Recommended specification D-1 Table 2 Dimensions, dimensional tolerances and bar arrangement of blocks

Classification		Dimensions mm														Bar arrangement			
	Nominal designation	Upper diameter		Lower diameter							Height					Spiral reinforcing bar [a]		Vertical reinforcing bar	
		a	Tolerances	*b*	Tolerances	*c*	*d*	*e*	*f*	*g* [c]	*h*	Tolerances	*i*	*i'*	*j*	Diameter	Number of windings	Diameter	Quantity (pieces)
Slope wall	600A	600	±5	900	±8	[b] 250	150	[b] 1 100	1 200	60 (80)	300	±5	50	60	30	5.00	6	5.00	20
	600B										450						7		
	600C										600						9		
	600D			1 200					1 500	70					40				
	900	900	±8			150		1 200		(90)				50	—				28
	1 200	1 200		1 500				1 500	1 800	80 (100)									36
Straight wall	900A	900	±8	—	—	150	—	1 200	—	60	300	±5	50	50	—	5.00	6	5.00	20
	900B									(80)	600						9		
	1 200A	1 200						1 500		70	300						6		28
	1 200B									(90)	600						9		
	1 500A	1 500						1 800		80	300						6		36
	1 500B									(100)	600						9		

NOTE : Chamfer, notch and other processing are allowed, if they do not affect the shape and they do not compromise the strength. Products may have a vice, a joint and a footrest fixture.

Notes [a] A spiral reinforcing bar may be alternatively a lateral reinforcing bar.

[b] For 600A, 600B, 600C, and 600D, the dimension (*c*) may be 150 mm and the dimension (*e*) may be 900 mm.

[c] The dimension *g* may be the dimension indicated within ( ).

D-1.5 Bar arrangement

The bar arrangement of blocks shall be as specified in recommended specification D-1 figure 1 and recommended specification D-1 table 2.

D-1.6 Strength test

The strength test of blocks shall be as specified in **D.6.1**.

The tester shall be of Class 1 or superior specified in **JIS B 7721**, or shall be at least equivalent in allowance thereto.

D-1.7 Quality of concrete

The compressive strength of concrete shall be as specified in **D.7.2**.

D-1.8 Inspections

D-1.8.1 Inspection items

The inspection items of blocks shall be as follows.

a) **Final inspection** The final inspection items shall be as follows.

1) Appearance

2) Performance

3) Shape and dimensions

b) **Delivery inspection** The delivery inspection items shall be as follows. However, the delivery inspection may be omitted subjected to the agreement between the parties concerned with delivery.

1) Appearance

2) Shape and dimensions

D-1.8.2 Inspection lot

The size of inspection lot of blocks shall be decided by the manufacturer for final inspection, and by the purchaser for delivery inspection subjected to the agreement between the parties concerned with delivery by considering characteristics of the product, production method, production quantity, production period, ordered quantity, etc. One inspection lot may consist of 300 units or fraction thereof.

D-1.8.3 Inspection methods

The inspection methods of blocks shall be as follows.

a) **Final inspection** The final inspection method shall be as follows.

1) **Appearance** The inspection of appearance shall be conducted by taking arbitrary number of samples per one lot. When they conform to the provisions of **5.1**, the lot shall be accepted. If one or more of them do not conform, the lot shall be inspected 100 %, and accepted when the provisions are conformed.

2) **Performance** The inspection of performance shall be conducted as specified in **D-1.6**. If the inspection conforms to **D-1.3.1**, the lot shall be accepted. If not conformed, the lot shall be rejected.

3) **Shape and dimensions** For the inspection of shape and dimensions, two arbitrary samples per one lot shall be taken. If both of the two conform to the provisions of **D-1.4**, the lot shall be accepted. If one or more of them do not conform, the re-inspection may be conducted.

In the re-inspection, four more blocks shall be taken from the lot and if all the four conform to the provisions of **D-1.4**, the lot shall be accepted after the first non-conforming product is eliminated. If one or more of them do not conform in the re-inspection, the lot shall be rejected.

b) **Delivery inspection** The delivery inspection method shall be as follows.

1) **Appearance** The appearance shall be inspected in the same way as **a**).

2) **Shape and dimensions** The shape and dimensions shall be inspected in the same way as **a**).

D-1.9 Marking

The blocks which conform to all the requirements of this Standard shall be marked as specified in **D.9**.

Annex E (normative)
Surface-drainage ditches

E.1 Outline

This Annex specifies Group I and Group II of surface-drainage ditches which are used mainly for the road shoulder among the RC products specified in this Standard.

E.2 Classification

The classification of surface-drainage ditches shall be as specified in table E.1.

In addition, Group I shall be as specified in table E.2.

Table E.1 Classification of surface-drainage ditches

Major division	Minor division
Surface-drainage ditches	U form gutter
	Top cover type/embedded cover type U form gutter
	L form gutter
	Plate form gutter
	Gutter for drainage pavement and longitudinal pipe
	Longitudinal gradient variable gutter
	Osmotic and permeable gutter
	Others

Table E.2 Classification of Group I of surface-drainage ditches

Classification	Division by application	Division by strength	Detail
U form gutter	Installed mainly in parallel with a driveway.	Class 1	See recommended specification E-1.
Top cover type/ embedded cover type U form gutter	Installed mainly in sidewalks.	Class 1	See recommended specification E-2 and recommended specification E-3.
	Installed in parallel with a driveway where vehicles (one rear-wheel below 32 kN) rarely run nearby the gutters, or when they do, only temporarily at a low speed for evading an oncoming car.	Class 2	See recommended specification E-2.
	Installed in parallel with a driveway where vehicles (one rear-wheel below 50 kN) rarely run nearby the gutters, or when they do, only temporarily at a low speed for evading an oncoming car.	Class 3	See recommended specification E-3.
L form gutter	Installed in parallel with a driveway where vehicles (one rear-wheel below 50 kN) rarely run nearby the gutters, or when they do, only temporarily at a low speed for evading an oncoming car.	—	See recommended specification E-4.

E.3 Performance

The performance of surface-drainage ditches shall conform to the provisions of table E.3.

In addition, the performance items of Group II shall be subjected to the agreement between the parties concerned with delivery.

Table E.3 Performance of surface-drainage ditches

Performance item	Performance	Performance check method
Service stage performance	Shall be safe to be subjected to the regular load assumed at the time of use, and crack width shall be less than the permissible value.	See design document or **E.6**.
End stage performance [a)]	Shall not break due to the load assumed at the time of end stage.	See design document or **E.6**.
Durability [b)]	Durability shall be secured against deterioration assumed.	See design document or actual results.
Workability	Workability for transportation, installation, assembly, etc. shall be secured.	See design document or actual results.

Notes [a)] Confirmation of the end stage performance shall be made when requested by the purchaser.

[b)] Durability may be confirmed by the actual results of such similar products as are equivalent in terms of water-cement ratio and/or air content, and reinforcing bar cover.

E.4 Shape, dimensions and dimensional tolerances

The shape, dimensions and dimensional tolerances of surface-drainage ditches shall be as follows. As to Group I, if the design concept is not different, and if the performance (quality) and performance (quality) check method are the same, the reference dimension may be changed within ± 10 % in response to the purchaser's demand, provided that the necessary performance (quality) is satisfied.

a) **Shape** The shapes of surface-drainage ditches are shown in figure E.1 to figure E.4.

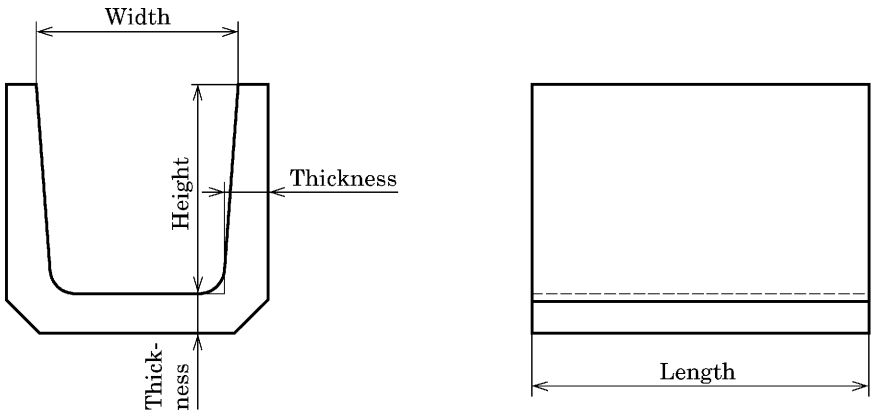
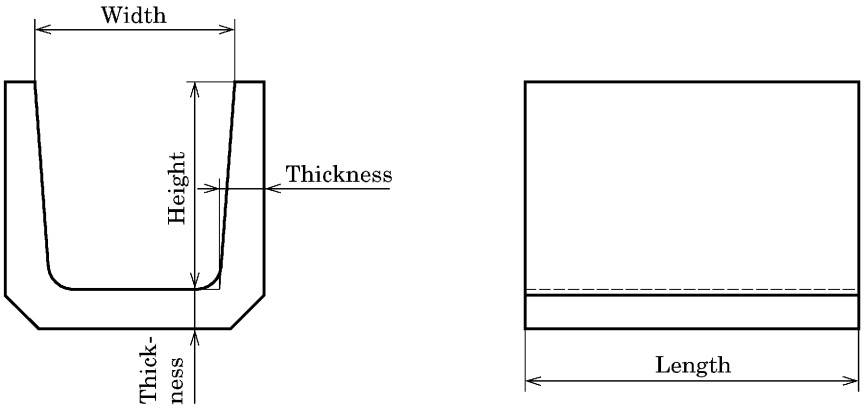


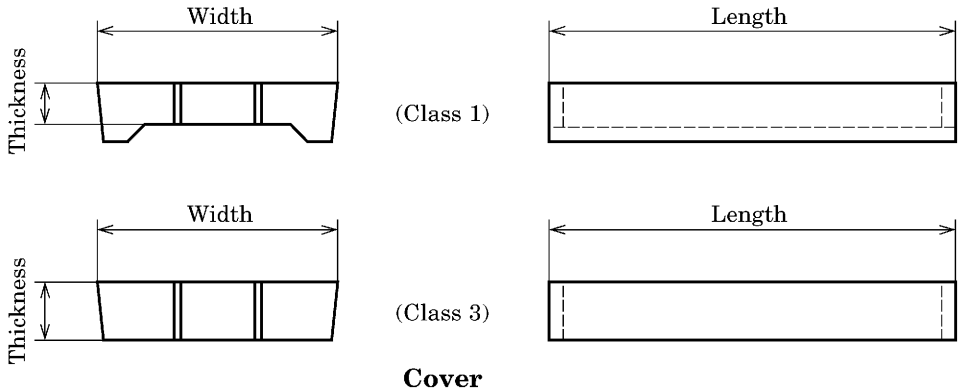
Figure E.1 Example of shape of U form gutter

Cover (Class 1, Class 2)

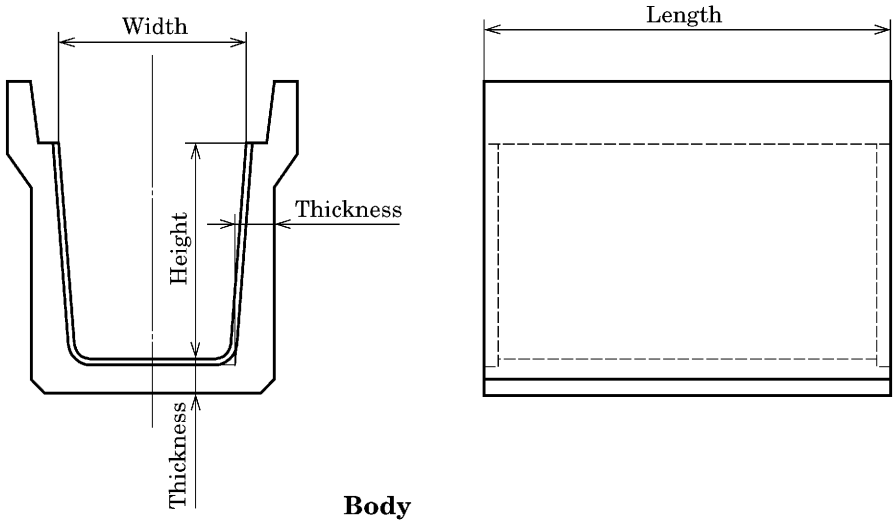


Body

Figure E.2 Example of shape of top cover type U form gutter



Cover



Body

Figure E.3 Example of shape of embedded cover type U form gutter

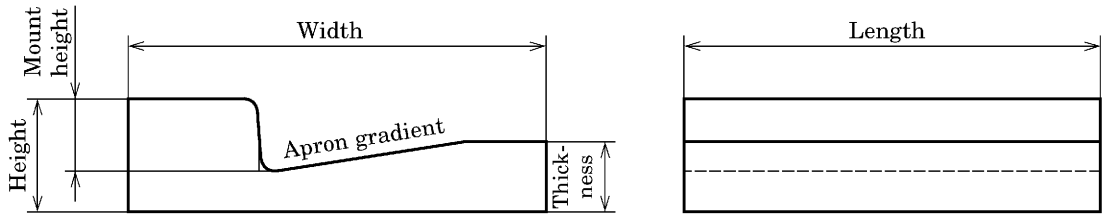


Figure E.4 Example of shape of L form gutter

b) **Dimensions and dimensional tolerances** The dimensions and dimensional tolerances of the products classified into Group I shall be as specified in table E.4 to table E.6. The dimensions and dimensional tolerances of the products classified into Group II shall be subjected to the agreement between the parties concerned with delivery.

1) **U form gutter** The dimensions and dimensional tolerance of U form gutter shall be as specified in table E.4.

Table E.4 Dimensions and dimensional tolerance of U form gutter

Unit: mm

Classification		Width	Height	Length	Thickness
U form gutter	Dimensions	150 to 600	150 to 600	600 to 2 000	35 to 80
	Tolerances	±2	±2	±3 [a)]	±3
NOTE 1 The inside surface of gutter may have chamfer, notch, practical acceptable roughness, and other processing which do not affect the shape or compromise the strength.					
NOTE 2 The gutter may also have a hang hole at the centre-of-gravity, provided that it does not affect the strength of products. Also it may have a vice and a joint.					
Note [a)] The tolerances on the length of 1 000 mm shall be ±5 mm and those on the length of 2 000 m shall be ±6 mm.					

2) **Top cover type/embedded cover type U form gutter** The dimensions and dimensional tolerances of top cover type/embedded cover type U form gutter shall be as specified in table E.5.

Table E.5 Dimensions and dimensional tolerances of top cover type/ embedded cover type U form gutter

Unit: mm

Classification		Width	Height	Length	Thickness
Top cover type U form gutter	Body dimensions	150 to 600	150 to 600	600 to 2 000	35 to 80
	Tolerances	±2	±2	±3 [a)]	±3
	Cover dimensions	210 to 740	—	500 to 600	35 to 150
	Tolerances	±3	—	±3	±2
Embedded cover type U form gutter	Body dimensions	250 to 500	250 to 600	1 000 to 2 000	55 to 90
	Tolerances	±3	±3	±6	±3
	Cover dimensions	362 to 622	—	500	90 to 125
	Tolerances	±3	—	±3	±3

NOTE 1 The inside surface and cover of body may have chamfer, notch, practical acceptable roughness or patterning an exposed face, and other processing which do not affect the shape or compromise the strength.

NOTE 2 The body may also have a hang hole at the centre-of-gravity, provided that it does not affect the strength of products. Also it may have a vice and a joint.

NOTE 3 The cover may be provided with a handle, grating, steel bar, rubber bar, or other special functions.

Note [a)] The tolerances on the length of 1 000 mm shall be ±5 mm and those on the length of 2 000 mm shall be ±6 mm.

3) **L form gutter** The dimensions and dimensional tolerances of L form gutter shall be as specified in table E.6.

Table E.6 Dimensions and dimensional tolerances of L form gutter

Unit: mm

Classification			Width	Height	Length	Mount height	Thickness
L form gutter	Dimensions	Mount height 100 or less	350 to 550	155 to 175	600	100 [a)]	85 to 105
		Mount height over 100	665 to 705	270 to 370	2 000 [b)]	150 to 250 [a)]	150
	Tolerances		±2	±3	±3 [c)]	±2	±3

NOTE 1 Working such as chamfering, notching, patterning on exposed face, washing out and chipping on L form gutter of such a degree that the strength and the function of the body (water flow, driver's visual guidance, etc.) are not compromised is permissible. Moreover, a lifting implement and a connector may be attached.

NOTE 2 Special function such as attaching safety signs (reflecting plate, etc.) to L form gutter may be added. The specific specification (performance, attaching position, etc.) shall be according to the designation of the purchaser.

NOTE 3 The apron gradient may be 2/100 to 1/10.

Notes [a)] The mount height may be 20 mm to 50 mm. Moreover, the mount height may have different dimension for each left and right in longitudinal direction.

[b)] The length of gutters of mount height of over 100 mm may be 600 mm. The tolerances in the case of 600 mm shall be ±3 mm.

[c)] The tolerances in the case of the length of 2 000 mm shall be ±6 mm.

E.5 Bar arrangement

The bar arrangement shall be as specified in **JIS A 5364** and a design document. However, subjected to the agreement between the parties concerned with delivery, the bar arrangement other than that of the recommended specification may be adopted in the range in which the product performance (including the provisions of **E.3**) is not compromised.

E.6 Test methods

E.6.1 Compressive strength test

The compressive strength test shall be as specified in **JIS A 1132** and **JIS A 1108**.

E.6.2 Bending strength test

The bending strength test shall be as specified in **JIS A 5363**.

The tester shall be of Class 1 or superior specified in **JIS B 7721**, or shall be at least equivalent in allowance thereto.

E.7 Quality of concrete

E.7.1 Material and production method

The material for concrete and the production method shall be as specified in **JIS A 5364**.

E.7.2 Compressive strength

The compressive strength of concrete shall be verified by the compressive strength of the sample which has been processed by the same curing as the product or the compressive strength which has been controlled properly. When the predetermined material aging is finished, the compressive strength shall satisfy the values indicated in table E.7.

In addition, products of Group II shall be subjected to the agreement between the parties concerned with delivery.

Table E.7 Compressive strength of concrete

Unit: N/mm^2

Classification	Compressive strength of concrete
U form gutter	24 or more
Top cover type U form gutter	24 or more (Class 1) and 27 or more (Class 2)
Embedded cover type U form gutter	27 or more
L form gutter	27 or more
NOTE : The compressive strength of concrete may refer to Annex A of **JIS A 5364**.	

E.8 Inspections

Inspections shall be as specified in **JIS A 5365** and the following.

a) **Final inspection** The final inspection of surface-drainage ditches shall be conducted for the appearance, performance, shape and dimensions, and shall be as follows.

1) **Appearance** For the appearance, it shall be a 100 % inspection or a sampling inspection in consideration of the characteristics of product, production method, production quantity, etc.

2) **Performance, shape and dimensions** For the performance, shape and dimensions, the inspection shall be a sampling inspection.

When the performance is inspected by a sample as alternative characteristics, the correlation between the sample and the product shall be established.

3) **Size of inspection lot** The size of inspection lot shall be determined by the manufacturer in consideration of the characteristics of product, production method, production quantity, production period, ordered quantity, etc.

Any product in the inspection lot shall have the same characteristics, and shall be manufactured using the same materials, concrete mix proportion and production method, etc.

b) **Delivery inspection** The delivery inspection of surface-drainage ditches shall be conducted for the appearance, shape and dimensions. The size of inspection lot and the sampling method shall be subjected to the agreement between the parties concerned with delivery, and shall be specified by the purchaser. The delivery inspection may be omitted subjected to the agreement between the parties concerned with delivery.

E.9 Marking

The marking items on surface-drainage ditches shall be the following as specified in **JIS A 5361**.

a) Classification or its abbreviation

b) Manufacturer's name or its abbreviation

c) Date of manufacture or its abbreviation

d) When recycle material is used, the statement to that effect

E.10 Others (**recommended specification**)

Group I of surface-drainage ditches is shown in table E.8.