 mm^4$ |
| 500WC | 440 | 480 | 500 | 40 | 40 | 400 | 10.0 | 5.75 | 56000 | 2150 |
| | 414 | 480 | 500 | 40 | 32 | 400 | 12.5 | 5.85 | 52800 | 2110 |
| | 383 | 472 | 500 | 36 | 32 | 400 | 12.5 | 6.50 | 48800 | 1890 |
| | 340 | 514 | 500 | 32 | 25 | 450 | 18.0 | 7.42 | 43200 | 2050 |
| | 290 | 506 | 500 | 28 | 20 | 450 | 22.5 | 8.57 | 37000 | 1750 |
| | 267 | 500 | 500 | 25 | 20 | 450 | 22.5 | 9.60 | 34000 | 1560 |
| | 228 | 490 | 500 | 20 | 20 | 450 | 22.5 | 12.0 | 29000 | 1260 |
| 400WC | 362 | 430 | 400 | 40 | 40 | 350 | 8.75 | 4.50 | 46000 | 1360 |
| | 328 | 430 | 400 | 40 | 28 | 350 | 12.5 | 4.65 | 41800 | 1320 |
| | 303 | 422 | 400 | 36 | 28 | 350 | 12.5 | 5.17 | 38600 | 1180 |
| | 270 | 414 | 400 | 32 | 25 | 350 | 14.0 | 5.86 | 34400 | 1030 |
| | 212 | 400 | 400 | 25 | 20 | 350 | 17.5 | 7.60 | 27000 | 776 |
| | 181 | 390 | 400 | 20 | 20 | 350 | 17.5 | 9.50 | 23000 | 620 |
| | 144 | 382 | 400 | 16 | 16 | 350 | 21.9 | 12.0 | 18400 | 486 |
| 350WC | 280 | 355 | 350 | 40 | 28 | 275 | 9.82 | 4.03 | 35700 | 747 |
| | 258 | 347 | 350 | 36 | 28 | 275 | 9.82 | 4.47 | 32900 | 661 |
| | 230 | 339 | 350 | 32 | 25 | 275 | 11.0 | 5.08 | 29300 | 573 |
| | 197 | 331 | 350 | 28 | 20 | 275 | 13.8 | 5.89 | 25100 | 486 |

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1. All welds to AS/NZS 1554.1 Category SP.

| About x-axis | | | About y-axis | | | | Torsion Constant | Warping Constant | Designation | |
|---|---|---|---|---|---|---|---|---|---|---|
| $Z_x$ | $S_x$ | $r_x$ | $I_y$ | $Z_y$ | $S_y$ | $r_y$ | J | $I_w$ | | |
| $10^3mm^3$ | $10^3mm^3$ | mm | $10^6mm^4$ | $10^3mm^3$ | $10^3mm^3$ | mm | $10^3mm^4$ | $10^9mm^6$ | kg/m | |
| 8980 | 10400 | 196 | 835 | 3340 | 5160 | 122 | 30100 | 40400 | 500WC | 440 |
| 8800 | 10100 | 200 | 834 | 3340 | 5100 | 126 | 25400 | 40400 | | 414 |
| 7990 | 9130 | 197 | 751 | 3000 | 4600 | 124 | 19900 | 35700 | | 383 |
| 7980 | 8980 | 218 | 667 | 2670 | 4070 | 124 | 13100 | 38800 | | 340 |
| 6930 | 7700 | 218 | 584 | 2330 | 3540 | 126 | 8420 | 33300 | | 290 |
| 6250 | 6950 | 214 | 521 | 2080 | 3170 | 124 | 6370 | 29400 | | 267 |
| 5130 | 5710 | 208 | 417 | 1670 | 2540 | 120 | 3880 | 23000 | | 228 |
| 6340 | 7460 | 172 | 429 | 2140 | 3340 | 96.5 | 24800 | 16300 | 400WC | 362 |
| 6140 | 7100 | 178 | 427 | 2140 | 3270 | 101 | 19200 | 16200 | | 328 |
| 5570 | 6420 | 175 | 385 | 1920 | 2950 | 99.8 | 14800 | 14300 | | 303 |
| 4950 | 5660 | 173 | 342 | 1710 | 2610 | 99.8 | 10400 | 12500 | | 270 |
| 3880 | 4360 | 169 | 267 | 1330 | 2040 | 99.4 | 5060 | 9380 | | 212 |
| 3180 | 3570 | 164 | 214 | 1070 | 1640 | 96.4 | 3080 | 7310 | | 181 |
| 2550 | 2830 | 163 | 171 | 854 | 1300 | 96.3 | 1580 | 5720 | | 144 |
| 4210 | 4940 | 145 | 286 | 1640 | 2500 | 89.6 | 16500 | 7100 | 350WC | 280 |
| 3810 | 4450 | 142 | 258 | 1470 | 2260 | 88.5 | 12700 | 6230 | | 258 |
| 3380 | 3910 | 140 | 229 | 1310 | 2000 | 88.4 | 8960 | 5400 | | 230 |
| 2940 | 3350 | 139 | 200 | 1140 | 1740 | 89.3 | 5750 | 4600 | | 197 |

PUBLIC RECORD

# 08. WIRE ROD

## Carbon&Alloy steel Specifications

### (1) Structural steel

| Grade | Standards | | | | Chemical Composition(wt, %) | | |
|---|---|---|---|---|---|---|---|
| | KS-JIS | SAE/AISI | ASTM | DIN/Others | C | Si | Mn |
| S10C | SM10C | 1010 | | CK10 | 0.08~0.13 | 0.15~0.35 | 0.30~0.60 |
| S15C | SM15C | 1015 | | CK15 | 0.13~0.18 | 0.15~0.35 | 0.30~0.60 |
| S20C | SM20C | 1020 | | CK20 | 0.18~0.23 | 0.15~0.35 | 0.30~0.60 |
| S25C | SM25C | 1025 | | CK25 | 0.22~0.28 | 0.15~0.35 | 0.30~0.60 |
| S30C | SM30C | 1030 | | CK30 | 0.27~0.33 | 0.15~0.35 | 0.60~0.90 |
| S35C | SM35C | 1035 | | CK35 | 0.32~0.38 | 0.15~0.35 | 0.60~0.90 |
| S40C | SM40C | 1040 | | CK40 | 0.37~0.43 | 0.15~0.35 | 0.60~0.90 |
| S45C | SM45C | 1045 | | CK45 | 0.42~0.48 | 0.15~0.35 | 0.60~0.90 |
| S50C | SM50C | 1050 | | CK50 | 0.47~0.53 | 0.15~0.35 | 0.60~0.90 |
| S53C | SM53C | 1053 | | CK53 | 0.50~0.56 | 0.15~0.35 | 0.60~0.90 |
| S55C | SM55C | 1055 | | CK55 | 0.52~0.58 | 0.15~0.35 | 0.60~0.90 |
| S58C | SM58C | 1058 | | CK58 | 0.55~0.61 | 0.15~0.35 | 0.60~0.90 |
| XC43 | | | | | 0.40~0.46 | 0.15~0.35 | 0.60~0.90 |
| XC55 | | | | S53CCF | 0.52~0.56 | 0.15~0.35 | 0.60~0.90 |
| S45CR | | | | | 0.42~0.48 | 0.15~0.35 | 0.60~0.90 |
| S55CR | | | | | 0.55~0.58 | 0.15~0.35 | 0.60~0.90 |
| S54CS | | | | S45CHS | 0.44~0.47 | 0.20~0.30 | 0.60~0.90 |
| S53CM | | | | | 0.50~0.56 | 0.15~0.35 | 0.65~0.85 |
| S55CM | | | | | 0.55~0.58 | 0.15~0.35 | 0.60~0.90 |
| S58CM | | | | | 0.55~0.60 | 0.15~0.35 | 0.60~0.90 |
| SAE1006 | SWRCH6A | 1005 | | | ~0.08 | | 0.25~0.40 |
| SAE1045M | S45C | 1045 | | | 0.46~0.50 | 0.20~0.30 | 0.80~1.10 |
| SAE1050M | S50C | 1050 | | | 0.48~0.55 | 0.15~0.35 | 0.90~1.10 |
| LF2 | | | A266Grade2 | SF490V | ~0.30 | 0.15~0.35 | 0.60~1.35 |
| A105 | SM490YB | | | SA105 | ~0.35 | ~0.35 | 0.60~1.05 |

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| Chemical Composition(wt, %) | | | | | | | Designation |
|---|---|---|---|---|---|---|---|
| P | S | Ni | Cr | Mo | Cu | Others | |
| ~0.030 | ~0.035 | | | | | | S10C |
| ~0.030 | ~0.035 | | | | | | S15C |
| ~0.030 | ~0.035 | | | | | | S20C |
| ~0.030 | ~0.035 | | | | | | S25C |
| ~0.030 | ~0.035 | | | | | | S30C |
| ~0.030 | ~0.035 | | | | | | S35C |
| ~0.030 | ~0.035 | | | | | | S40C |
| ~0.030 | ~0.035 | | | | | | S45C |
| ~0.030 | ~0.035 | | | | | | S50C |
| ~0.030 | ~0.035 | | | | | | S53C |
| ~0.030 | ~0.035 | | | | | | S55C |
| ~0.030 | ~0.030 | | | | | | S58C |
| ~0.030 | ~0.035 | | 0.20~0.40 | | | | XC43 |
| ~0.030 | ~0.030 | | 0.10~0.20 | | | | XC55 |
| ~0.030 | ~0.035 | | 0.10~0.20 | | | | S45CR |
| ~0.030 | ~0.035 | | 0.10~0.20 | | | | S55CR |
| ~0.030 | 0.020~0.040 | | ~0.20 | | | | S54CS |
| ~0.030 | 0.025~0.045 | | | | | | S53CM |
| ~0.025 | ~0.025 | | 0.12~0.20 | | | | S55CM |
| ~0.025 | ~0.025 | | 0.10~0.40 | | | | S58CM |
| ~0.030 | ~0.050 | | | | | | SAE1006 |
| ~0.025 | 0.015~0.030 | | | | | | SAE1045M |
| ~0.030 | 0.025~0.040 | | | | | | SAE1050M |
| ~0.035 | ~0.040 | | | | | | LF2 |
| ~0.040 | ~0.050 | | | | | | A105 |

# 08. WIRE ROD

## Carbon&Alloy steel Specifications

### (2) Mn steel

| Grade | Standards | | | | Chemical Composition(wt, %) | | |
|---|---|---|---|---|---|---|---|
| | KS-JIS | SAE/AISI | ASTM | DIN/Others | C | Si | Mn |
| SMN420 | SMN420 | 1520 | LT40 | 20MN2 | 0.17~0.23 | 0.15~0.35 | 1.20~1.50 |
| SMN433 | SMN433 | 1536 | | 28MN6 | 0.30~0.35 | 0.15~0.35 | 1.20~1.50 |
| SMN438 | SMN438 | 1541 | | 35MN2 | 0.35~0.41 | 0.15~0.35 | 1.35~1.65 |
| SMN443 | SMN443 | 1547 | | 40MN2 | 0.40~0.46 | 0.15~0.35 | 1.35~1.65 |
| SAE1541M | | | | | 0.40~0.45 | 0.15~0.35 | 1.40~1.65 |
| SAE1552M | | | | | 0.51~0.54 | 0.15~0.35 | 1.40~1.65 |
| AISI1340 | | 1340 | | | 0.38~0.43 | 0.15~0.35 | 1.60~1.90 |
| S34MNV | SMN430V | | A572 | 32MNV | ~0.37 | ~0.35 | ~1.40 |
| S45MN5 | | | | | 0.42~0.50 | ~0.40 | ~1.40 |

### (3) Cr steel

| Grade | Standards | | | | Chemical Composition(wt, %) | | |
|---|---|---|---|---|---|---|---|
| | KS-JIS | SAE/AISI | ASTM | DIN/Others | C | Si | Mn |
| SCR415(H) | SCR415H | 5115(H) | | 15Cr | 0.12~0.18 | 0.15~0.35 | 0.60~0.90 |
| SCR420(H) | SCR420H | 5120(H) | | 20Cr | 0.18~0.23 | 0.15~0.35 | 0.60~0.90 |
| SCR430(H) | SCR430H | 5130(H) | | 30Cr | 0.28~0.33 | 0.15~0.35 | 0.60~0.90 |
| SCR435H | SCR435H | 5135(H) | | 35Cr | 0.32~0.39 | 0.15~0.35 | 0.60~0.90 |
| SCR440(H) | SCR440H | 5140(H) | | 42Cr | 0.38~0.43 | 0.15~0.35 | 0.60~0.90 |
| SCR420H1 | | | | SCR420H2 | 0.17~0.23 | 0.15~0.35 | 0.55~0.90 |
| SCR420H1V | | | | SCR420H2V | 0.17~0.23 | 0.15~0.35 | 0.55~0.90 |
| SCR420H3VS2 | | | | SCR420HS | 0.17~0.23 | 0.15~0.35 | 0.55~0.90 |
| SCR420H9VS2 | | | | SCR420HS | 0.17~0.23 | 0.15~0.35 | 0.55~0.90 |
| SCR420HB | | | | SAE5120HB | 0.17~0.23 | 0.15~0.35 | 0.55~0.90 |
| 16MnCRS5 | | | | 41CrS4 | 0.14~0.19 | ~0.40 | 1.00~1.30 |

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| Chemical Composition(wt, %) | | | | | | | Designation |
|---|---|---|---|---|---|---|---|
| P | S | Ni | Cr | Mo | Cu | Others | |
| ~0.030 | ~0.030 | | | | | | SMN420 |
| ~0.030 | ~0.030 | | | | | | SMN433 |
| ~0.030 | ~0.030 | | | | | | SMN438 |
| ~0.030 | ~0.030 | | | | | | SMN443 |
| ~0.035 | ~0.050 | | | | | | SAE1541M |
| ~0.035 | 0.010~0.030 | | | | | | SAE1552M |
| ~0.030 | ~0.040 | | | | | | AISI1340 |
| ~0.020 | ~0.020 | | | | | V added | S34MNV |
| ~0.035 | 0.025~0.045 | | | | | Al added | S45MN5 |

| Chemical Composition(wt, %) | | | | | | | Designation |
|---|---|---|---|---|---|---|---|
| P | S | Ni | Cr | Mo | Cu | Others | |
| ~0.030 | ~0.030 | | 0.90~1.20 | | | | SCR415(H) |
| ~0.030 | ~0.030 | | 0.90~1.20 | | | | SCR420(H) |
| ~0.030 | ~0.030 | | 0.90~1.20 | | | | SCR430(H) |
| ~0.030 | ~0.030 | | 0.90~1.20 | | | | SCR435H |
| ~0.030 | ~0.030 | | 0.90~1.20 | | | | SCR440(H) |
| ~0.025 | ~0.025 | | 0.85~1.25 | | | | SCR420H1 |
| ~0.030 | ~0.030 | | 0.85~1.25 | | | | SCR420H1V |
| ~0.030 | 0.020~0.030 | ~0.25 | 0.85~1.25 | | ~0.30 | | SCR420H3VS2 |
| ~0.030 | 0.020~0.030 | ~0.25 | 0.85~1.25 | | ~0.30 | | SCR420H9VS2 |
| ~0.030 | ~0.020 | | 0.85~1.25 | 0.05~0.10 | | B.Nbadded | SCR420HB |
| ~0.035 | 0.020~0.035 | | 0.80~1.10 | | | | 16MnCRS5 |

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# 08. WIRE ROD

## Carbon&Alloy steel Specifications

### (4) Cr-Mo steel

| Grade | Standards | | | | Chemical Composition(wt, %) | | |
|---|---|---|---|---|---|---|---|
| | KS-JIS | SAE/AISI | ASTM | DIN/Others | C | Si | Mn |
| SCM415 | SCM415H | 4115(H) | | 16CrMO4 | 0.13~0.18 | 0.15~0.35 | 0.60~0.90 |
| SCM418 | SCM418H | 4118(H) | | 18CrMO4 | 0.16~0.21 | 0.15~0.35 | 0.60~0.90 |
| SCM420 | SCM420H | 4120(H) | | 20CrMO4 | 0.18~0.23 | 0.15~0.35 | 0.60~0.90 |
| SCM435 | SCM435H | 4135(H) | | 34CrMO4 | 0.33~0.33 | 0.15~0.35 | 0.60~0.90 |
| SCM440 | SCM440H | 4140(H) | A320 L7 | 42CrMO4 | 0.38~0.43 | 0.15~0.35 | 0.60~0.85 |
| SCM445 | SCM445H | 4145(H) | | 50CrMO4 | 0.43~0.48 | 0.15~0.35 | 0.60~0.90 |
| SCM420V | | | | 12CrMO4 | 0.17~0.22 | 0.20~0.35 | 0.50~0.85 |
| SCM445V | | | A193B16 | | 0.43~0.48 | 0.20~0.35 | 0.50~0.85 |
| SCM722H | | | | | 0.19~0.25 | 0.15~0.35 | 0.55~0.90 |
| SCM822H | | | | | 0.20~0.25 | 0.15~0.35 | 0.60~0.90 |
| SCMH1 | | 4120H | | | 0.20~0.25 | 0.15~0.35 | 0.60~1.00 |
| SCMH1M | | 4120H | | | 0.20~0.25 | 0.15~0.35 | 0.70~1.10 |
| SACM645 | SACM1 | | | 41CrAlMo7-10 | 0.40~0.50 | 0.15~0.50 | ~0.60 |
| SCM920HVSI | | | | | 0.17~0.21 | ~0.15 | 0.60~0.85 |
| B5 | STPA25 | | F5/T5 | 8CrMo16-5 | 0.10~0.15 | ~1.00 | ~1.00 |
| B16 | SNB16 | | B21 | 40CrMoV4 | 0.36~0.47 | 0.15~0.35 | 0.45~0.70 |
| F11 | | | A739 B11 | | 0.05~0.15 | 0.50~1.00 | 0.30~0.60 |
| F12 | | | | 15CrMoV5-9 | 0.10~0.15 | ~0.50 | 0.30~0.60 |
| F22 | STPA24 | | B22 | 31CrMo12 | ~0.15 | ~0.50 | 0.30~0.60 |
| F23 | | | | | 0.04~0.10 | ~0.50 | 0.10~0.60 |
| 21CRMOV9 | | | | B50A164B | 0.17~0.25 | 0.30~0.60 | 0.30~0.60 |
| 20CRMOVTIB4-10 | | | | | 0.17~0.23 | ~0.40 | 0.35~0.75 |
| 31CRMOV9 | | | | WNr1.8519 | 0.27~0.34 | ~0.40 | 0.40~0.70 |
| 31CRMO12 | | | | WNr1.8515 | 0.28~0.35 | ~0.40 | 0.40~0.70 |
| 58CRMOV4 | | | | EN17792 | 0.55~0.62 | 0.15~0.40 | 0.70~1.10 |
| A5CM17H1 | SCM420H | 4118(H) | | 18CrMo4 | 0.15~0.21 | 0.15~0.35 | 0.55~0.90 |
| SCM620HSI | | | | | 0.18~0.23 | 0.80~0.95 | 0.40~0.75 |

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| Chemical Composition(wt, %) | | | | | | | Grade |
|---|---|---|---|---|---|---|---|
| P | S | Ni | Cr | Mo | Cu | Others | |
| ~0.030 | ~0.030 | | 0.90~1.20 | 0.15~0.25 | | | SCM415 |
| ~0.030 | ~0.030 | | 0.90~1.20 | 0.15~0.25 | | | SCM418 |
| ~0.030 | ~0.030 | | 0.90~1.20 | 0.15~0.25 | | | SCM420 |
| ~0.030 | ~0.030 | | 0.90~1.20 | 0.15~0.30 | | | SCM435 |
| ~0.030 | ~0.030 | | 0.90~1.20 | 0.15~0.30 | | | SCM440 |
| ~0.030 | ~0.030 | | 0.90~1.20 | 0.15~0.30 | | | SCM445 |
| ~0.030 | ~0.035 | | 0.90~1.20 | 0.15~0.25 | | V added | SCM420V |
| ~0.030 | ~0.030 | | 0.90~1.20 | 0.15~0.30 | | V added | SCM445V |
| ~0.030 | ~0.030 | | 0.95~1.25 | 0.20~0.40 | | | SCM722H |
| ~0.030 | ~0.030 | | 0.90~1.20 | 0.35~0.45 | | | SCM822H |
| ~0.030 | ~0.030 | | 0.90~1.30 | 0.20~0.40 | | | SCMH1 |
| ~0.030 | ~0.030 | | 0.95~1.35 | 0.08~0.15 | | | SCMH1M |
| ~0.030 | ~0.030 | ~0.25 | 1.30~1.70 | 0.15~0.30 | ~0.30 | Ai added | SACM645 |
| ~0.020 | ~0.030 | | 1.25~1.45 | 0.55~0.65 | | Nb added | SCM920HVSI |
| ~0.040 | ~0.030 | | 4.00~6.00 | 0.40~0.65 | | | B5 |
| ~0.035 | ~0.040 | | 0.80~1.15 | 0.50~0.65 | | V added | B16 |
| ~0.030 | ~0.030 | | 1.00~1.50 | 0.44~0.65 | | Al added | F11 |
| ~0.010 | ~0.010 | | 0.80~1.25 | 0.44~0.65 | | | F12 |
| ~0.040 | ~0.040 | | 2.00~2.50 | 0.87~1.13 | | | F22 |
| ~0.030 | ~0.010 | | 1.90~2.60 | 0.05~1.30 | | W,V,Nbadded | F23 |
| ~0.035 | ~0.035 | ~0.60 | 1.20~1.50 | 1.00~1.20 | | V added | 21CRMOV9 |
| ~0.020 | ~0.020 | ~0.20 | 0.9~1.20 | 0.9~1.10 | | Ti,V,B added | 20CRMOVTIB4-10 |
| ~0.025 | ~0.035 | | 2.30~2.70 | 0.15~0.25 | | V added | 31CRMOV9 |
| ~0.020 | ~0.030 | | 2.80~3.30 | 0.30~0.50 | | | 31CRMO12 |
| ~0.035 | ~0.040 | | 0.90~1.20 | 0.15~0.25 | | V added | 58CRMOV4 |
| ~0.030 | 0.015~0.025 | | 0.85~1.25 | 0.15~0.35 | | | A5CM17H1 |
| ~0.020 | ~0.030 | 0.25~0.45 | 2.10~2.40 | 0.20~0.40 | ~0.30 | V,Nb added | SCM620HSI |

PUBLIC RECORD

# NOTE

PUBLIC RECORD

## CONTACT DETAILS

**Website** www.Lavacorp.co.kr

**E-mail** contact@Lavacorp.co.kr

Address

**SOUTH KOREA ( REPUBLIC OF KOREA )**
B-1115, 152 MAGOKSEO-RO,
GANGSEO-GU, SEOUL, 07788

**TAIWAN ( REPUBLIC OF CHINA )**
28F NO. 55, ZHONGZHENG 3RD ROAD
XINXING DISTRICT, KAOHSIUNG 800

PUBLIC RECORD

# Exhibit A-4.1 (1)
# Financial Statements
## (in Korean)

PUBLIC RECORD

# 재 무 상 태 표

제 7기 2021년 12월 31일 현재
제 6기 2020년 12월 31일 현재

회사명 : (주)라바상사 (단위 : 원)

| 과 목 | 제 7(당)기 | 제 6(전)기 |
|---|---|---|
| | 금 액 | 금 액 |

***Non-Confidential Rationale***

***The CONFIDENTIAL document(s) contain commercially sensitive confidential business. We request that this information be treated as strictly confidential, as it would be harmful to LAVA CORPORATION and/or its members if it were disclosed or otherwise made available to the competitors of same.***
***As such, the contents of this exhibit are not included in the public record (non-confidential).***

# 재 무 상 태 표

제 7기 2021년 12월 31일 현재
제 6기 2020년 12월 31일 현재

회사명 : (주)라바상사 (단위 : 원)

| 과 목 | 제 7(당)기 | 제 6(전)기 |
|---|---|---|
| | 금 액 | 금 액 |

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# 손 익 계 산 서

제 7(당)기 2021년 1월 1일부터 2021년 12월 31일까지
제 6(전)기 2020년 1월 1일부터 2020년 12월 31일까지

회사명 : (주)라바상사 (단위 : 원)

| 과 목 | 제 7 (당)기 | 제 6 (전)기 |
|---|---|---|
| | 금 액 | 금 액 |

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# 손 익 계 산 서

제 7(당)기 2021년 1월 1일부터 2021년 12월 31일까지
제 6(전)기 2020년 1월 1일부터 2020년 12월 31일까지

회사명 : (주)라바상사 (단위 : 원)

| 과 목 | 제 7 (당)기 | 제 6 (전)기 |
|---|---|---|
| | 금 액 | 금 액 |

***Non-Confidential Rationale***

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PUBLIC RECORD

# Exhibit A-4.1 (2)
# Financial Statements
## (in English)

# Fianacial Statements - Balance Sheet

For the years ended December 31, 2021
For the years ended December 31, 2020

LAVA Corporation (Unit: KRW)

| Accounts | 2021 | 2020 |
|---|---|---|
| | Amount | Amount |

***Non-Confidential Rationale***

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***As such, the contents of this exhibit are not included in the public record (non-confidential).***

# Fianacial Statements - Balance Sheet

For the years ended December 31, 2021
For the years ended December 31, 2020

LAVA Corporation (Unit: KRW)

| Accounts | 2021 | 2020 |
|---|---|---|
| | Amount | Amount |

***Non-Confidential Rationale***

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***As such, the contents of this exhibit are not included in the public record (non-confidential).***

# Fianancial Statements - Income Statement

For the years ended December 31, 2021
For the years ended December 31, 2020

LAVA Corporation (Unit: KRW)

| Accounts | 2021 | 2020 |
|---|---|---|
| | Amount | Amount |

***Non-Confidential Rationale***

***The CONFIDENTIAL document(s) contain commercially sensitive confidential business. We request that this information be treated as strictly confidential, as it would be harmful to LAVA CORPORATION and/or its members if it were disclosed or otherwise made available to the competitors of same.***
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PUBLIC RECORD

# Fianancial Statements - Income Statement

For the years ended December 31, 2021
For the years ended December 31, 2020

LAVA Corporation (Unit: KRW)

| Accounts | 2021 | 2020 |
|---|---|---|
| | Amount | Amount |

***Non-Confidential Rationale***

***The CONFIDENTIAL document(s) contain commercially sensitive confidential business. We request that this information be treated as strictly confidential, as it would be harmful to LAVA CORPORATION and/or its members if it were disclosed or otherwise made available to the competitors of same.***
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PUBLIC RECORD

# Exhibit A-4.2 (1)
# 2021 Tax Return

*This document is a translation of the next page.*

PUBLIC RECORD

# LAVA Corporation
# Tax Return

Business Year : 7th (January 01, 2021 ~ December 31, 2021)

SUNGYUL Accounting Corporation

PUBLIC RECORD

# 주식회사 라바상사
# 세무조정계산서

제 7 기(2021 년 1 월 1 일~2021 년 12 월 31 일)

| 조정반번호 | 서울 | - | 1 | 7 | 3 | 6 |
|---|---|---|---|---|---|---|

SUNGYUL ACCOUNTING CORPORATION 성율회계법인

PUBLIC RECORD

***Non-Confidential Rationale***

***The CONFIDENTIAL document(s) contain commercially sensitive confidential business. We request that this information be treated as strictly confidential, as it would be harmful to LAVA CORPORATION and/or its members if it were disclosed or otherwise made available to the competitors of same.***
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***Non-Confidential Rationale***

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PUBLIC RECORD

# Exhibit A-4.2 (2)
# 2020 Tax Return

*This document is a translation of the next page.*

PUBLIC RECORD

# LAVA Corporation
# Tax Return

Business Year : 6th (January 01, 2020 ~ December 31, 2020)

SUNGYUL Accounting Corporation

PUBLIC RECORD

# 주식회사 라바상사
# 세무조정계산서

제 6 기(2020 년 1 월 1 일~2020 년 12 월 31 일)

| 조정반번호 | 서울 | - | 1 | 7 | 3 | 6 |
|---|---|---|---|---|---|---|

SUNGYUL ACCOUNTING CORPORATION 성율회계법인

PUBLIC RECORD

***Non-Confidential Rationale***

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PUBLIC RECORD

# Exhibit A-4.2 (3)
# Reconciliation between Financial Statements and Tax Returns

# Reconciliation between Financial Statements and Tax Returns

**LAVA Corporation**

- **Reconciliation Chart between Financial Statements and Tax Returns**

***Non-Confidential Rationale***

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# Reconciliation between Financial Statements and Tax Returns

**LAVA Corporation**

- **Income Statement in Exhibit A-4.1 (2)**

## Financial Statements - Income Statement

For the years ended December 31, 2021
For the years ended December 31, 2020

LAVA Corporation (Unit: KRW)

| Accounts | 2021 | 2020 |
|---|---|---|
| | Amount | Amount |

***Non-Confidential Rationale***

***The CONFIDENTIAL document(s) contain commercially sensitive confidential business. We request that this information be treated as strictly confidential, as it would be harmful to LAVA CORPORATION and/or its members if it were disclosed or otherwise made available to the competitors of same.***
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PUBLIC RECORD

# Reconciliation between Financial Statements and Tax Returns

**LAVA Corporation**

- **Income Statement in Exhibit A-4.1 (2)**

## Financial Statements - Income Statement

For the years ended December 31, 2021
For the years ended December 31, 2020

LAVA Corporation (Unit: KRW)

| Accounts | 2021 | 2020 |
|---|---|---|
| | Amount | Amount |

***Non-Confidential Rationale***

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# Reconciliation between Financial Statements and Tax Returns

**LAVA Corporation**

- **FY 2021 Income Statement in Exhibit A-4.2 (1)**

***Non-Confidential Rationale***

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***As such, the contents of this exhibit are not included in the public record (non-confidential).***

# Reconciliation between Financial Statements and Tax Returns

**LAVA Corporation**

- **FY 2021 Income Statement in Exhibit A-4.2 (1)**

***Non-Confidential Rationale***

***The CONFIDENTIAL document(s) contain commercially sensitive confidential business. We request that this information be treated as strictly confidential, as it would be harmful to LAVA CORPORATION and/or its members if it were disclosed or otherwise made available to the competitors of same.***
***As such, the contents of this exhibit are not included in the public record (non-confidential).***

# Reconciliation between Financial Statements and Tax Returns

**LAVA Corporation**

- **FY 2021 Income Statement in Exhibit A-4.2 (1)**

***Non-Confidential Rationale***

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# Reconciliation between Financial Statements and Tax Returns

**LAVA Corporation**

- **FY 2020 Income Statement in Exhibit A-4.2 (2)**

***Non-Confidential Rationale***

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# Reconciliation between Financial Statements and Tax Returns

**LAVA Corporation**

- **FY 2020 Income Statement in Exhibit A-4.2 (2)**

***Non-Confidential Rationale***

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# Reconciliation between Financial Statements and Tax Returns

**LAVA Corporation**

- **FY 2020 Income Statement in Exhibit A-4.2 (2)**

***Non-Confidential Rationale***

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***As such, the contents of this exhibit are not included in the public record (non-confidential).***

PUBLIC RECORD

# Exhibit A-4.5 (1)
# 2021 Trial Balance
## (in Korean)

PUBLIC RECORD

# 합계잔액시산표

2021년 12월 31일 현재

회사명 : (주)라바상사 (단위 : 원)

| 차 변 | | 계 정 과 목 | 대 변 | |
|---|---|---|---|---|
| 잔 액 | 합 계 | | 합 계 | 잔 액 |

***Non-Confidential Rationale***

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***As such, the contents of this exhibit are not included in the public record (non-confidential).***

# 합계잔액시산표

2021년 12월 31일 현재

회사명 : (주)라바상사 (단위 : 원)

| 차 변 | | 계 정 과 목 | 대 변 | |
|---|---|---|---|---|
| 잔 액 | 합 계 | | 합 계 | 잔 액 |

***Non-Confidential Rationale***

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***As such, the contents of this exhibit are not included in the public record (non-confidential).***

# 합계잔액시산표

2021년 12월 31일 현재

회사명 : (주)라바상사 (단위 : 원)

| 차 변 | | 계 정 과 목 | 대 변 | |
|---|---|---|---|---|
| 잔 액 | 합 계 | | 합 계 | 잔 액 |

***Non-Confidential Rationale***

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PUBLIC RECORD

# Exhibit A-4.5 (2)
# 2021 Trial Balance
## (in English)

# Trial Balance

As of December 31, 2021

Lava Corporation (Unit: KRW)

| Debit | | Accounts | Credit | |
|---|---|---|---|---|
| Balance | Total | | Total | Balance |

***Non-Confidential Rationale***

***The CONFIDENTIAL document(s) contain commercially sensitive confidential business. We request that this information be treated as strictly confidential, as it would be harmful to LAVA CORPORATION and/or its members if it were disclosed or otherwise made available to the competitors of same.***
***As such, the contents of this exhibit are not included in the public record (non-confidential).***

# Trial Balance

As of December 31, 2021

Lava Corporation (Unit: KRW)

| Debit | | Accounts | Credit | |
|---|---|---|---|---|
| Balance | Total | | Total | Balance |

***Non-Confidential Rationale***

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***As such, the contents of this exhibit are not included in the public record (non-confidential).***

# Trial Balance

As of December 31, 2021

Lava Corporation (Unit: KRW)

| Debit | | Accounts | Credit | |
|---|---|---|---|---|
| Balance | Total | | Total | Balance |

***Non-Confidential Rationale***

***The CONFIDENTIAL document(s) contain commercially sensitive confidential business. We request that this information be treated as strictly confidential, as it would be harmful to LAVA CORPORATION and/or its members if it were disclosed or otherwise made available to the competitors of same.***
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PUBLIC RECORD

# Exhibit A-4.6
# Chart of Accounts

# Chart of Accounts

LAVA Corporation

| Code | Account Name (in Korean) | Account Name (in English) |
|---|---|---|

***Non-Confidential Rationale***

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***As such, the contents of this exhibit are not included in the public record (non-confidential).***

# Chart of Accounts

LAVA Corporation

| Code | Account Name (in Korean) | Account Name (in English) |
|---|---|---|

***Non-Confidential Rationale***

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PUBLIC RECORD

# Exhibit B-1.1
# Sales Process for
# Exports to Australia

PUBLIC RECORD

# Sales Process for Exports to Australia

**LAVA Corporation**

**Customer Inquiry**

An Australian customer inquires for a purchase to LAVA through telephone or e-mail.

**Sales Order**

LAVA and the Australian customer negotiate the price and quantity through telephone or e-mail and makes a sales contract.

**Purchase Order**

LAVA places an order after negotiations with a manufacturer and makes a purchase contract with the manufacturer.

**Production**

According to manufacturer's production schedule, the goods are produced under the order.

**Shipment and Invoicing**

Once production is completed, the manufacturer ships the goods to the location according to a delivery term and issues commercial invoice and a zero VAT invoice to LAVA, which indicates that the sale is for export.
LAVA organises the shipping of the merchandise under a delivery term as agreed and issues shipping documents such as commercial invoice, packing list, etc. to the Australian Customer.

**Payment**

LAVA collects a payment from the Australian customer[ ]and makes payment to the manufacturer[ ]

PUBLIC RECORD

# Attachment B-2
# Australian Sales

## LAVA Corporation

Review period 1 January 2021 to 31 December 2021

## EXPORT SALES

*Inserted*

| Serial No. | Customer name | Level of trade | Prime | Minimum yield strength specified by product standard | Finished form | Nominal diameter | Length | Deformation pattern along Length |
|---|---|---|---|---|---|---|---|---|
| [0] | [1] | [2] | [3.1] | [3.1] | [3.1] | [3.1] | [3.1] | [3.1] |
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## LAVA Corporation

Review period 1 January 2021 to 31 December 2021

## EXPORT SALES

*Inserted*

| Serial No. | Customer name | Level of trade | MCC | Outer diameter (mm) | Wall thickness (mm) | Length (mm) | Product code | Specification / Standard | Invoice number |
|---|---|---|---|---|---|---|---|---|---|
| [0] | [1] | [2] | [3.2] | [3.3] | [3.4] | [3.5] | [4] | [4.1] | [4.2] |
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## LAVA Corporation

Review period 1 January 2021 to 31 December 2021

## EXPORT SALES

*Inserted*

| Serial No. | Customer name | Level of trade | Invoice date | Date of sale | Quarter | Order number | Shipping terms | Payment terms (days) | Nominal Quantity [MT] | Actual Quantity [MT] | Pieces |
|---|---|---|---|---|---|---|---|---|---|---|---|
| [0] | [1] | [2] | [4.3] | [5] | [6] | [7] | [8] | [9] | [10] | [10.1] | [10.2] |
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## LAVA Corporation

Review period 1 January 2021 to 31 December 2021

## EXPORT SALES

| *Inserted* | | | | | | *Inserted* | *Inserted* | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Serial No.** | **Customer name** | **Level of trade** | **Currency** | **Gross invoice value (USD)** | **Unit Gross Invoice Value (USD/MT)** | **Gross invoice value (KRW)** | **Unit Gross Invoice Value (KRW/MT)** | **Discounts** | **Rebates** | **Other charges** |
| **[0]** | **[1]** | **[2]** | **[11]** | **[12]** | **[12.1]** | **[12.2]** | **[12.3]** | **[13]** | **[14]** | **[15]** |
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## LAVA Corporation

Review period 1 January 2021 to 31 December 2021

## EXPORT SALES

*Inserted*

| Serial No. | Customer name | Level of trade | Net invoice value (USD) | Unit Net invoice value (USD/MT) | Ocean freight (USD) | Unit Ocean freight (USD/MT) | Marine insurance | Unit Marine insurance | FOB export price (USD) |
|---|---|---|---|---|---|---|---|---|---|
| [0] | [1] | [2] | [16] | [16.1] | [17] | [17.1] | [18] | [18.1] | [19] |
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## LAVA Corporation

Review period 1 January 2021 to 31 December 2021

## EXPORT SALES

*Inserted*

| Serial No. | Customer name | Level of trade | Unit FOB export price (USD/MT) | Exchange rate (KRW/USD) | FOB export price (KRW) | Unit FOB export price (KRW/MT) | Packing | Unit Packaging | Inland transport | Unit Inland Transport |
|---|---|---|---|---|---|---|---|---|---|---|
| [0] | [1] | [2] | [19.1] | [20] | [21] | [21.1] | [22] | [22.1] | [23] | [23.1] |
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## LAVA Corporation

Review period 1 January 2021 to 31 December 2021

## EXPORT SALES

*Inserted*

| Serial No. | Customer name | Level of trade | Handling & other (KRW) | Unit Handling & other (KRW/MT) | Warranty expenses | Unit Warranty expenses | Technical support | Unit Technical support | Commission |
|---|---|---|---|---|---|---|---|---|---|
| [0] | [1] | [2] | [24] | [24.1] | [25] | [25.1] | [26] | [26.1] | [27] |
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## LAVA Corporation

Review period 1 January 2021 to 31 December 2021

## EXPORT SALES

| *Inserted* | | | | | | *Inserted* | *Inserted* | |
|---|---|---|---|---|---|---|---|---|
| **Serial No.** | **Customer name** | **Level of trade** | **Unit Commission** | **Other costs** | **Unit Other Expenses** | **Credit Expenses (KRW)** | **Unit Credit Expenses (KRW/MT)** | **Name of Supplier** |
| **[0]** | **[1]** | **[2]** | **[27.1]** | **[28]** | **[28.1]** | [28.2] | [28.3] | **[29]** |
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## LAVA Corporation

Review period 1 January 2021 to 31 December 2021

## EXPORT SALES

*Inserted*

| Serial No. | Customer name | Level of trade | Name of Manufacturer (if different from supplier) | Country of Manufacture | Purchase invoice No. | Purchase invoice date | Purchase volume - Nominal Quantity [MT] |
|---|---|---|---|---|---|---|---|
| [0] | [1] | [2] | [29.1] | [29.2] | [29.3] | [29.4] | [30] |
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## LAVA Corporation

Review period 1 January 2021 to 31 December 2021

## EXPORT SALES

*Inserted*

| Serial No. | Customer name | Level of trade | Purchase volume - Actual Quantity [MT] | Purchase price (USD) | Delivery terms (purchase) | Delivery cost (if incurred separately) | Unit Purchase Price (USD / MT) |
|---|---|---|---|---|---|---|---|
| [0] | [1] | [2] | [30.1] | [30.2] | [30.3] | [30.4] | [30.5] |
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PUBLIC RECORD

# Attachment B-2.2
# Source Data for
# B-2 Australia Sales

**LAVA Corporation**

**Exhibit B-2.2 source data for worksheet 'B-2 Australian sales'**

| Column code | Column title | Source | |
|---|---|---|---|
| | | Accounting code | Exhibit |
| [0] | Serial No. | | Exhibit B-3.1 The two largest samples of export sales to Australia<br>Exhibit B-3.2. Linkage of Samples to B-2 Australia Sales |
| [1] | Customer name | | |
| [2] | Level of trade | | |
| [3.1] | Prime | | |
| [3.1] | Minimum yield strength specified by product standard | | |
| [3.1] | Finished form | | |
| [3.1] | Nominal diameter | | |
| [3.1] | Length | | |
| [3.1] | Deformation pattern along Length | | |
| [3.2] | MCC | | |
| [3.3] | Outer diameter (mm) | | |
| [3.4] | Wall thickness (mm) | | |
| [3.5] | Length (mm) | | |
| [4] | Product code | | |
| [4.1] | Specification / Standard | | |
| [4.2] | Invoice number | | |
| [4.3] | Invoice date | | |
| [5] | Date of sale | | |
| [6] | Quarter | | |
| [7] | Order number | | |
| [8] | Shipping terms | | |
| [9] | Payment terms (days) | | |
| [10] | Nominal Quantity [MT] | | |
| [10.1] | Actual Quantity [MT] | | |
| [10.2] | Pieces | | |
| [11] | Currency | | |
| [12] | Gross invoice value(USD) | | |
| [12.1] | Unit Gross Invoice Value(USD/MT) | | |
| [12.2] | Gross invoice value(KRW) | [ ] | |
| [12.3] | Unit Gross Invoice Value(KRW/MT) | | |
| [13] | Discounts | | |
| [14] | Rebates | | |
| [15] | Other charges | | |
| [16] | Net invoice value(USD) | | |
| [16.1] | Unit Net invoice value(USD/MT) | | |
| [17] | Ocean freight(USD) | [ ] | |
| [17.1] | Unit Ocean freight(USD/MT) | | |
| [18] | Marine insurance | | |
| [18.1] | Unit Marine insurance | | |
| [19] | FOB export price(USD) | | |
| [19.1] | Unit FOB export price (USD/MT) | | |
| [20] | Exchange rate(KRW/USD) | | |
| [21] | FOB export price (KRW) | | |
| [21.1] | Unit FOB export price (KRW/MT) | | |
| [22] | Packing | | |
| [22.1] | Unit Packaging | | |
| [23] | Inland transport | | |
| [23.1] | Unit Inland Transport | | |
| [24] | Handling & other(KRW) | [ ] | |
| [24.1] | Unit Handling & other(KRW/MT) | | |
| [25] | Warranty expenses | | |
| [25.1] | Unit Warranty expenses | | |
| [26] | Technical support | | |
| [26.1] | Unit Technical support | | |
| [27] | Commission | | |
| [27.1] | Unit Commission | | |
| [28] | Other costs | | |
| [28.1] | Unit Other Expenses | | |
| [28.2] | Credit Expenses(KRW) | | |
| [28.3] | Unit Credit Expenses (KRW/MT) | | |
| [29] | Name of Supplier | | |
| [29.1] | Name of Manufacturer (if different from supplier) | | |
| [29.2] | Country of Manufacture | | |
| [29.3] | Purchase invoice No. | | |
| [29.4] | Purchase invoice date | | |
| [30] | Purchase volume - Nominal Quantity [MT] | | |
| [30.1] | Purchase volume - Actual Quantity [MT] | | |
| [30.2] | Purchase price (USD) | | |
| [30.3] | Delivery terms (purchase) | | |
| [30.4] | Delivery cost (if incurred separately) | | |
| [30.5] | Unit Purchase Price (USD / MT) | | |

PUBLIC RECORD

# Exhibit B-3.1(1)

# The Two Largest Samples of Export Sales to Australia

# -Sample1-

# (1) Sample Sales Supporting Documents
## - Export to Australia

### The Largest Export Sale

# (1) Sample of The Largest Export Sale

Index

PUBLIC RECORD

# (1) Sample of The Largest Export Sale

Summary

PUBLIC RECORD

# (1) Sample of The Largest Export Sale

Sales Contract

PUBLIC RECORD

# (1) Sample of The Largest Export Sale

Sales Contract

PUBLIC RECORD

# (1) Sample of The Largest Export Sale

Commercial Invoice

PUBLIC RECORD

# (1) Sample of The Largest Export Sale

Applied Exchange Rate

PUBLIC RECORD

# (1) Sample of The Largest Export Sale

Packing List

PUBLIC RECORD

# (1) Sample of The Largest Export Sale

Bill of Lading

PUBLIC RECORD

# (1) Sample of The Largest Export Sale

Bill of Lading

PUBLIC RECORD

# (1) Sample of The Largest Export Sale

Certificate of Origin

PUBLIC RECORD

# (1) Sample of The Largest Export Sale

Export Permit

PUBLIC RECORD

# (1) Sample of The Largest Export Sale

Bank Statement (Proof of Payment)

PUBLIC RECORD

# (1) Sample of The Largest Export Sale

Summary of Handling and Other Expense

PUBLIC RECORD

# (1) Sample of The Largest Export Sale

PUBLIC RECORD

# (1) Sample of The Largest Export Sale

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# (1) Sample of The Largest Export Sale

PUBLIC RECORD

# (1) Sample of The Largest Export Sale

Purchase Invoice

PUBLIC RECORD

# (1) Sample of The Largest Export Sale

Purchase Invoice

PUBLIC RECORD

# (1) Sample of The Largest Export Sale

Calculation of Credit Expense

PUBLIC RECORD

PUBLIC RECORD

# Exhibit B-3.1(2)

# The Two Largest Samples of Export Sales to Australia

# -Sample2-

# (2) Sample Sales Supporting Documents
## - Export to Australia

## The Second Largest Export Sale

***Non-Confidential Rationale***

***The CONFIDENTIAL document(s) contain commercially sensitive confidential business. We request that this information be treated as strictly confidential, as it would be harmful to LAVA CORPORATION and/or its members if it were disclosed or otherwise made available to the competitors of same.***
***As such, the contents of this exhibit are not included in the public record (non-confidential).***

# (2) Sample of The Second Largest Export Sale

Summary

PUBLIC RECORD

***Non-Confidential Rationale***

***The CONFIDENTIAL document(s) contain commercially sensitive confidential business. We request that this information be treated as strictly confidential, as it would be harmful to LAVA CORPORATION and/or its members if it were disclosed or otherwise made available to the competitors of same.***
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# (2) Sample of The Second Largest Export Sale

Applied Exchange Rate

PUBLIC RECORD

***Non-Confidential Rationale***

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***Non-Confidential Rationale***

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# (2) Sample of The Second Largest Export Sale

Summary of Handling and Other Expense

PUBLIC RECORD

***Non-Confidential Rationale***

***The CONFIDENTIAL document(s) contain commercially sensitive confidential business. We request that this information be treated as strictly confidential, as it would be harmful to LAVA CORPORATION and/or its members if it were disclosed or otherwise made available to the competitors of same.***
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***As such, the contents of this exhibit are not included in the public record (non-confidential).***

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***As such, the contents of this exhibit are not included in the public record (non-confidential).***

# (2) Sample of The Second Largest Export Sale

Calculation of Credit Expense

PUBLIC RECORD

***Non-Confidential Rationale***

***The CONFIDENTIAL document(s) contain commercially sensitive confidential business. We request that this information be treated as strictly confidential, as it would be harmful to LAVA CORPORATION and/or its members if it were disclosed or otherwise made available to the competitors of same.***
***As such, the contents of this exhibit are not included in the public record (non-confidential).***

PUBLIC RECORD

# Exhibit B-3.2

# Linkage of Samples to B-2 Australia Sales

# Linkage of Samples to B-2 Australia Sales

## LAVA Corporation

### The Largest Export Sale Sample #1

| Column Code | FIELD NAME | Reported | Source Documents and Data | Notes |
|---|---|---|---|---|
| [0] | Serial No. | [ | | ] |
| [1] | Customer name | [ | | ] |
| [2] | Level of trade | [ | | ] |
| [3.1] | Prime | [ | | ] |
| [3.1] | Minimum yield strength specified by product standard | [ | | ] |
| [3.1] | Finished form | [ | | ] |
| [3.1] | Nominal diameter | [ | | ] |
| [3.1] | Length | [ | | ] |
| [3.1] | Deformation pattern along Length | [ | | ] |
| [3.2] | MCC | [ | | ] |
| [3.3] | Outer diameter (mm) | [ | | ] |
| [3.4] | Wall thickness (mm) | [ | | ] |
| [3.5] | Length (mm) | [ | | ] |
| [4] | Product code | [ | | ] |
| [4.1] | Specification / Standard | [ | | ] |
| [4.2] | Invoice number | [ | | ] |
| [4.3] | Invoice date | [ | | ] |
| [5] | Date of sale | [ | | ] |
| [6] | Quarter | [ | | ] |
| [7] | Order number | [ | | ] |
| [8] | Shipping terms | [ | | ] |
| [9] | Payment terms (days) | [ | | ] |
| [10] | Nominal Quantity [MT] | [ | | ] |
| [10.1] | Actual Quantity [MT] | [ | | ] |
| [10.2] | Pieces | [ | | ] |
| [11] | Currency | [ | | ] |
| [12] | Gross invoice value(USD) | [ | | ] |
| [12.1] | Unit Gross Invoice Value(USD/MT) | [ | | ] |
| [12.2] | Gross invoice value(KRW) | [ | | ] |
| [12.3] | Unit Gross Invoice Value(KRW/MT) | [ | | ] |
| [13] | Discounts | [ | | ] |
| [14] | Rebates | [ | | ] |
| [15] | Other charges | [ | | ] |
| [16] | Net invoice value(USD) | [ | | ] |
| [16.1] | Unit Net invoice value(USD/MT) | [ | | ] |
| [17] | Ocean freight(USD) | [ | | ] |
| [17.1] | Unit Ocean freight(USD/MT) | [ | | ] |
| [18] | Marine insurance | [ | | ] |
| [18.1] | Unit Marine insurance | [ | | ] |
| [19] | FOB export price(USD) | [ | | ] |
| [19.1] | Unit FOB export price (USD/MT) | [ | | ] |
| [20] | Exchange rate(KRW/USD) | [ | | ] |
| [21] | FOB export price (KRW) | [ | | ] |
| [21.1] | Unit FOB export price (KRW/MT) | [ | | ] |
| [22] | Packing | [ | | ] |
| [22.1] | Unit Packaging | [ | | ] |
| [23] | Inland transport | [ | | ] |
| [23.1] | Unit Inland Transport | [ | | ] |
| [24] | Handling & other(KRW) | [ | | ] |
| [24.1] | Unit Handling & other(KRW/MT) | [ | | ] |
| [25] | Warranty expenses | [ | | ] |
| [25.1] | Unit Warranty expenses | [ | | ] |
| [26] | Technical support | [ | | ] |
| [26.1] | Unit Technical support | [ | | ] |
| [27] | Commission | [ | | ] |
| [27.1] | Unit Commission | [ | | ] |
| [28] | Other costs | [ | | ] |
| [28.1] | Unit Other Expenses | [ | | ] |
| [28.2] | Credit Expenses(KRW) | [ | | ] |
| [28.3] | Unit Credit Expenses (KRW/MT) | [ | | ] |
| [29] | Name of Supplier | [ | | ] |
| [29.1] | Name of Manufacturer (if different from supplier) | [ | | ] |
| [29.2] | Country of Manufacture | [ | | ] |
| [29.3] | Purchase invoice No. | [ | | ] |
| [29.4] | Purchase invoice date | [ | | ] |
| [30] | Purchase volume - Nominal Quantity [MT] | [ | | ] |
| [30.1] | Purchase volume - Actual Quantity [MT] | [ | | ] |
| [30.2] | Purchase price (USD) | [ | | ] |
| [30.3] | Delivery terms (purchase) | [ | | ] |
| [30.4] | Delivery cost (if incurred separately) | [ | | ] |
| [30.5] | Unit Purchase Price (USD / MT) | [ | | ] |

### Notes

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# Linkage of Samples to B-2 Australia Sales

## LAVA Corporation

### The Second Largest Export Sale Sample #2

| Column Code | FIELD NAME | Reported | Source Documents and Data | Notes |
|---|---|---|---|---|
| [0] | Serial No. | [ | | ] |
| [1] | Customer name | [ | | ] |
| [2] | Level of trade | [ | | ] |
| [3.1] | Prime | [ | | ] |
| [3.1] | Minimum yield strength specified by product standard | [ | | ] |
| [3.1] | Finished form | [ | | ] |
| [3.1] | Nominal diameter | [ | | ] |
| [3.1] | Length | [ | | ] |
| [3.1] | Deformation pattern along Length | [ | | ] |
| [3.2] | MCC | [ | | ] |
| [3.3] | Outer diameter (mm) | [ | | ] |
| [3.4] | Wall thickness (mm) | [ | | ] |
| [3.5] | Length (mm) | [ | | ] |
| [4] | Product code | [ | | ] |
| [4.1] | Specification / Standard | [ | | ] |
| [4.2] | Invoice number | [ | | ] |
| [4.3] | Invoice date | [ | | ] |
| [5] | Date of sale | [ | | ] |
| [6] | Quarter | [ | | ] |
| [7] | Order number | [ | | ] |
| [8] | Shipping terms | [ | | ] |
| [9] | Payment terms (days) | [ | | ] |
| [10] | Nominal Quantity [MT] | [ | | ] |
| [10.1] | Actual Quantity [MT] | [ | | ] |
| [10.2] | Pieces | [ | | ] |
| [11] | Currency | [ | | ] |
| [12] | Gross invoice value(USD) | [ | | ] |
| [12.1] | Unit Gross Invoice Value(USD/MT) | [ | | ] |
| [12.2] | Gross invoice value(KRW) | [ | | ] |
| [12.3] | Unit Gross Invoice Value(KRW/MT) | [ | | ] |
| [13] | Discounts | [ | | ] |
| [14] | Rebates | [ | | ] |
| [15] | Other charges | [ | | ] |
| [16] | Net invoice value(USD) | [ | | ] |
| [16.1] | Unit Net invoice value(USD/MT) | [ | | ] |
| [17] | Ocean freight(USD) | [ | | ] |
| [17.1] | Unit Ocean freight(USD/MT) | [ | | ] |
| [18] | Marine insurance | [ | | ] |
| [18.1] | Unit Marine insurance | [ | | ] |
| [19] | FOB export price(USD) | [ | | ] |
| [19.1] | Unit FOB export price (USD/MT) | [ | | ] |
| [20] | Exchange rate(KRW/USD) | [ | | ] |
| [21] | FOB export price (KRW) | [ | | ] |
| [21.1] | Unit FOB export price (KRW/MT) | [ | | ] |
| [22] | Packing | [ | | ] |
| [22.1] | Unit Packaging | [ | | ] |
| [23] | Inland transport | [ | | ] |
| [23.1] | Unit Inland Transport | [ | | ] |
| [24] | Handling & other(KRW) | [ | | ] |
| [24.1] | Unit Handling & other(KRW/MT) | [ | | ] |
| [25] | Warranty expenses | [ | | ] |
| [25.1] | Unit Warranty expenses | [ | | ] |
| [26] | Technical support | [ | | ] |
| [26.1] | Unit Technical support | [ | | ] |
| [27] | Commission | [ | | ] |
| [27.1] | Unit Commission | [ | | ] |
| [28] | Other costs | [ | | ] |
| [28.1] | Unit Other Expenses | [ | | ] |
| [28.2] | Credit Expenses(KRW) | [ | | ] |
| [28.3] | Unit Credit Expenses (KRW/MT) | [ | | ] |
| [29] | Name of Supplier | [ | | ] |
| [29.1] | Name of Manufacturer (if different from supplier) | [ | | ] |
| [29.2] | Country of Manufacture | [ | | ] |
| [29.3] | Purchase invoice No. | [ | | ] |
| [29.4] | Purchase invoice date | [ | | ] |
| [30] | Purchase volume - Nominal Quantity [MT] | [ | | ] |
| [30.1] | Purchase volume - Actual Quantity [MT] | [ | | ] |
| [30.2] | Purchase price (USD) | [ | | ] |
| [30.3] | Delivery terms (purchase) | [ | | ] |
| [30.4] | Delivery cost (if incurred separately) | [ | | ] |
| [30.5] | Unit Purchase Price (USD / MT) | [ | | ] |

### Notes

[ ]

[ ]

[ ]

[ ]

PUBLIC RECORD

# Attachment B-4
# Upwards Sales

**LAVA Corporation**

## Upwards Sales Reconciliation

(Unit: KRW, MT)

| Description | Value | Volume | Source Documents |
|---|---|---|---|
| Revenue in Income Statement | [ ] | [ ] | |
| - Variance* | [ ] | [ ] | |
| Financial year revenue before adjustments | [ ] | [ ] | |
| Difference between the period and financial year | [ ] | [ ] | |
| Total company sales revenue in the period | [ ] | [ ] | Exhibit A-4.1. Financial Statements |
| - Variance* | [ ] | [ ] | |
| Summary of all products sold | [ ] | [ ] | |
| - Goods under consideration (GUC) | [ ] | [ ] | |
| - Other products [ ] | [ ] | [ ] | Exhibit B-4.2. Upwards Sales Reconciliation |
| Goods under consideration (GUC) | [ ] | [ ] | |
| - Domestic Sales | [ ] | [ ] | |
| - Australian Sales | [ ] | [ ] | B-2 Australian Sales |
| - Third Country Sales | [ ] | [ ] | |

PUBLIC RECORD

# Exhibit B-4.2
# Upwards Sales Reconciliation

# Upward Sales Reconciliation

**LAVA Corporation**

- **Reporting Methodology**

## Upward Sales Reconciliation

(Unit: KRW , MT)

| Description | Value | Volume | Source Documents |
|---|---|---|---|
| Revenue in Income Statement | [ | ] | |
| - Variance* | [ | ] | |
| Financial year revenue before adjustments | [ | ] | |
| Difference between the period and financial year | [ | ] | |
| Total company sales revenue in the period | [ | ] | Exhibit A-4.1. Financial Statements |
| - Variance* | [ | ] | |
| Summary of all products sold | [ | ] | |
| - Goods under consideration (GUC) | [ | ] | |
| - Other products [ ] | [ | ] | Exhibit B-4.2. Upwards Sales Reconciliation |
| Goods under consideration (GUC) | [ | ] | |
| - Domestic Sales | [ | ] | |
| - Australian Sales | [ | ] | B-2 Australian Sales |
| - Third Country Sales | [ | ] | |

# Upwards Sales Reconciliation

**LAVA Corporation**

- **Revenue in Income Statement in Exhibit A-4.1 (2)**

***Non-Confidential Rationale***

***The CONFIDENTIAL document(s) contain commercially sensitive confidential business. We request that this information be treated as strictly confidential, as it would be harmful to LAVA CORPORATION and/or its members if it were disclosed or otherwise made available to the competitors of same.***
***As such, the contents of this exhibit are not included in the public record (non-confidential).***

# Upward Sales Reconciliation

LAVA Corporation

***Non-Confidential Rationale***

***The CONFIDENTIAL document(s) contain commercially sensitive confidential business. We request that this information be treated as strictly confidential, as it would be harmful to LAVA CORPORATION and/or its members if it were disclosed or otherwise made available to the competitors of same.***
***As such, the contents of this exhibit are not included in the public record (non-confidential).***

PUBLIC RECORD

# Upward Sales Reconciliation

## LAVA Corporation

| *Inserted* | | | | | | | | | | | | *Inserted* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Serial No. | Customer name | Level of trade | Invoice number | Invoice date | Date of sale | Nominal Quantity [MT] | Actual Quantity [MT] | Pieces | Currency | Gross invoice value (USD) | Unit Gross Invoice Value (USD/MT) | Gross invoice value (KRW) |
| [0] | [1] | [2] | [4.2] | [4.3] | [5] | [10] | [10.1] | [10.2] | [11] | [12] | [12.1] | [12.2] |
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PUBLIC RECORD

# Attachment B-5
# Upward Selling Expenses

## LAVA Corporation

### Upwards Selling Expense Reconciliation

(Unit: KRW)

| Description | Value | Source Documents | Accounting code |
|---|---|---|---|
| Total direct selling expense over the period | [ ] | E-3.1 SG&A listing | [ ] |
| - Variance* | [ ] | | [ ] |
| Summary of all direct selling expense | [ ] | | [ ] |
| - Domestic direct selling expense | [ ] | | [ ] |
| - Australian direct selling expense | [ ] | E-3.1 SG&A listing | [ ] |
| - Other countries | [ ] | E-3.1 SG&A listing | [ ] |

PUBLIC RECORD

# Exhibit B-5.2
# Reconciliation of
# Direct Selling Expense

# Reconciliation of Direct Selling Expense

**LAVA Corporation**

***Non-Confidential Rationale***

***The CONFIDENTIAL document(s) contain commercially sensitive confidential business. We request that this information be treated as strictly confidential, as it would be harmful to LAVA CORPORATION and/or its members if it were disclosed or otherwise made available to the competitors of same.***
***As such, the contents of this exhibit are not included in the public record (non-confidential).***

# Reconciliation of Direct Selling Expense

**LAVA Corporation**

***Non-Confidential Rationale***

***The CONFIDENTIAL document(s) contain commercially sensitive confidential business. We request that this information be treated as strictly confidential, as it would be harmful to LAVA CORPORATION and/or its members if it were disclosed or otherwise made available to the competitors of same.***
***As such, the contents of this exhibit are not included in the public record (non-confidential).***

# Reconciliation of Direct Selling Expense

**LAVA Corporation**

*Inserted*

| Serial No. | Customer name | Level of trade | Invoice number | Invoice date | Ocean freight (USD) | Handling & other (KRW) |
|---|---|---|---|---|---|---|
| [0] | [1] | [2] | [4.2] | [4.3] | [17] | [24] |
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PUBLIC RECORD

# Reconciliation of Direct Selling Expense

**LAVA Corporation**

***Non-Confidential Rationale***

***The CONFIDENTIAL document(s) contain commercially sensitive confidential business. We request that this information be treated as strictly confidential, as it would be harmful to LAVA CORPORATION and/or its members if it were disclosed or otherwise made available to the competitors of same.***
***As such, the contents of this exhibit are not included in the public record (non-confidential).***

PUBLIC RECORD

# Attachment E-3.1
# SG&A Listing

LAVA Corporation

PUBLIC RECORD

## SELLING, GENERAL AND ADMINISTRATIVE EXPENSES

(Unit: KRW, %)

| Classification | Sales Value | Ratio |
|---|---|---|
| | | |
| | | |
| | | |

(Unit: KRW)

| Accounting code | Account name (in English) | Inserted<br>Account name (in Korean) | Direct selling expense? | Expense in accounting period (1 January 2021 to 31 December 2021) | Expense in relevant period (1 January 2021 to 31 December 2021) | Expense related to Australian sales | Expense related to third country sales | Remark |
|---|---|---|---|---|---|---|---|---|
| [1] | [2] | [2.1] | [3] | [4] | [5] | [6] | [7] | |
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PUBLIC RECORD

# Attachment E-3.2
# SG&A Calculation

## LAVA Corporation

## SELLING, GENERAL AND ADMINISTRATIVE EXPENSES

(Unit: KRW, %)

| | Amount for the relevant period (1 January 2021 to 31 December 2021) | Notes |
|---|---|---|
| Net Revenue | [ | ] |
| Total SG&A | [ | ] |
| % | [ | ] |

(Unit: KRW, MT, KRW/MT)

| MCC | Sales revenue over the period | Sales quantity over the period | Unit SG&A |
|---|---|---|---|
| [1] | [2] | [3] | [4] |
| [ | | | ] |