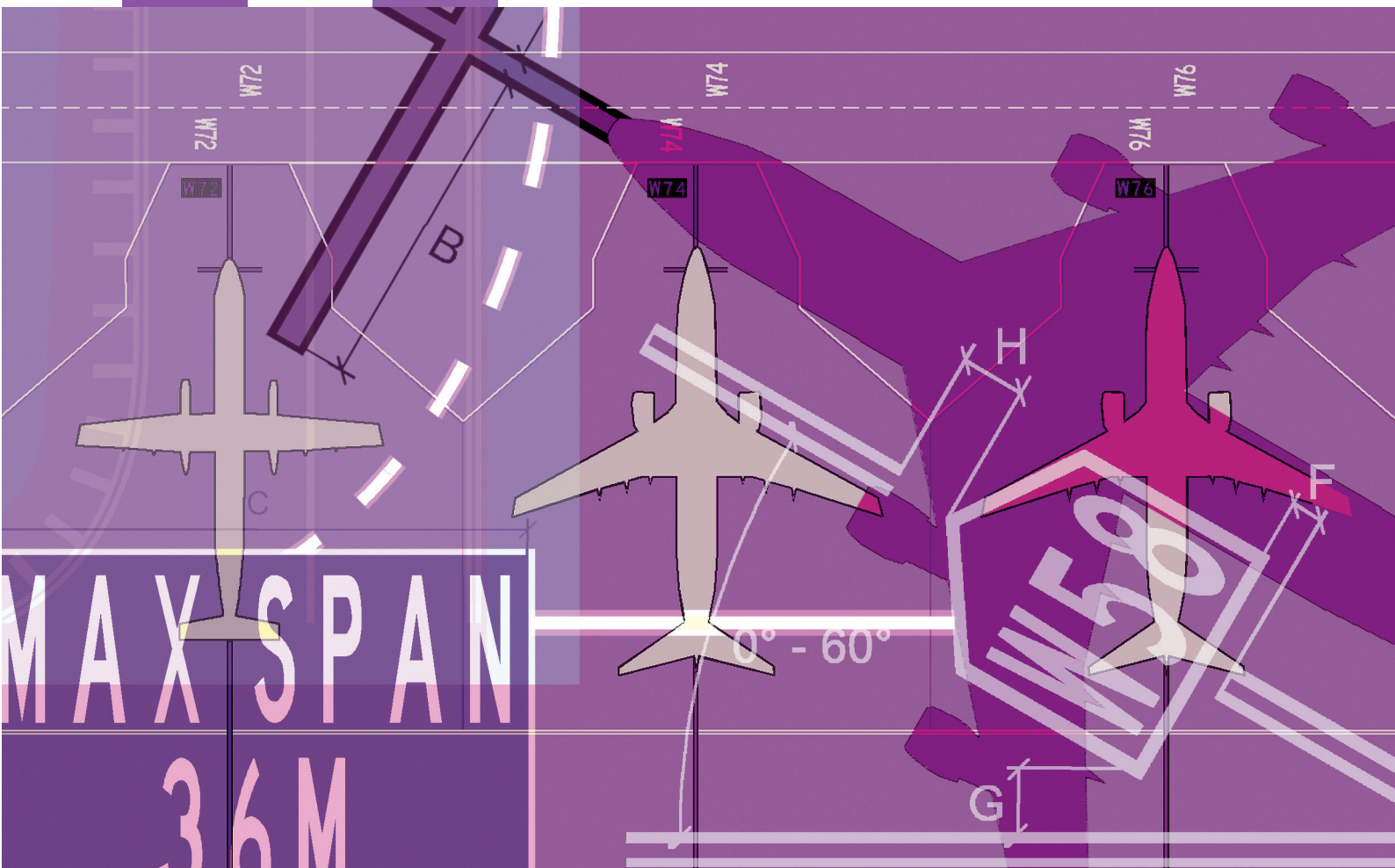


HANDBOOK

2nd Edition 2009



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FOREWORD TO THE SECOND EDITION

ACI believes that the first edition of this handbook (published in 2001) has made a significant contribution to safer apron environments, by fostering greater uniformity in the markings and signs provided by airport operators at airports world wide. Since then, best practices have continued to evolve, and based on ACI members' experience of using new or revised markings and signs, the ACI Operational Safety Sub-committee (OSSC) was tasked with reviewing the first edition.

ACI would like to thank all the OSSC members, and in particular Gerhard Gruber, of Vienna International Airport, and his colleagues Oliver Russ and Dietmar Schreiber, who prepared the draft of the text and graphics, and implemented amendments after discussion. Following extensive industry consultation, the result is contained in this second edition of the Handbook.

ACI's thanks are also due to ICAO for its assistance - especially to members of the Visual Aids Working Group of the Aerodromes Panel for reviewing the draft and providing comments. ACI also thanks Jean-Noël Massot of Aéroports de Paris who has ably represented ACI on the Visual Aids Working Group for many years. ACI will continue to work with ICAO on all aspects of aerodrome safety.

This handbook is intended for use by planners of apron areas, ground staff working on aprons, air traffic controllers, apron controllers and pilots. ACI believes that it is a useful complement to ICAO documentation, such as Annex 14, Volume I (Aerodrome Design and Operations) and the Aerodrome Design Manual, Part 4 (Visual Aids). The latter document states that "Additional guidance on apron markings is given in the ACI/IATA Apron Markings and Signs Handbook which gives examples of current best practices." (paragraph 2.1.2).

ACI would welcome any comments or feedback, which should be sent electronically to safety@aci.aero or in hard copy to:

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PRINCIPLES

1.1 RECOMMENDED COLOURS

ICAO Annex 14 provides that, "Taxiway markings, runway turn pad markings and aircraft stand markings shall be yellow" (5.2.1.5). There are no standards provided for the colours of other apron markings, except that "Apron safety lines shall be of a conspicuous colour which shall contrast with that used for aircraft stand markings" (5.2.1.6).

Aircraft stand markings are further described in section 5.2.13 of Annex 14, and Apron Safety Lines in section 5.2.14.

A **Mandatory Instruction Marking** as specified in ICAO Annex 14, section 5.2.16, shall consist of an inscription in white on a red background.

An **Information Marking**, as specified in ICAO Annex 14, section 5.2.17 shall consist of an:

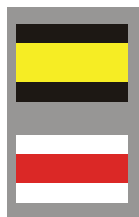
- inscription in yellow upon a black background, if it replaces or supplements a location sign
- inscription in black upon a yellow background if it replaces or supplements a direction or destination sign

The proposed colour coding of apron markings is therefore:

	Yellow	Indicates taxiway / taxilane centre line markings and aircraft stand markings intended for the safe manoeuvring of aircraft (ICAO). (See Note 1 below *)
	White	Indicates apron markings intended to regulate vehicle traffic and vehicle parking.
	Red	Indicates danger and borders where crossing is prohibited.
	Blue	Indicates subsidiary taxilane centre line, where alternative centre line routings are available (under ATC control). See note below.
	Orange	Indicates second subsidiary taxilane centre line, where alternative centre line routings are available (under ATC control). See note below.
	Green	Any other purposes as required locally.

Note: These colours are presently used in several European airports - see section 2.6 for full description

To increase visibility of markings at night, in low visibility conditions, and where contrast between marking and pavement is insufficient, they should have a border in contrasting colour on both sides.



Black Border For yellow and white markings on light coloured pavements (e.g. concrete).

White Border For red markings on dark coloured pavement (e.g. bitumen).

1.2 USING THIS HANDBOOK

Throughout the document the dimensions of markings are listed in tables as shown in the example below. Some of these tables have multiple lines as there are several options available for use to airport operators. The dimensions of markings must be determined based on the needs of the apron environment and operations at the specific location but should not differ from the recommendations contained in this handbook or in relevant local, national or international guidance material.

Example of dimensions table:

Dimensions	A	B	C	D
Option 1:	0.2m min.	0.1m	2.0m	2.0m
Option 2:	0.2m min.	0.1m	4.0m	4.0m

Example of a colour table:

Colour	Centre line	Border
	Yellow	Black

1.3 RECOMMENDED CHARACTERISTICS

- 1.3.1** According to ICAO **lines for the safe manoeuvring of aircraft** should have a width of not less than 0.15m (Annex 14, Recommendation 5.2.13.6).

ACI recommendation: For better visibility it is recommended that these lines should be a minimum of 0.2m in width.

- 1.3.2** According to ICAO apron safety lines (e.g. service roads, parking areas) should have a width of at least 0.1m (Annex 14, Recommendation 5.2.14.4).

ACI recommendation: For better visibility it is recommended that these lines should be a minimum of 0.15m in width. For stand safety lines it is recommended to use a width of not less than 0.2m.

- 1.3.3** According to ICAO at aerodromes where operations take place at night, pavement markings should be made with **reflective materials** designed to enhance the visibility of the markings (Annex 14, Recommendation 5.2.17). Guidance on reflective materials is given in the ICAO Aerodrome Design Manual, Part 4.

- 1.3.4** According to ICAO, the **character height** for both mandatory instruction markings (e.g. direction and destination), and information markings should be 4m (Annex 14, Recommendation 5.2.17.8).

ACI recommendation: Where space is limited, especially when parking stands have multiple centre lines, the character size can be reduced, but it is recommended not to use less than 2m character height, where the marking is to be read from the flight deck.

ACI recommendation: In case of space constraints, and to prevent confusion, **characters which need only be readable from a stationary position on the apron** (e.g. marshaller stop, stand identification on parking stand) should be a minimum of 0.5m in height.

- 1.3.5** According to ICAO the **form and proportions of characters** used for mandatory instruction markings and information markings should be in accordance with ICAO Annex 14, Appendix 3. (See Chapter 5 of this handbook).

- 1.3.6** Information markings and mandatory instruction markings should be positioned in such a way as to avoid the need to **turn the head** (i.e. should face in the direction in which they are to be read) if possible.

- 1.3.7** Information Marking ICAO Annex 14, Standard 5.2.17.1: "Where an information sign would normally be installed and it is impractical to install, as determined by the appropriate authority, an information marking shall be displayed on the surface of the pavement."

- 1.3.8** Naming of parts of the movement area (e.g. taxiways, taxilanes, holding positions, aircraft parking stands,...) shall be in accordance to ICAO regulations (Annex 14, 5.4.3.35 to 5.4.3.37). Multiple usage of same letter and/or number combinations can create confusion and should be avoided.

GENERAL CAUTION: Some drawings in this manual are not to scale.

2

2

APRON AND TAXIWAY MARKINGS FOR AIRCRAFT

2.1 STAND LEAD-IN LINE, TAXIWAY AND TAXILANE CENTRE LINE

Taxiway / taxilane centre line markings are clearly defined in ICAO Annex 14, section 5.2.8. Stand lead-in lines are effectively a continuation of taxiway centre lines, and should have the same width – see ICAO Annex 14, Recommendation 5.2.13.6. Their function is to allow an aircraft to taxi under its own power or to be towed whilst maintaining the necessary clearances from obstacles.

The minimum acceptable width specified by ICAO for a stand lead-in line is 0.15m, but ACI recommends a 0.2m minimum width, in order to give increased visibility.

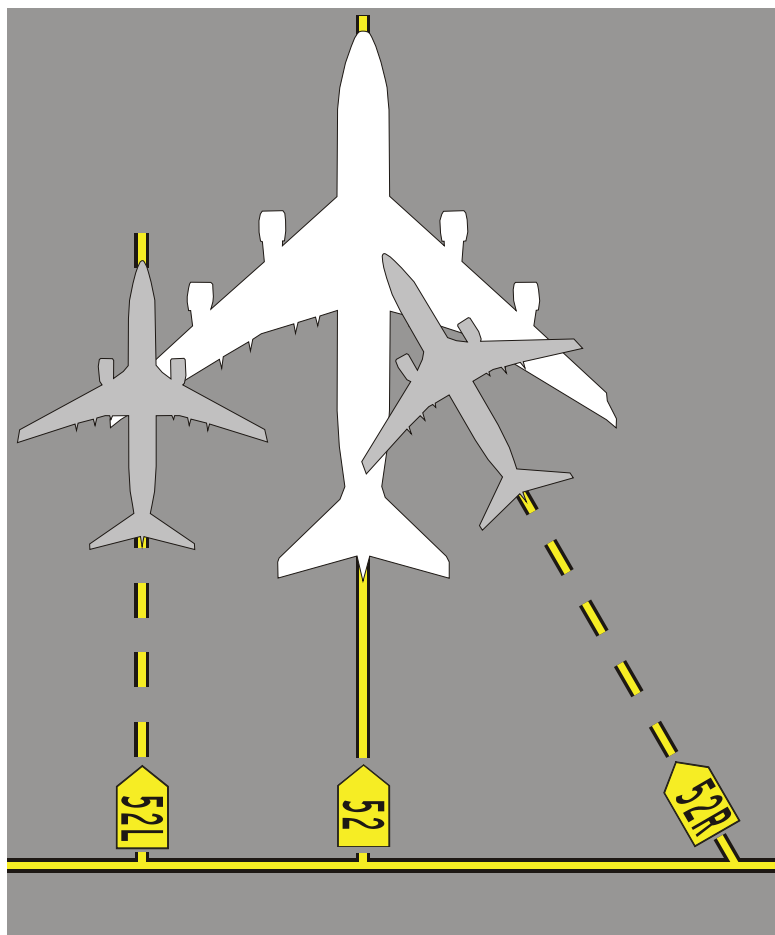
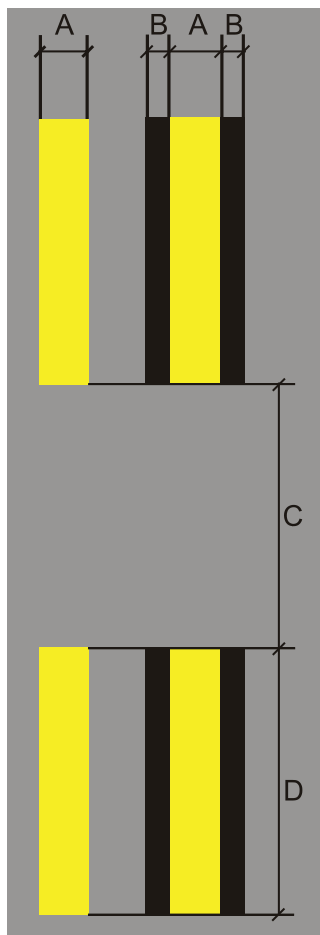
Colour	Centre line	Border
	Yellow	Black
Dimensions	A	B
	0.2m min.	0.1m



2.2 STAND LEAD-IN LINE FOR MULTIPLE AIRCRAFT TYPE PARKING STANDS

When aircraft stands are superimposed, the secondary or alternative centre line(s) should – according to ICAO Annex 14 (5.2.13.6) and the Aerodrome Design Manual – consist of broken lines, to distinguish them from the primary line, which should be continuous. The primary line should be for the most critical (most demanding) aircraft.

Colour	Centre line		Border	
	Yellow		Black	
Dimensions	A	B	C	D
	0.2m min.	0.1m	2.0m	2.0m
	0.2m min.	0.1m	4.0m	4.0m



2.3 APRON AND TAXIWAY EDGE

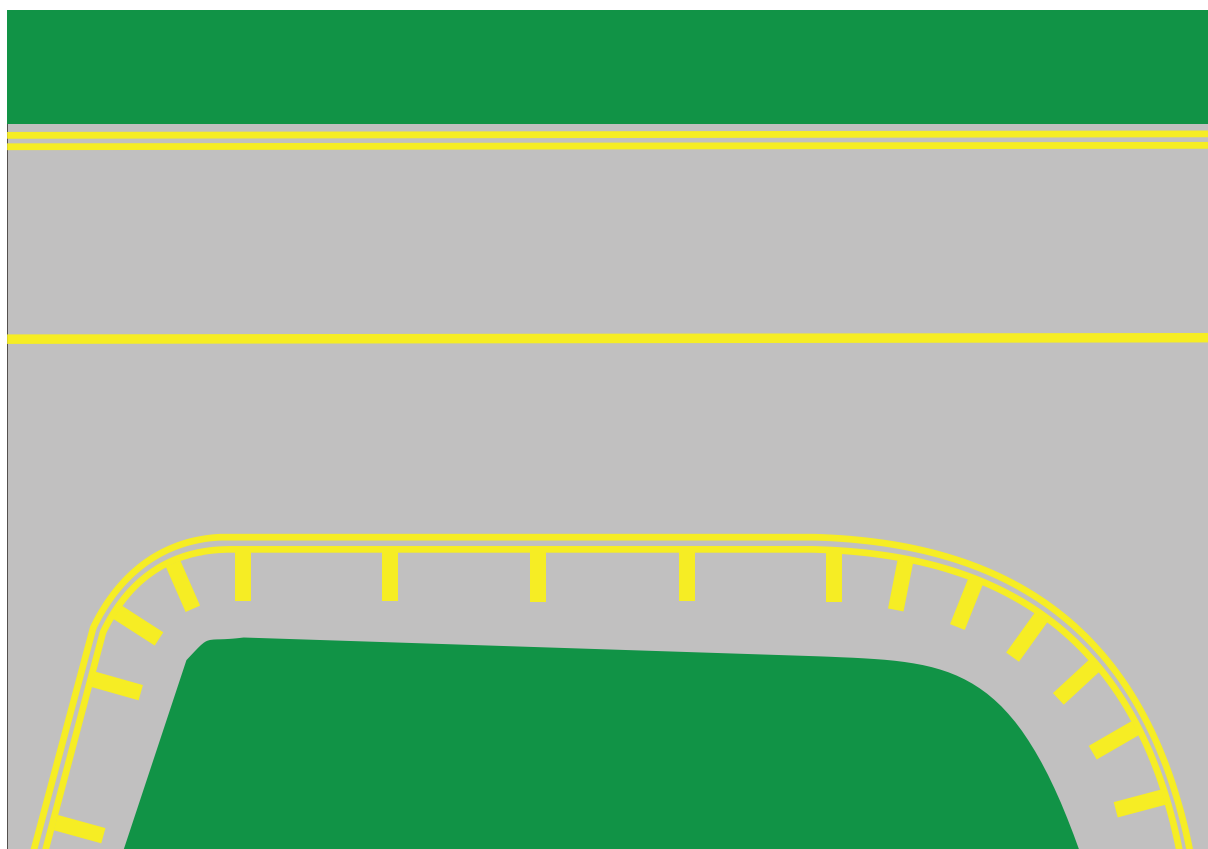
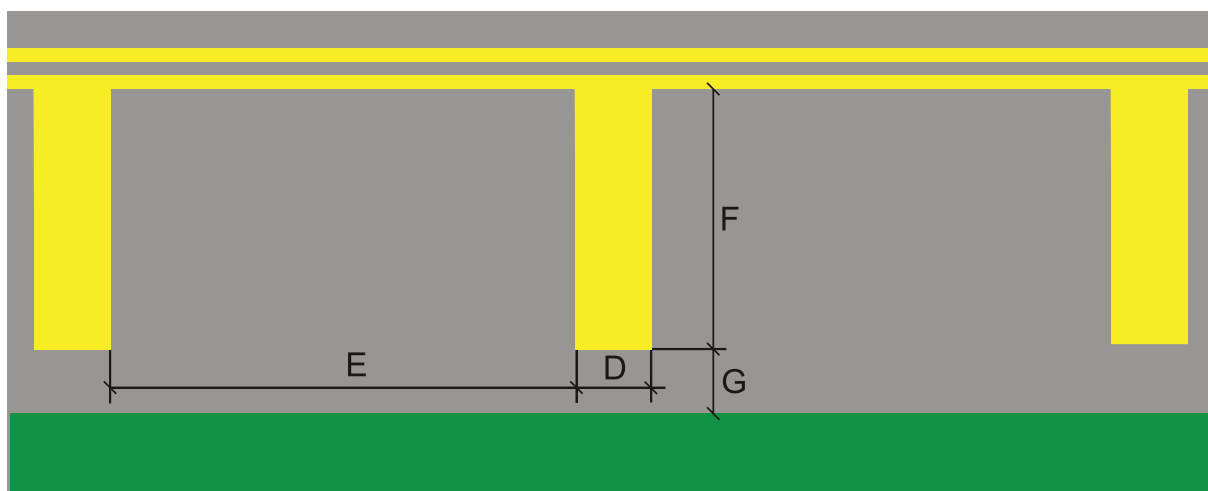
Apron and taxiway edge lines are used to delineate the boundary of a taxiway or apron area where the edge of the full strength pavement cannot be easily discerned, or when a low strength shoulder adjoins the full strength pavement.

Colour		Edge line	
		Yellow	
Dimensions	A	B	C
	0.15m	0.15m	0.1m



Additionally low strength shoulders should be marked with transverse stripes (see ICAO ADM Part 4, paragraph 2.2.3).

Dimensions	D	E	F	G
	0.9m	max. 15.0m on curves (30.0m on straight sections)	7.5m	max. 1.5m

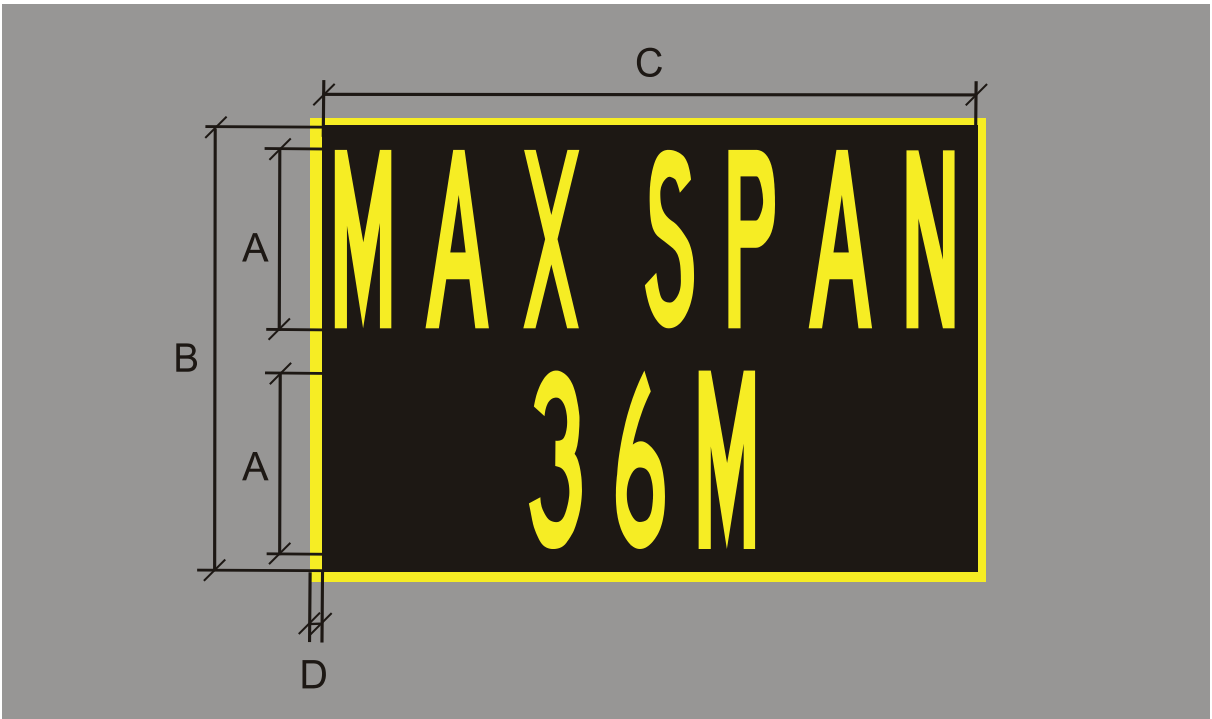


2.4 MAXIMUM WINGSPAN MARKING

A “MAX SPAN” marking is proposed to be used in conjunction with alternative taxilane centre lines. It would be classified as an information (location) marking. It should be located across the surface of a taxiway / taxilane centre line.

Colour	Characters	Background	Border
	Yellow	Black	Yellow

Dimensions	A	B	C	D
	2.0m	5.5m	Acc. to character width	0.1m
	4.0m	9.5m	Acc. to character width	0.1m



Note: Where space is limited the character size can be reduced, but it is recommended not to use less than 2.0m character height.

2.5 NO ENTRY MARKING

A “NO ENTRY” marking is a mandatory instruction marking according to ICAO Annex 14, Volume 1, 5.2.16.6. This states that a “NO ENTRY” marking shall consist of an inscription in white reading “NO ENTRY” on a red background. It shall be located on the left hand side of a taxiway centre line at a minimum distance of 1.0m from the centre line where an entry is prohibited.

Colour	Characters	Background	Border
	White	Red	White

Dimensions	A	B	C	D
	2.0m	3.0m	Acc. to character width	0.1m
	4.0m	5.0m	Acc. to character width	0.1m



Note: Where space is limited the character size can be reduced, but it is recommended not to use less than 2.0m character height.

Please note that ICAO also specifies a **sign** indicating “No Entry”, which is different in format (see Annex 14, Figure 5-28) see chapter 4 of this handbook.

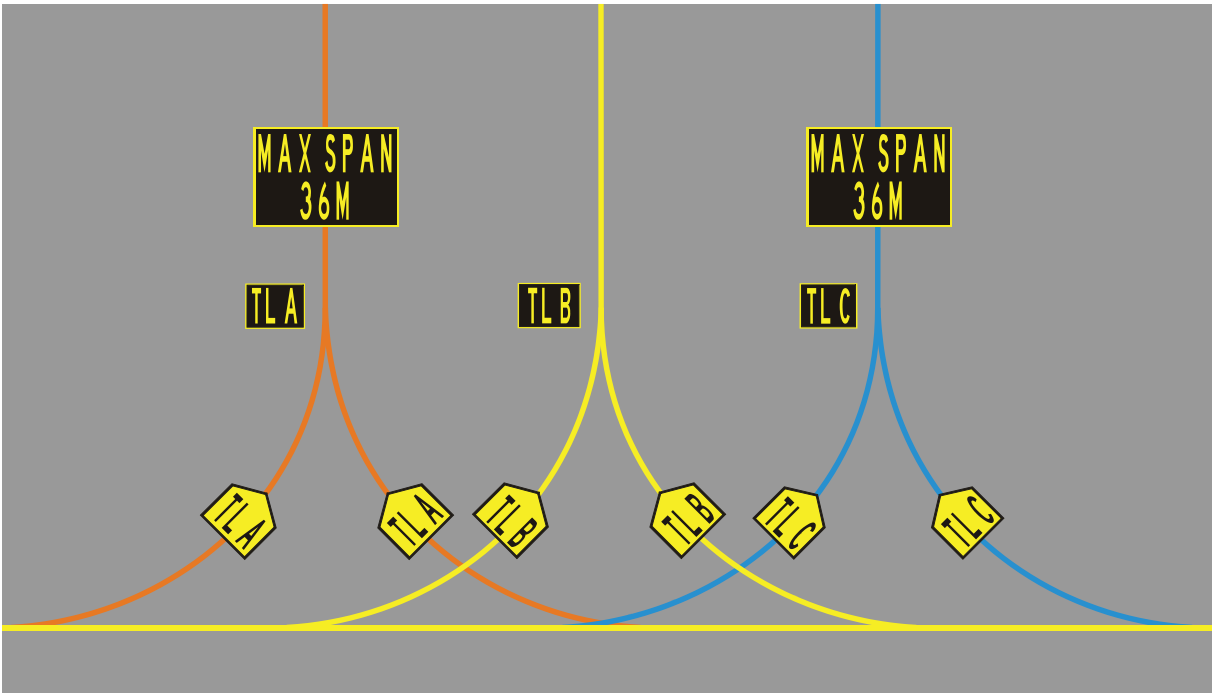
2.6 ALTERNATIVE AIRCRAFT STAND TAXILANE

To increase the flow of traffic in aircraft stand taxilanes, it may be found helpful to use alternative centre lines (e.g. two Code C aircraft with maximum wingspan 36m or one Code E aircraft with maximum wingspan 65m). Minimum distances from centre line to centre line and/or centre line to objects can be found in ICAO Annex 14, Volume 1, table 3-1.

Control of the use of such alternative centre lines by aircraft must rest with local Air Traffic Control (or where applicable) Apron Control, and local rules for their use must be promulgated in cooperation with the airport operator.

Colour	Centre line	Border
	Yellow / Blue / Orange	Black

Dimensions	Centre line	Border
	0.2m min.	0.1m



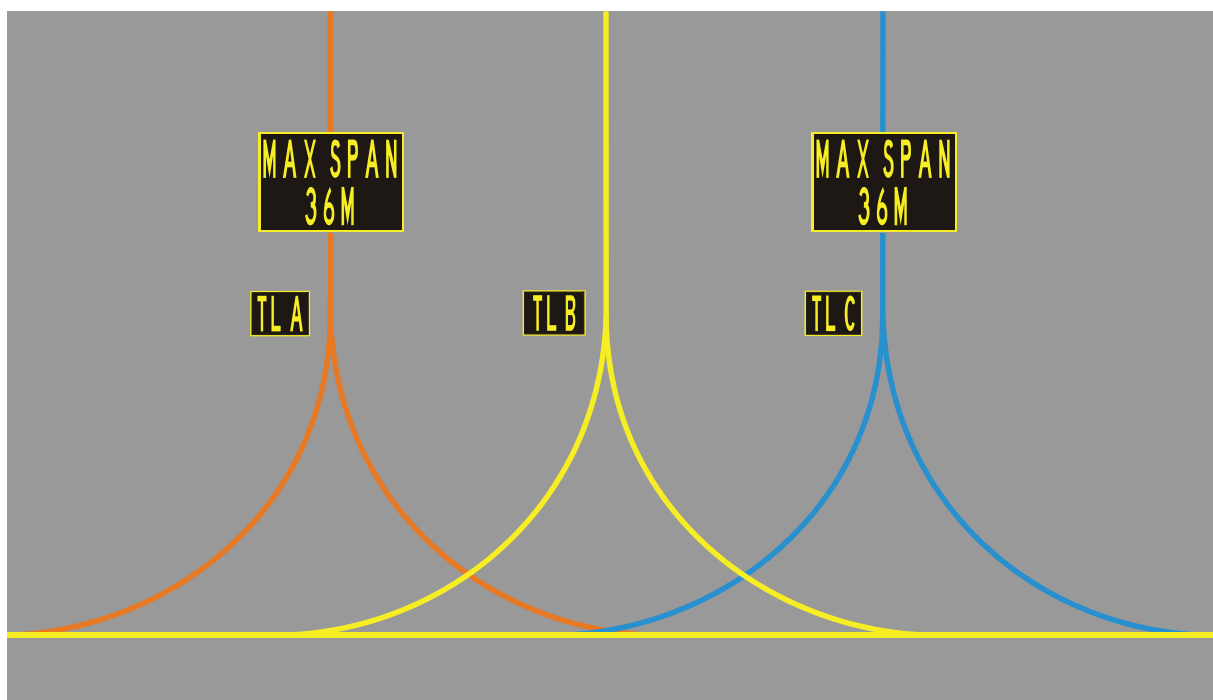
For depiction of the overview situation see Chapter 6.2.

Various optional configurations are shown below - depicting practices successfully employed at several airports, including Athens, Brussels, Munich and Paris (CDG).

Where alternative centre lines are necessary, colour coding can improve the safety of operations and provide clearer guidance for pilots and ground service vehicle drivers. Due to lack of suitable alternatives the colours blue and orange are recommended.

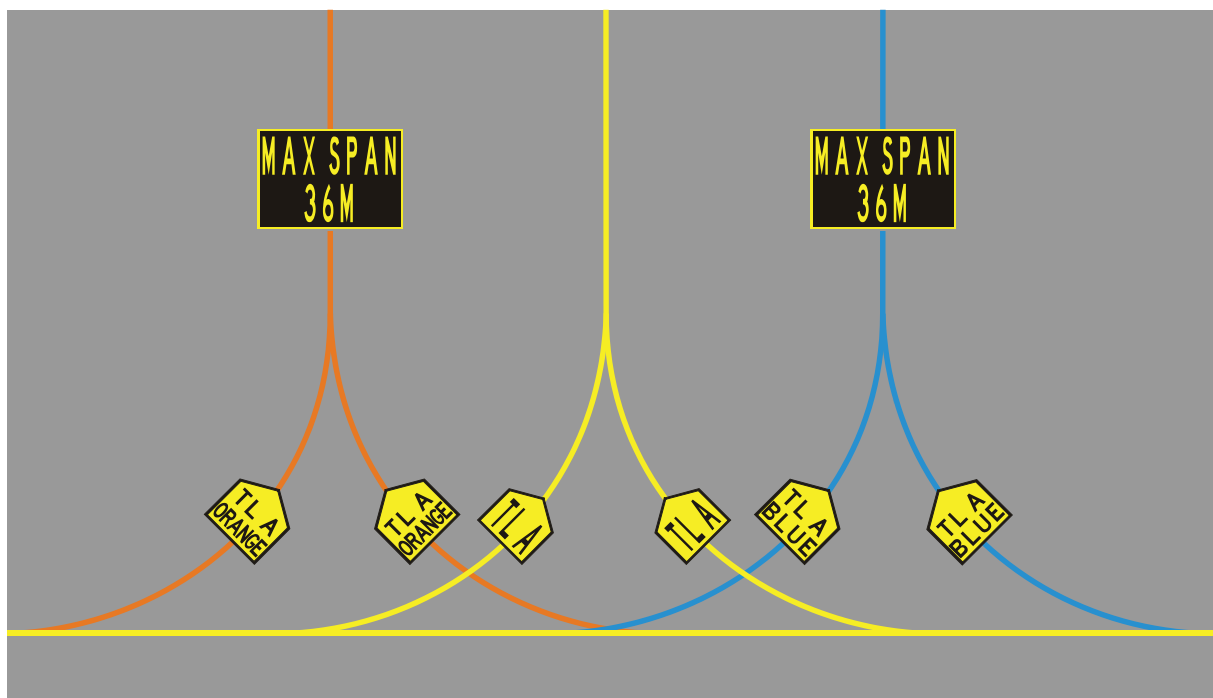
Although lighting is not within the scope of this handbook, it is suggested that alternative taxilane centre lines may be lit using the same colours as the markings, i.e. with blue or orange lights, alternating with green lights. However any such blue lights should not be in proximity to blue taxiway edge lighting, to avoid the possibility of confusion.

2.6.1 OPTION 1



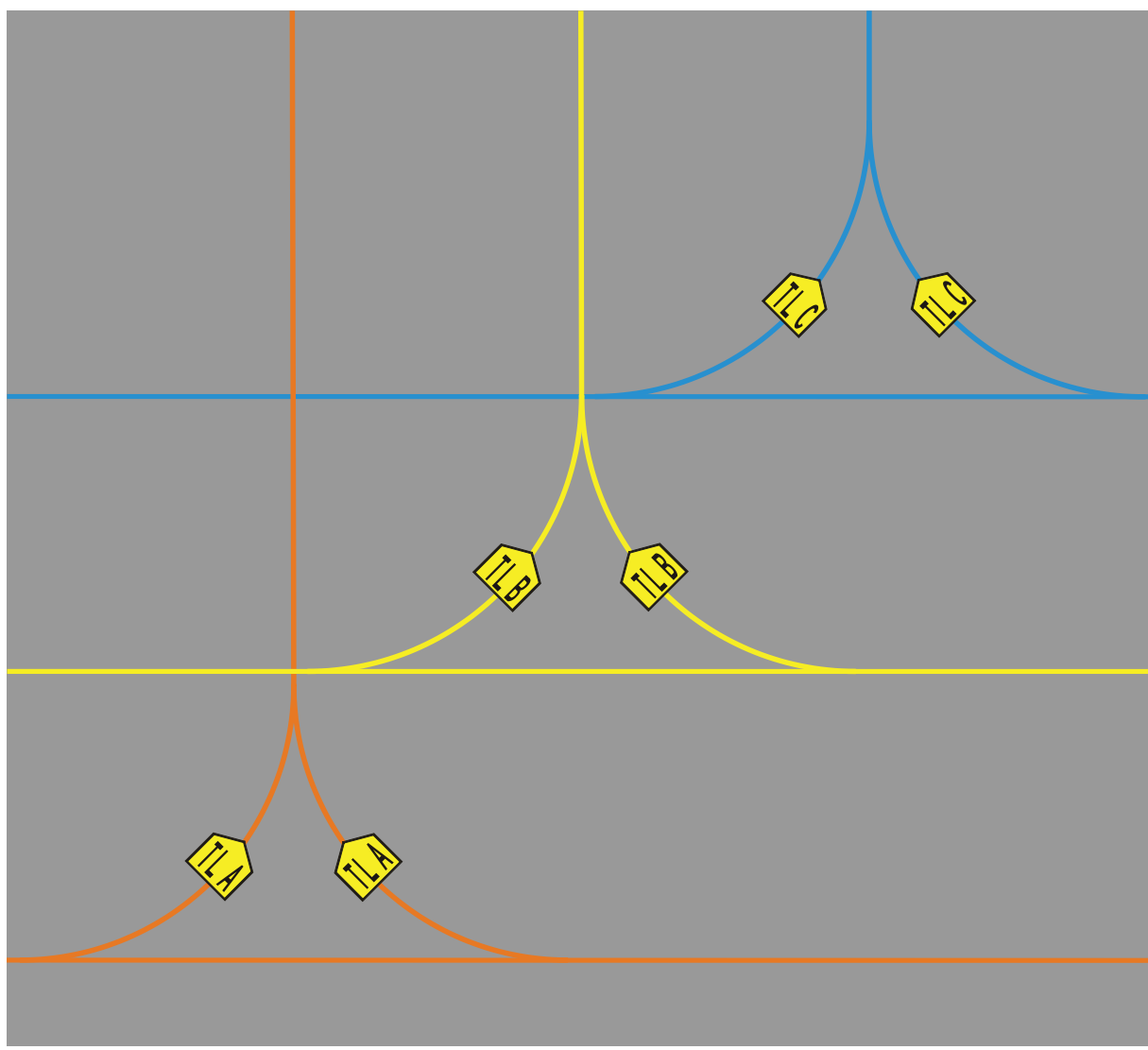
For depiction of the overview situation see Chapter 6.2.

2.6.2 OPTION 2



For depiction of the overview situation see Chapter 6.2.

2.6.3 EXAMPLE OF T-SHAPED ALTERNATIVE AIRCRAFT STAND TAXILANES



For depiction of the overview situation see Chapter 6.2.

2.7 STAND INFORMATION MARKINGS

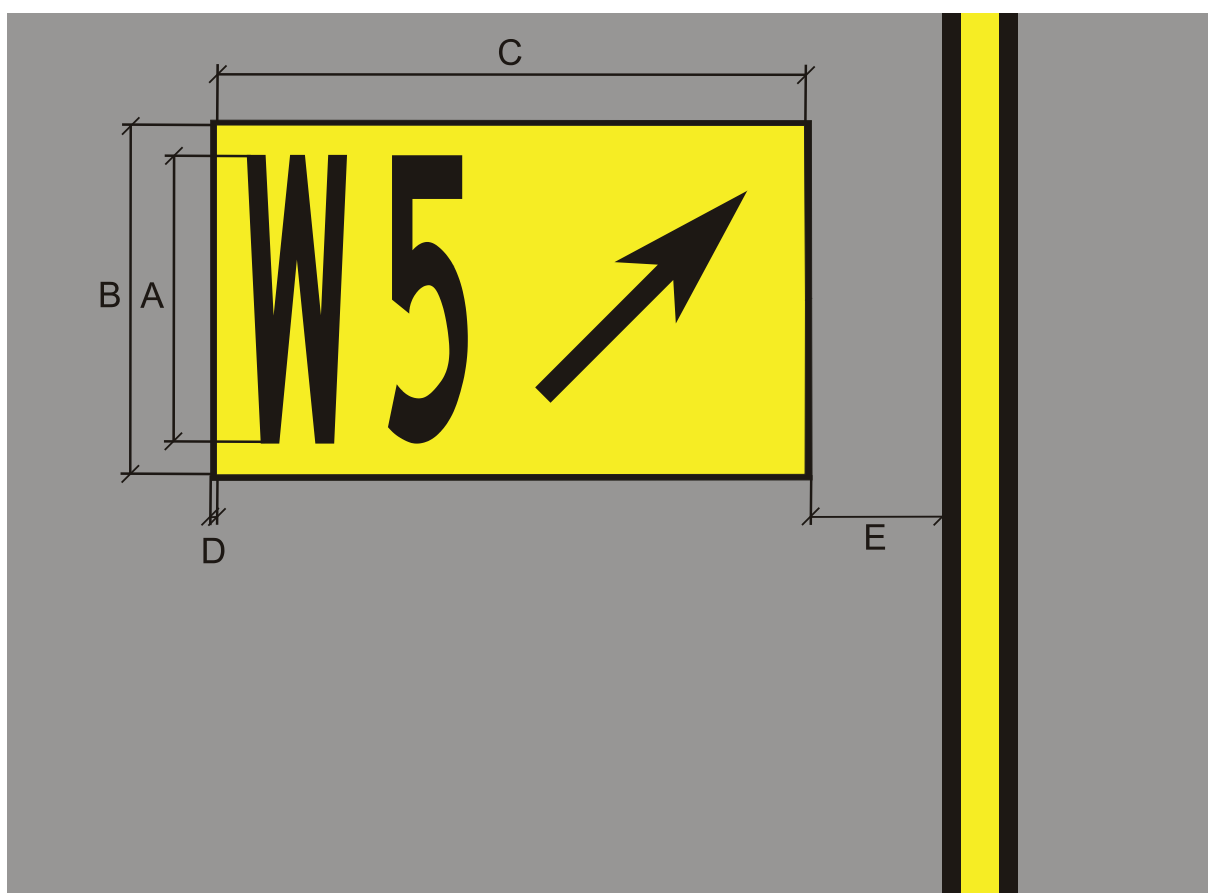
ICAO Annex 14, Standard 5.2.17.1: “Where an information sign would normally be installed and it is impractical to install, as determined by the appropriate authority, an information marking shall be displayed on the surface of the pavement”.

2.7.1 OPTION 1 – STAND DIRECTION

Information (direction or destination) markings are black on a yellow background.

Colour	Characters	Background	Border
	Black	Yellow	Black

Dimensions	A	B	C	D	E
	2.0m	2.5m	Acc. to character width	0.1m	1.0m
	4.0m	5.0m	Acc. to character width	0.1m	1.0m



Note: Where space is limited the character size can be reduced, but it is recommended not to use less than 2.0m character height.

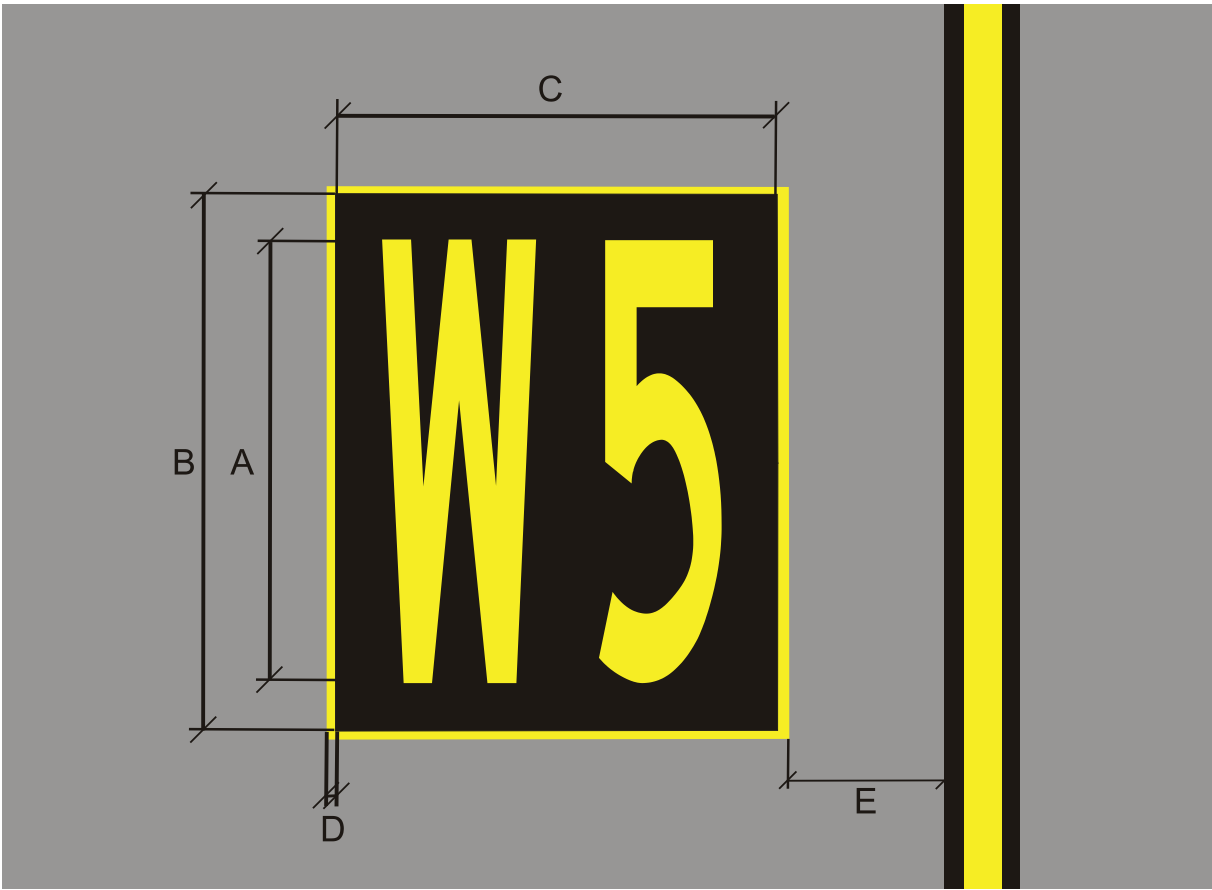
2

2.7.2 OPTION 2 – STAND LOCATION

Information (location) markings are yellow on a black background.

Colour	Characters		Background	Border	
	Yellow		Black	Yellow	

Dimensions	A	B	C	D	E
	2.0m	2.5m	Acc. to character width	0.1m	1.0m
	4.0m	5.0m	Acc. to character width	0.1m	1.0m



Note: Where space is limited the character size can be reduced, but it is recommended not to use less than 2.0m character height.

2.8 DIRECTION TO PARKING STAND

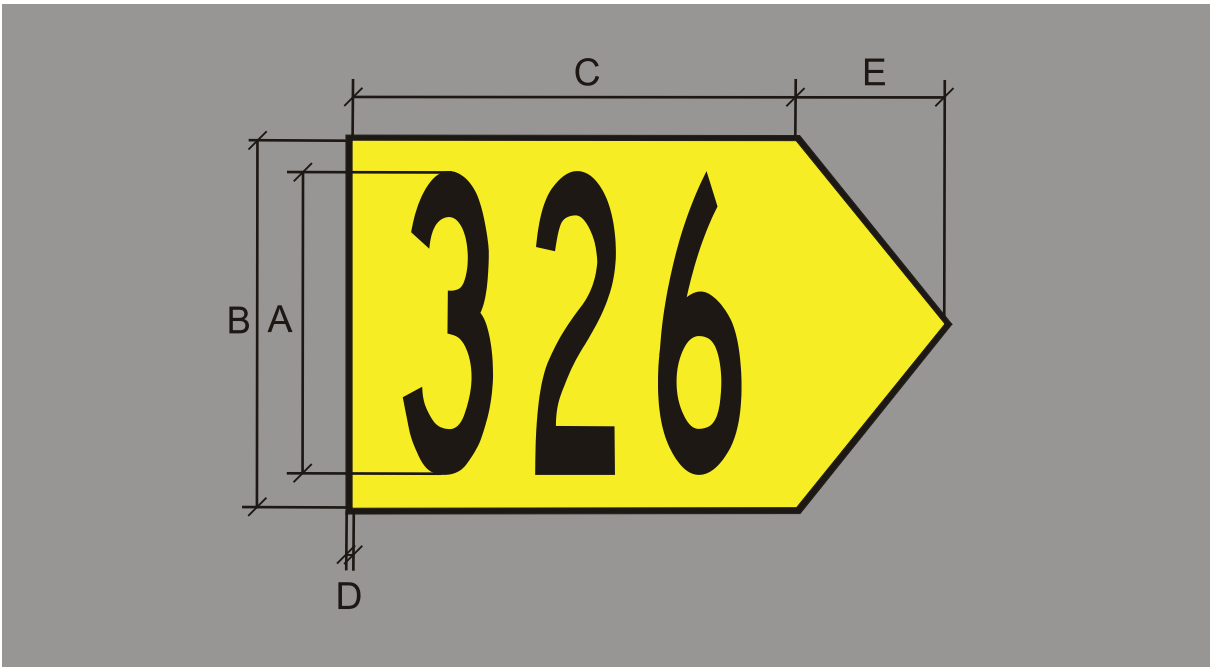
2.8.1 OPTION 1

This marking assists the pilot of an approaching aircraft to identify the appropriate parking stand, prior to initiating a turn.

Option 1 shall be used for stand lead-in lines at an angle of 61° to 90° to the taxilane / taxiway.

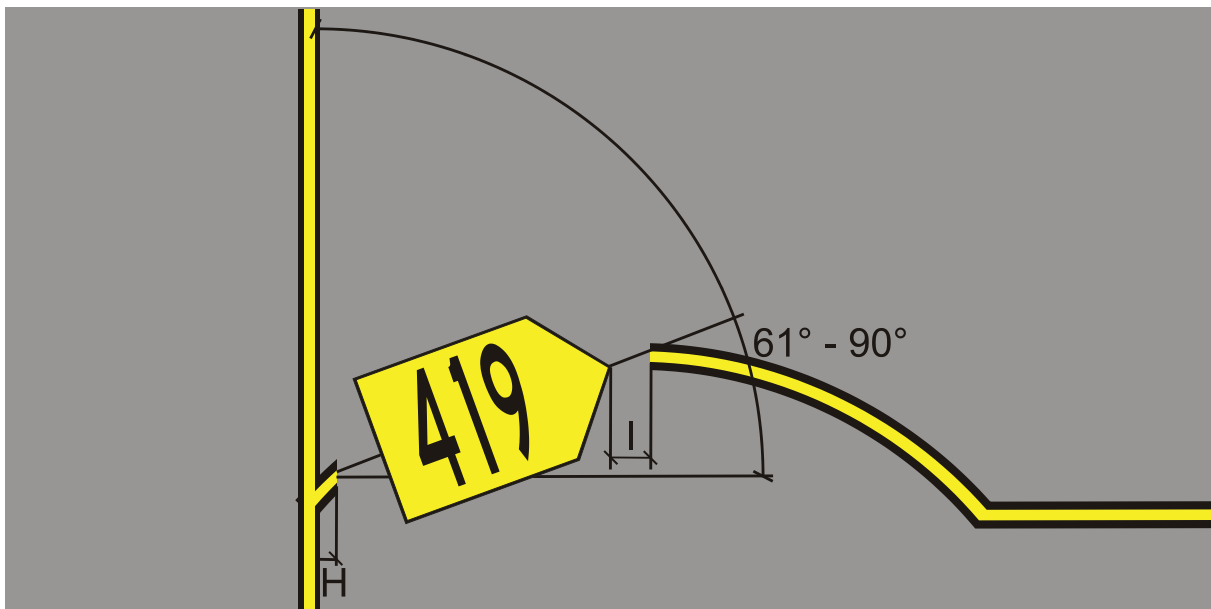
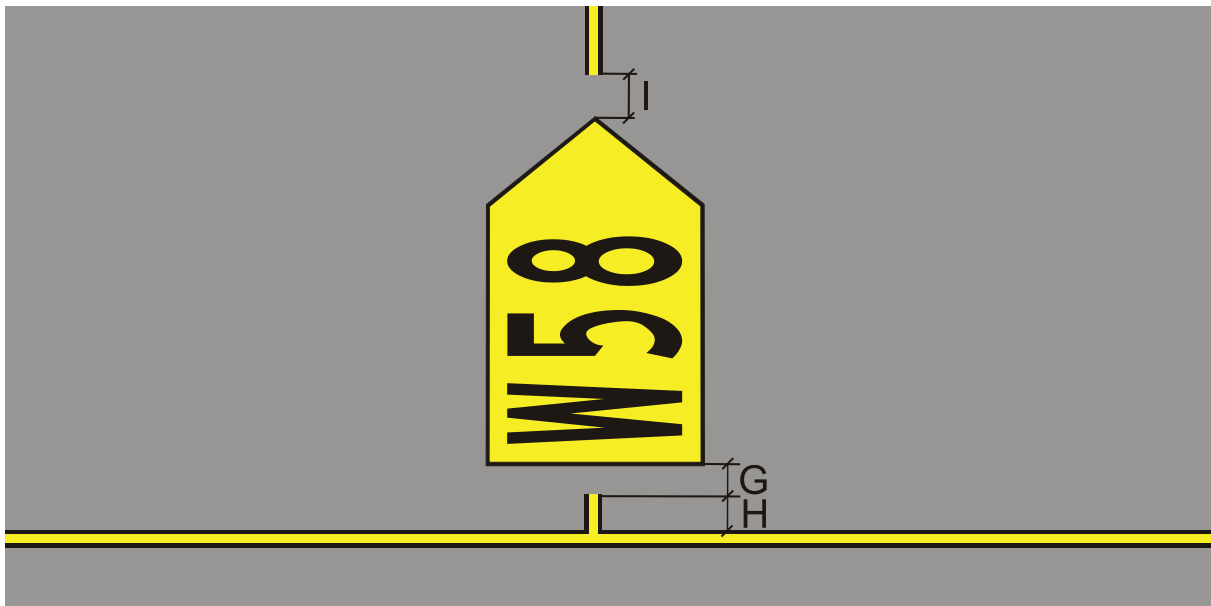
Colour	Characters	Background	Border
	Black	Yellow	Black

Dimensions	A	B	C	D	E
	2.0m	2.5m	Acc. to character width	0.1m	1.0m
	4.0m	5.0m	Acc. to character width	0.1m	2.0m

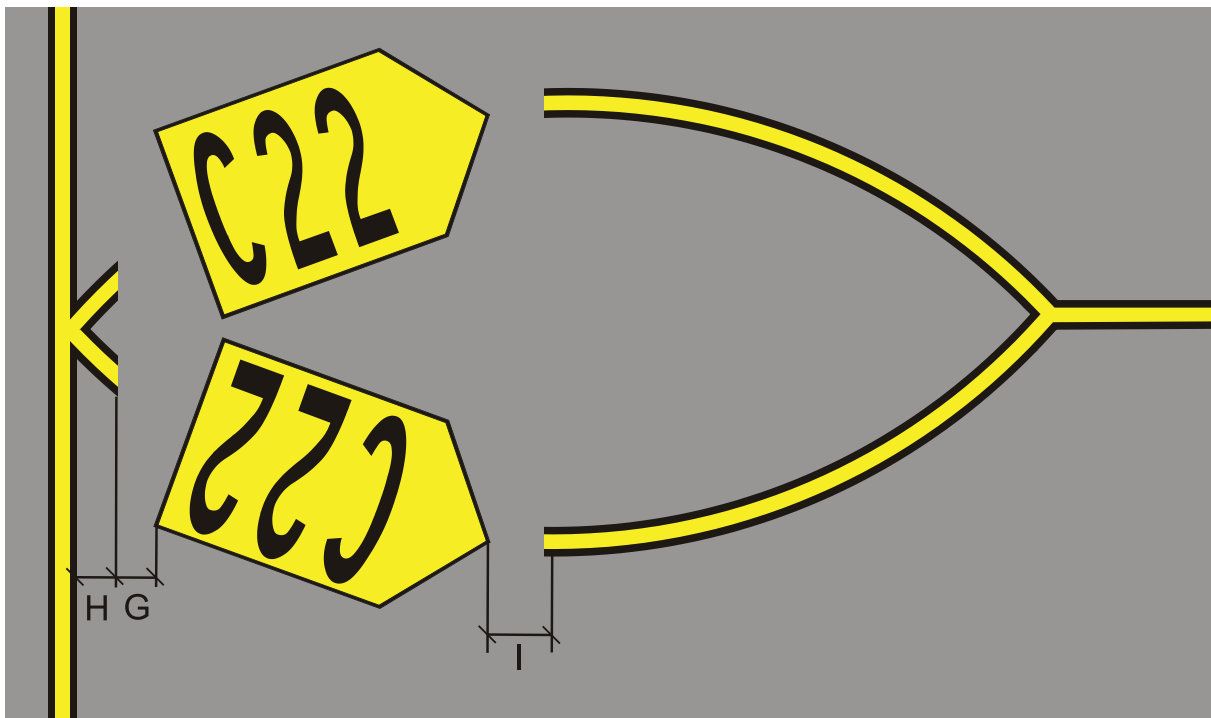
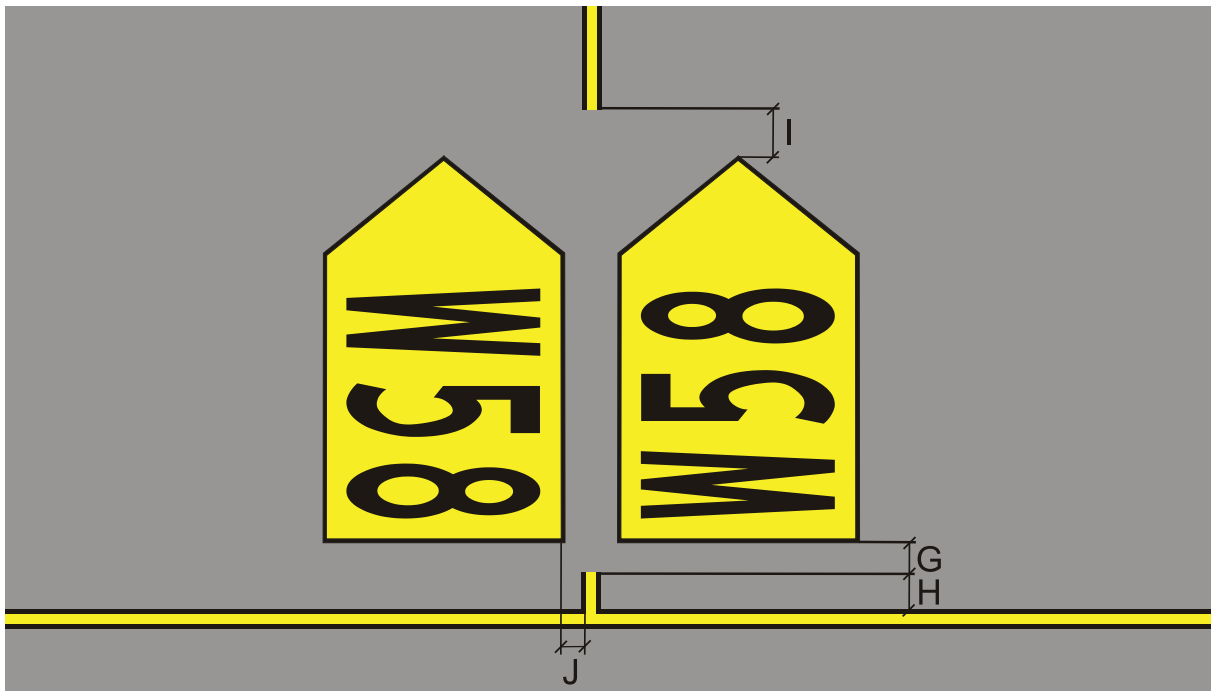


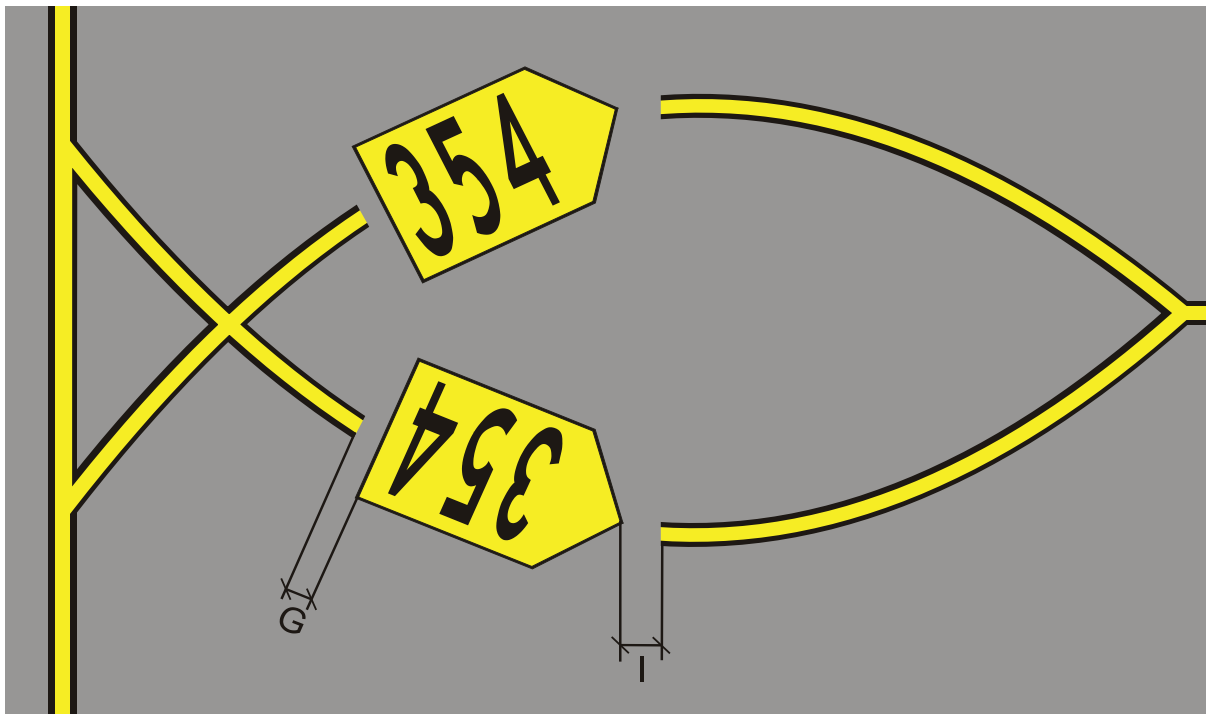
Note: Where space is limited, especially when parking stands have multiple centre lines, the character size can be reduced, but it is recommended not to use less than 2.0m character height.

Dimensions	G	H	I
	0.5m	0.5m min.	1.0m



Dimensions	G	H	I	J
	0.5m	0.5m min.	1.0m	0.3m





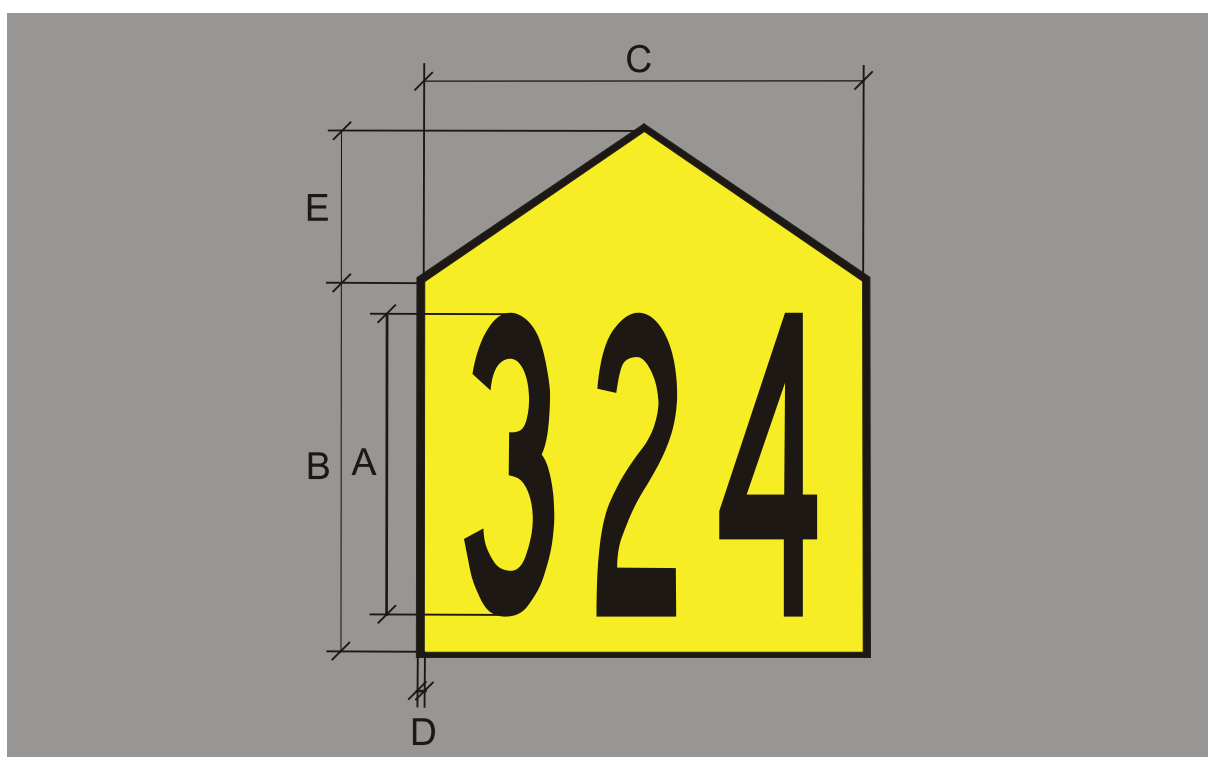
2.8.2 OPTION 2

This marking assists the pilot of an approaching aircraft to identify the appropriate parking stand, prior to initiating a turn.

Option 2 shall be used for stand lead-in lines at an angle of 0° to 60° to the taxilane / taxiway.

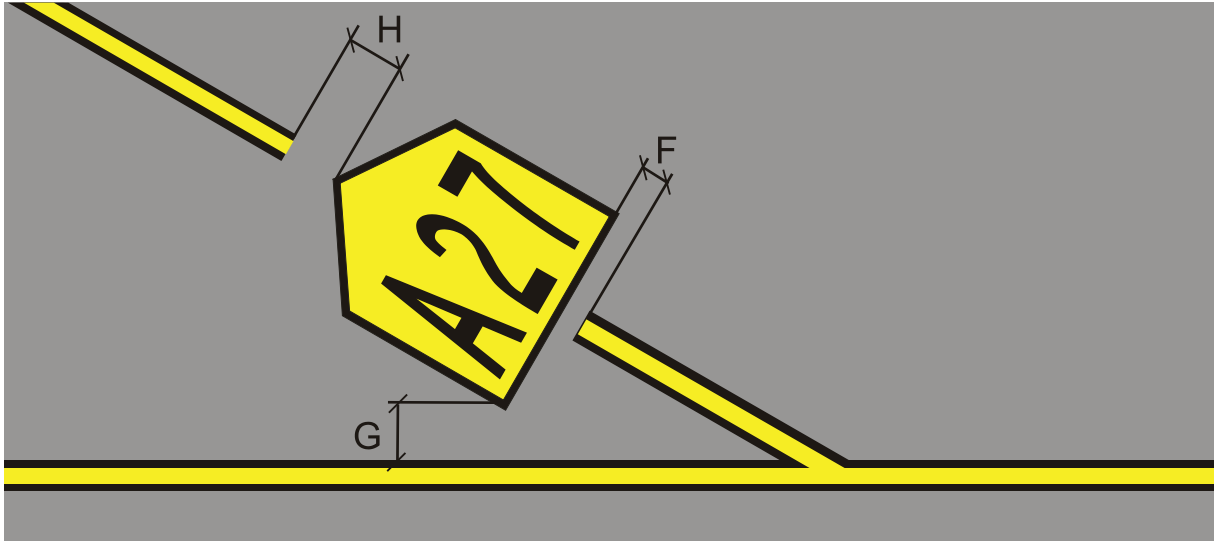
Colour	Characters	Background	Border
	Black	Yellow	Black

Dimensions	A	B	C	D	E
	2.0m	2.5m	Acc. to character width	0.1m	1.0m
	4.0m	5.0m	Acc. to character width	0.1m	2.0m



Note: Where space is limited, especially when parking stands have multiple centre lines, the character size can be reduced, but it is recommended not to use less than 2.0m character height.

Dimensions	F	G	H
	0.5m	0.5m min.	1.0m

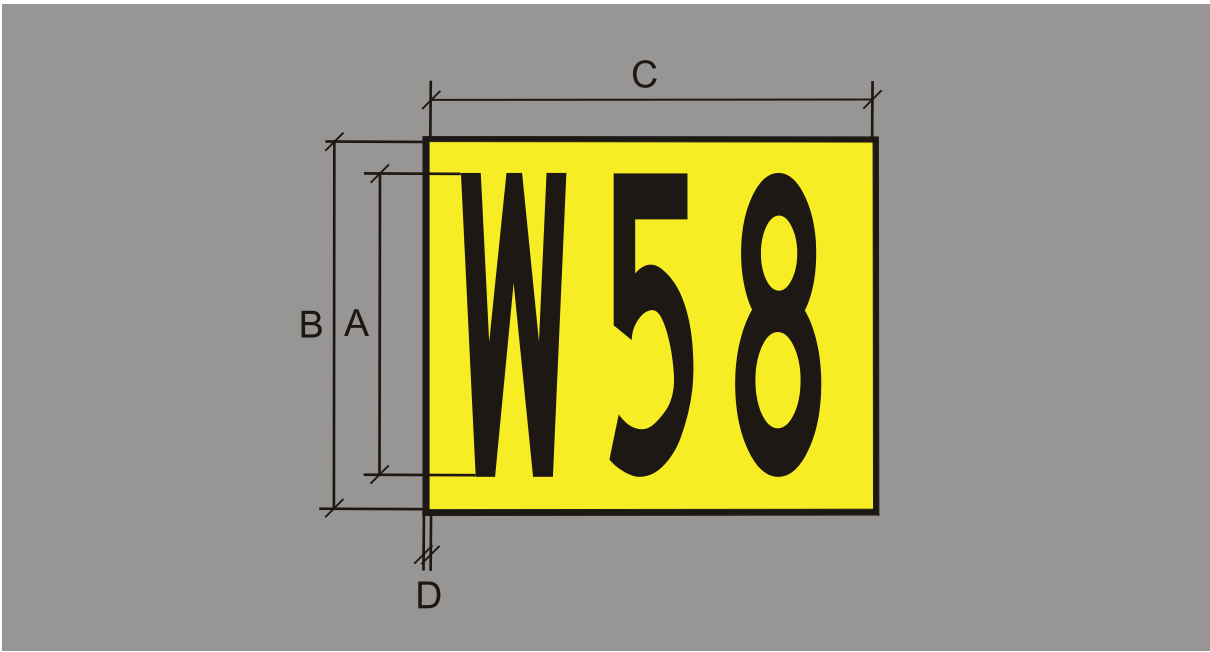


2.8.3 OPTION 3

This marking does not include an arrow and is similar to those illustrated in the ICAO Aerodrome Design Manual. The parking stand number is displayed on the lead-in line.

Colour	Characters	Background	Border
	Black	Yellow	Black

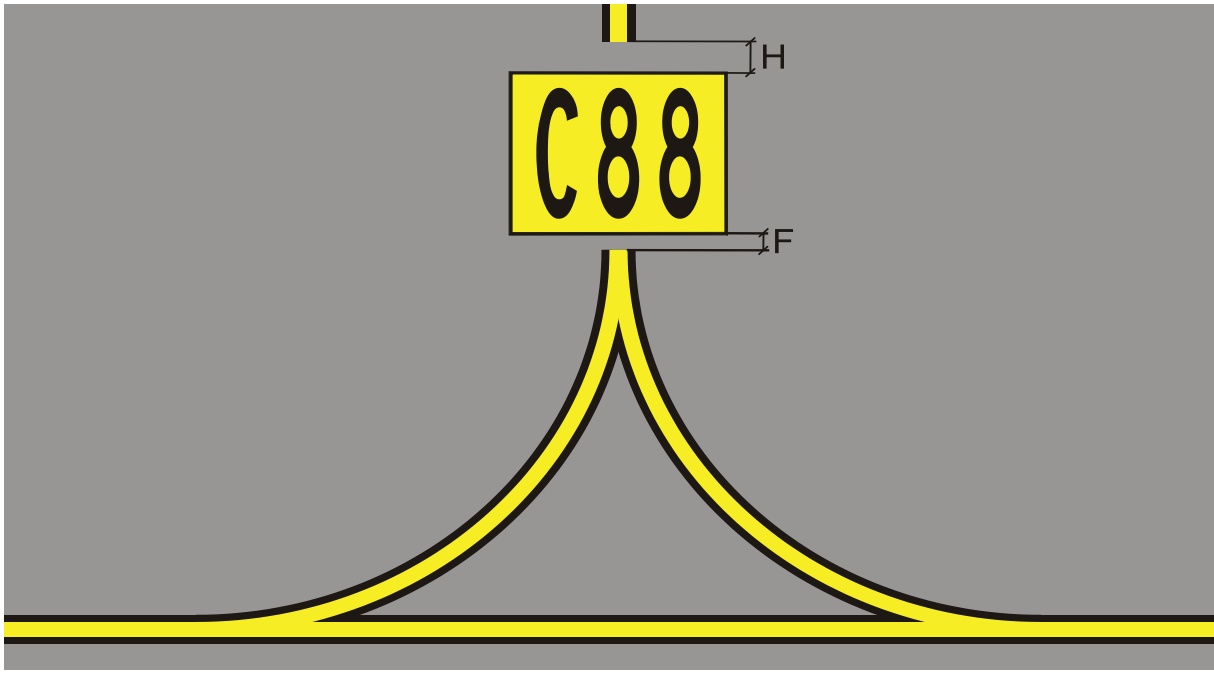
Dimensions	A	B	C	D
	2.0m	2.5m	Acc. to character width	0.1m
	4.0m	5.0m	Acc. to character width	0.1m



Note: Where space is limited, especially when parking stands have multiple centre lines, the character size can be reduced, but it is recommended not to use less than 2.0m character height.

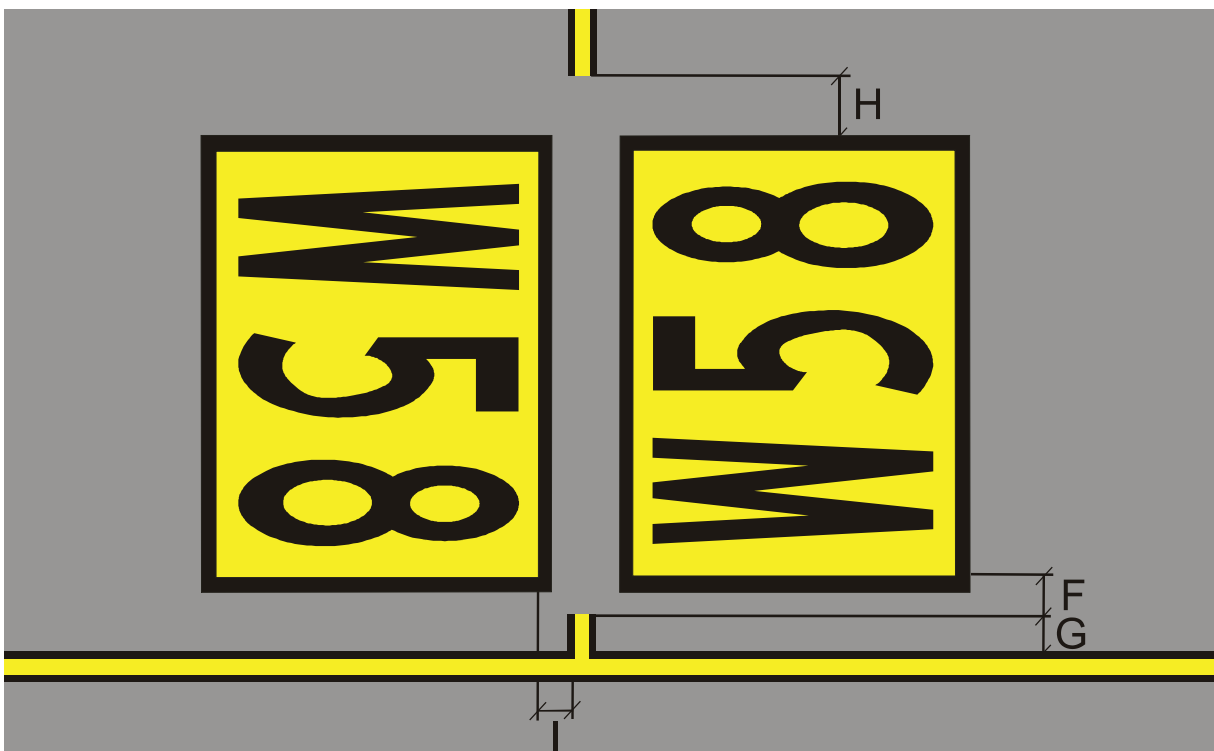
OPTION 3A

Dimensions	F	H
	0.5m	1.0m



OPTION 3B

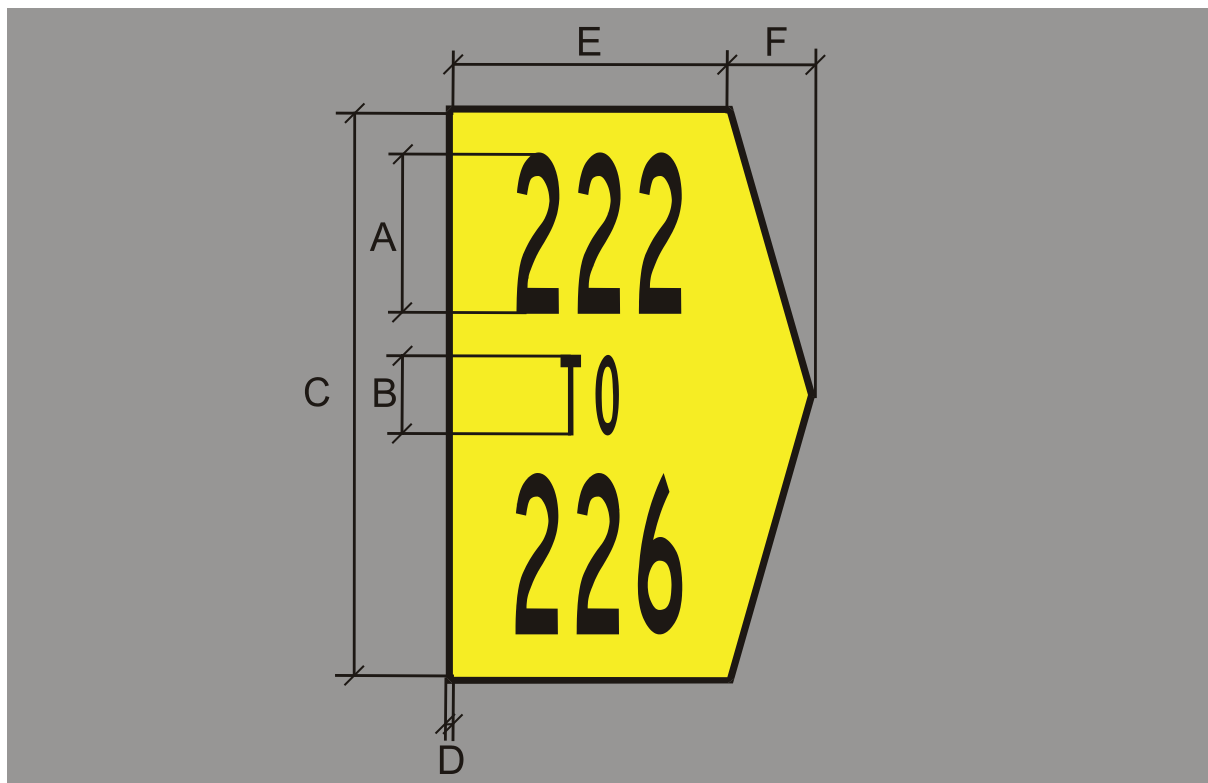
Dimensions	F	G	H	I
	0.5m	0.5m	1.0m	0.3m



2.9 DIRECTION TO AN AREA OF PARKING STANDS

This information (direction) marking assists the pilot of an approaching aircraft to identify an area of parking stands, prior to initiating a turn.

Dimensions	A	B	C	D	E	F
	2.0m	1.9m	6.0m	0.1m	Acc. to character width	1.0m

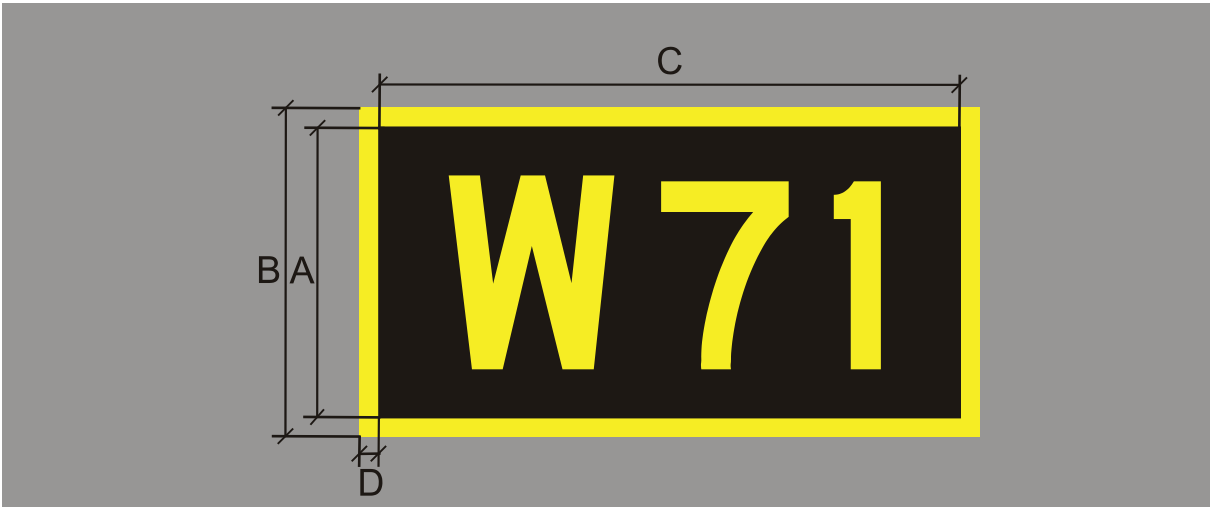


2.10 STAND IDENTIFICATION ON PARKING STAND

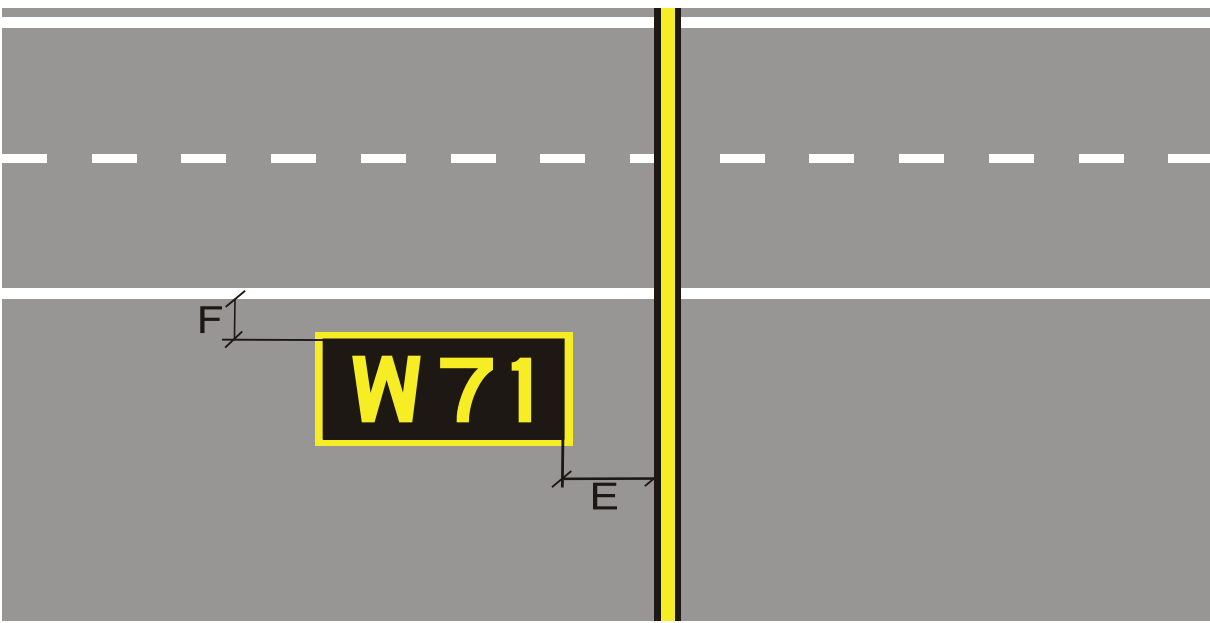
To indicate the location, a stand identification marking as displayed below, shall be established on the landside or terminal building end of a parking stand. The characters should be in accordance with ICAO Annex 14, Volume 1, Appendix 4.

Colour	Characters	Background	Border
	Yellow	Black	Yellow

Dimensions	A	B	C	D
	0.5m	0.75m	Acc. to character width	0.1m
	1.0m	1.5m	Acc. to character width	0.1m



Dimensions	E	F
	1.0m	0.5m



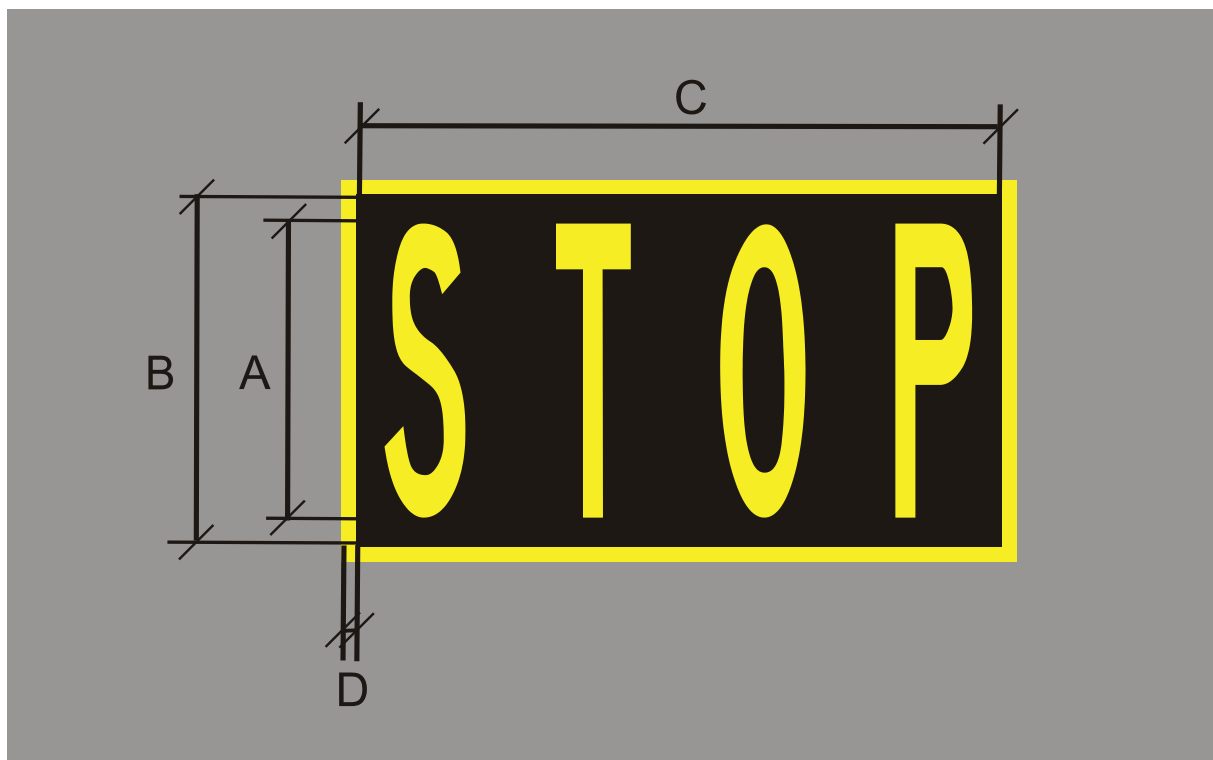
2.11 BASIC AIRCRAFT STOP LINE

This marking should be used where an aircraft is positioned on a stand without marshalling, where the transverse bar indicates the cockpit stop position. The marking should be suitable for the critical aircraft (usually the largest aircraft) which will use the stand. The same markings are used on either a power through position or a power in, push out position. The dimensions should be sufficient to ensure visibility by the pilot in command.

The word "STOP" shown in the illustration on the facing page may be regarded as optional, and would be omitted where markings for different aircraft sizes would be too close together.

Colour	Characters	Background	Border
	Yellow	Black	Yellow

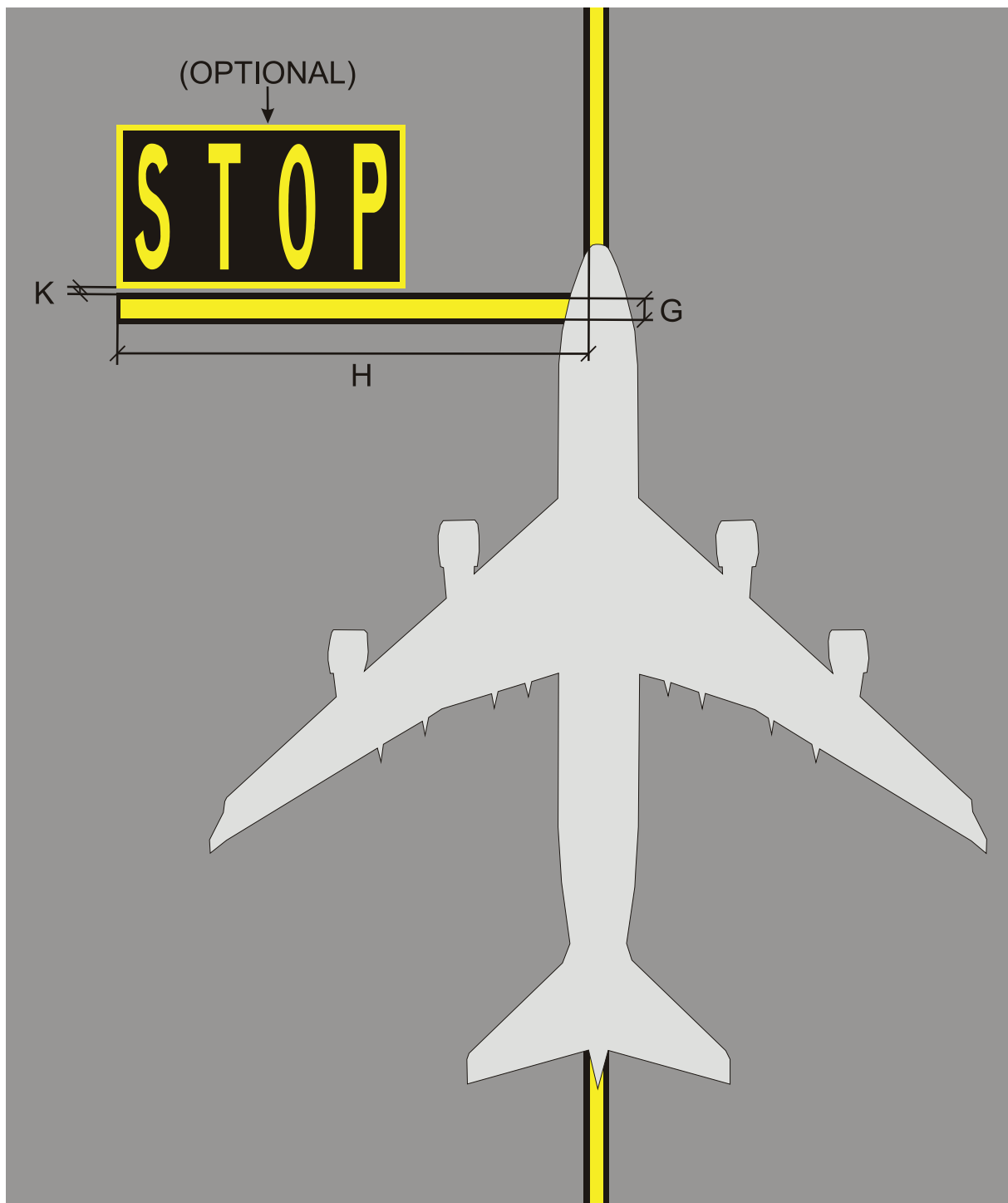
Dimensions	A	B	C	D
	2.0m	2.5m	Acc. to character width	0.1m
	4.0m	5.0m	Acc. to character width	0.1m



Note: Where space is limited the character size can be reduced, but it is recommended not to use less than 2.0m character height.

Colour	Stop line	Border
	Yellow	Black

Dimensions	ICAO Code Letter	G	H	K
	C	0.3m	11.0m	0.1m
	D	0.3m	16.0m	0.1m
	E	0.3m	16.0m	0.1m
	F	0.3m	16.0m	0.1m



2.12 MULTIPLE AIRCRAFT STOP LINE

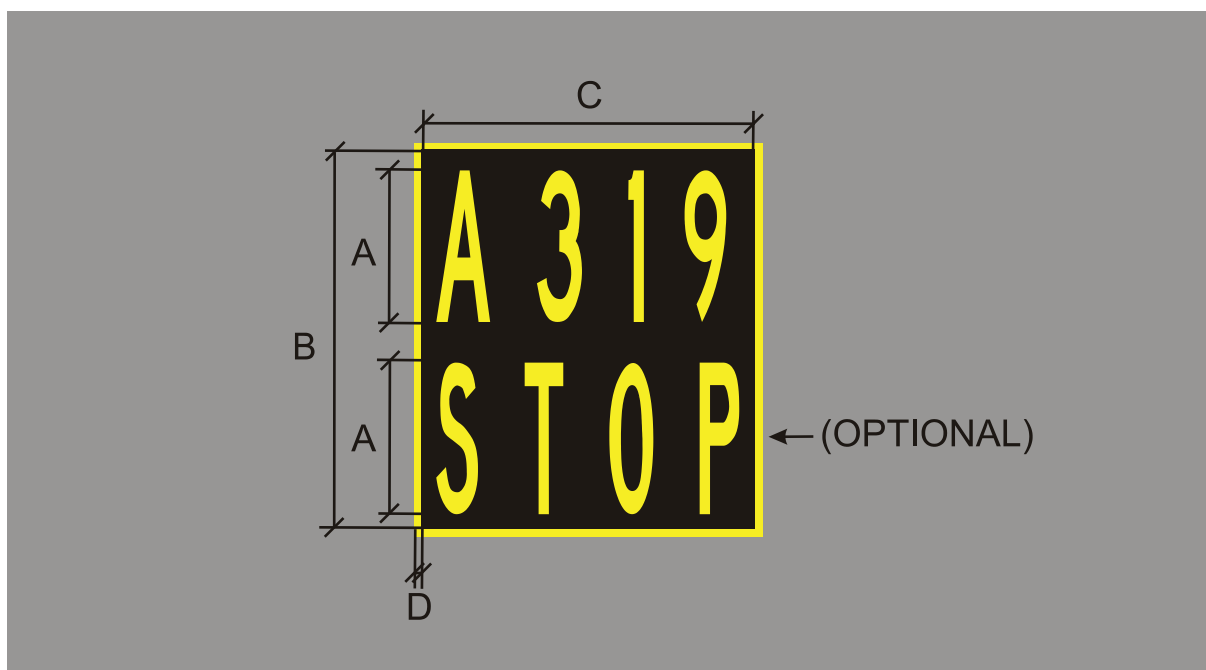
These markings should be used where an aircraft is positioned without a marshaller, but in association with an air bridge, or where fuel hydrant positions are critical, so that different cockpit stop positions are necessary for the different aircraft types to be accommodated. The dimensions should be sufficient to ensure visibility by the pilot in command.

The word "STOP" shown in the illustration on the facing page may be regarded as optional, and would be omitted where markings for different aircraft sizes would be too close together.

If a Visual Docking Guidance System is provided and in operation it supersedes the markings for pilots taxiing into the aircraft parking stand.

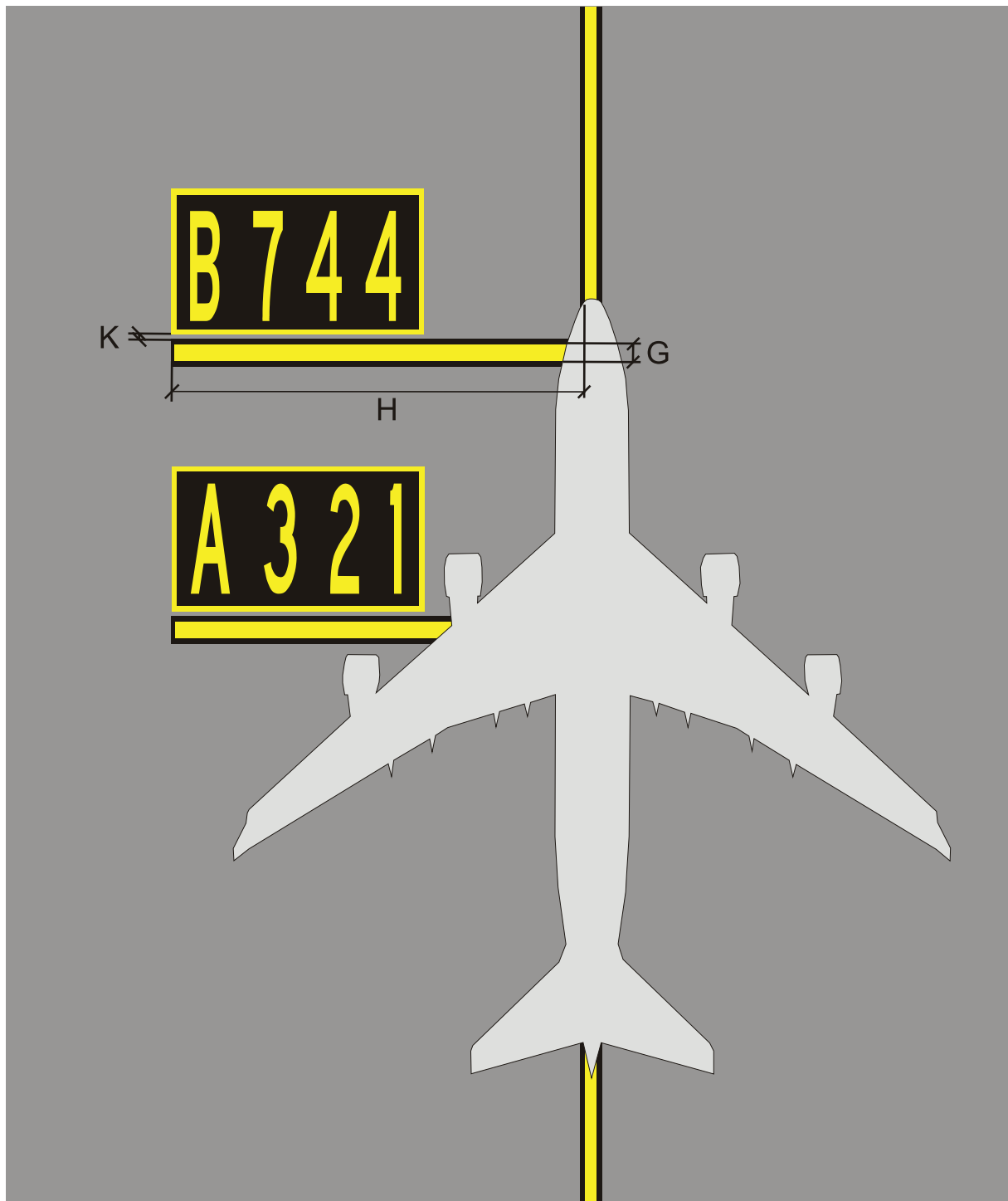
Colour	Characters	Background	Border
	Yellow	Black	Yellow

Dimensions	A	B	C	D
	2.0m	5.0m	Acc. to character width	0.1m
	4.0m	9.5m	Acc. to character width	0.1m



Colour	Stop line	Border
	Yellow	Black

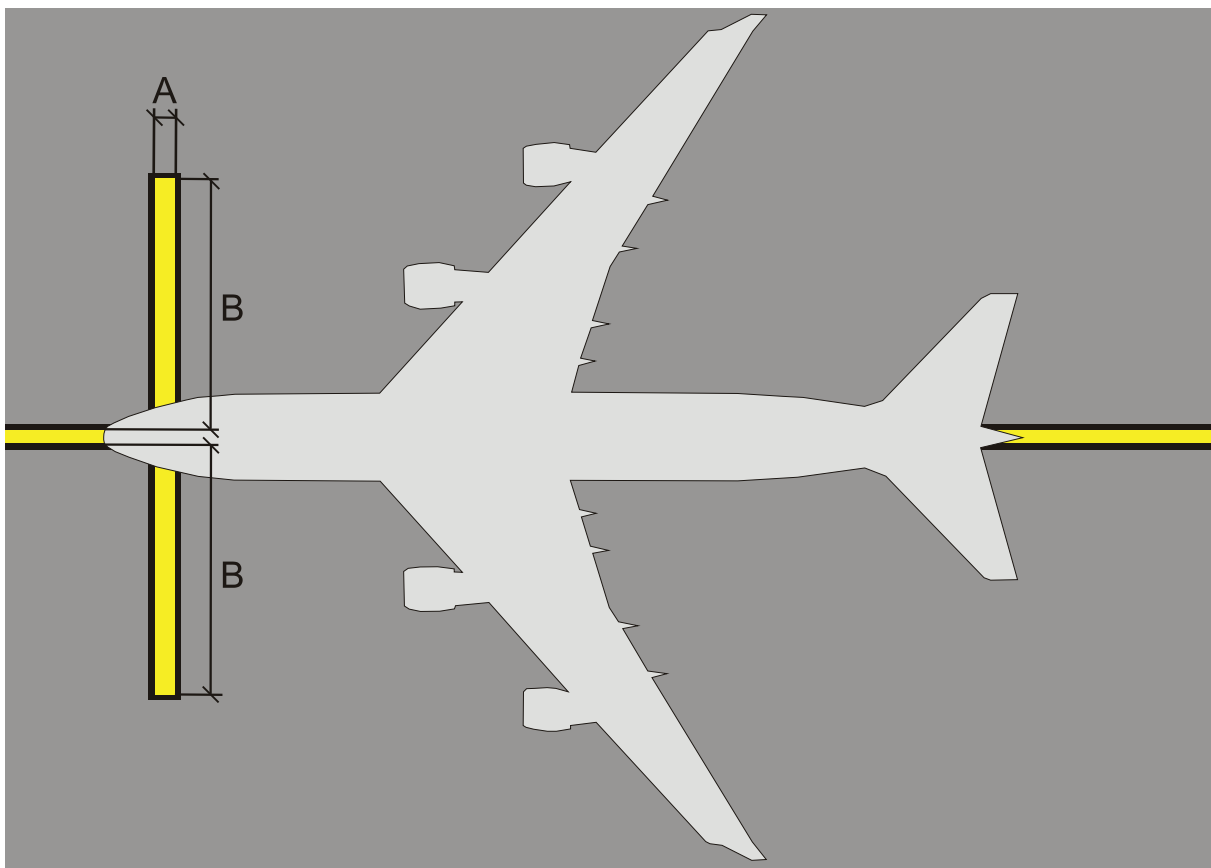
Dimensions	ICAO Code Letter	G	H	K
	C	0.3m	11.0m	0.1m
	D	0.3m	16.0m	0.1m
	E	0.3m	16.0m	0.1m
	F	0.3m	16.0m	0.1m



2.13 BASIC MARSHALLER AND TOWING STOP LINE

The marking should be used where an aircraft, either under power or being towed, is positioned on stand by a marshaller. The transverse bar indicates the nose wheel stop position to the marshaller. The same marking is used on either a power through position or a power in, push out position. The design of the marking is dependent on the critical aircraft for the stand.

Colour	Centre line	Border
	Yellow	Black
Dimensions	A	B
	0.2m min.	3.0m



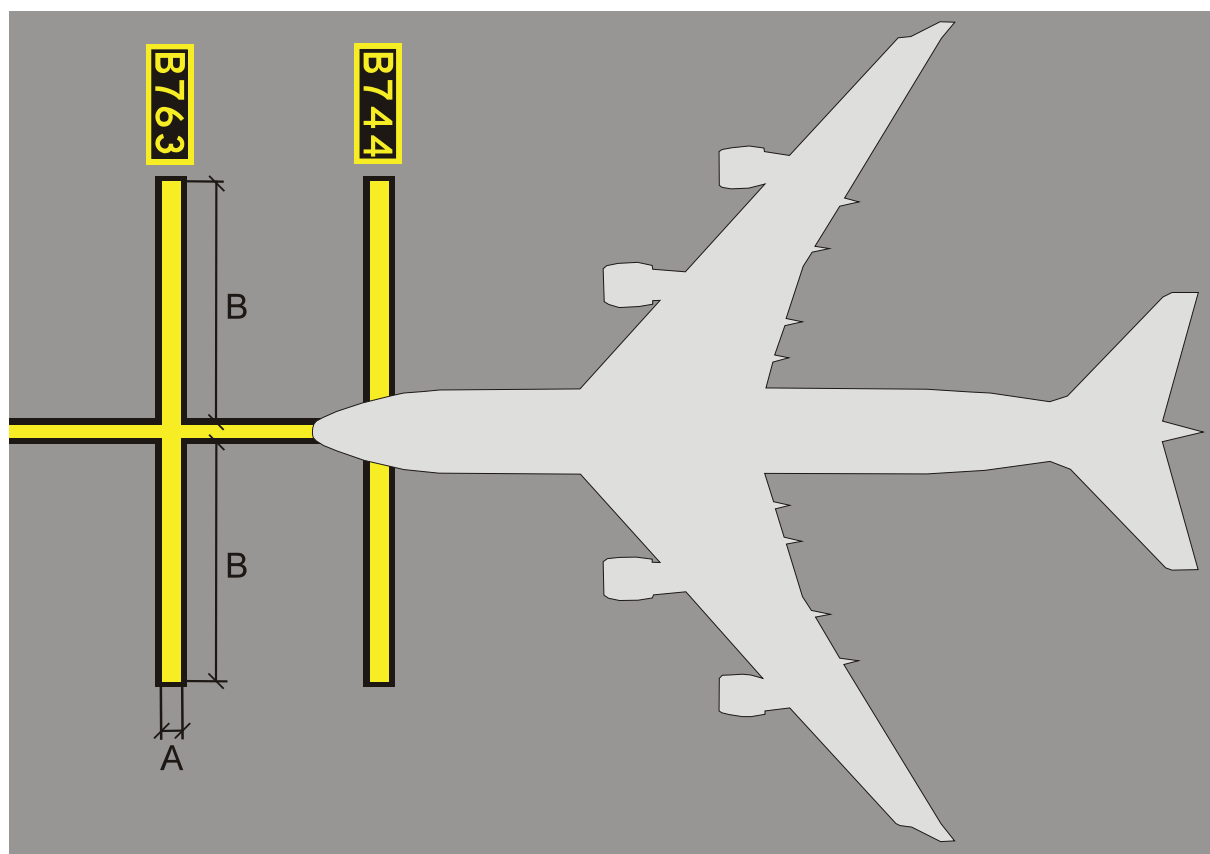
2.14 MULTIPLE MARSHALLER AND TOWING STOP LINE

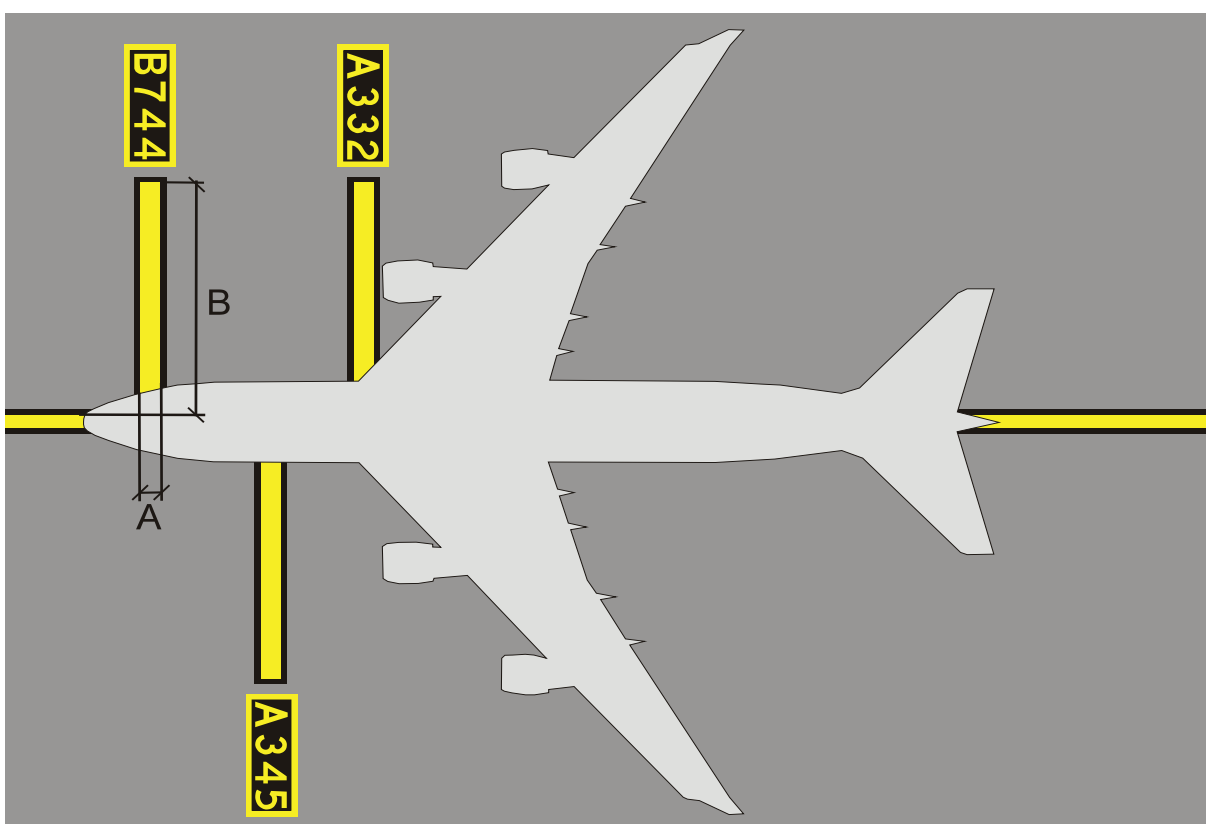
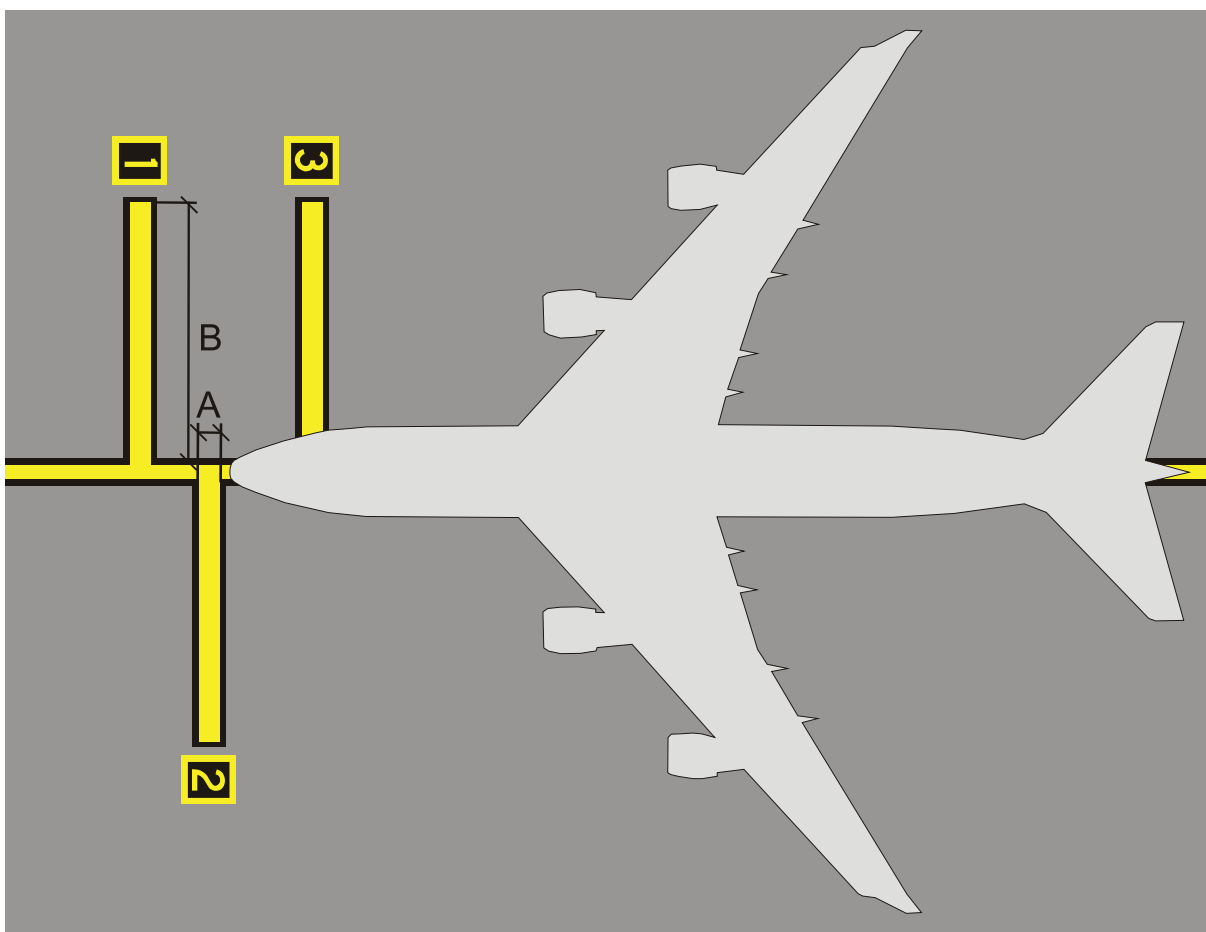
The markings on the following pages should be used where an aircraft, either under power or being towed, is positioned on stand by a marshaller, in association with an air bridge or where fuel hydrant positions are critical, so that different nose wheel stop positions are needed for the different aircraft types to be accommodated. The dimensions of the markings should be sufficient to be readily visible to the marshaller or tug driver. Characters should be a minimum of 0.5m height. The number and position of the markings are determined by the number and type of aircraft using the stand.

In cases where space is not available to use aircraft types to designate the different stop positions, they can be marked with a letter or a number (e.g. A, B or 1, 2), rather than an aircraft type. In this case the marshaller should be informed which stop position should be used.

Colour	Centre line	Border	Top line
	Yellow	Black	Yellow

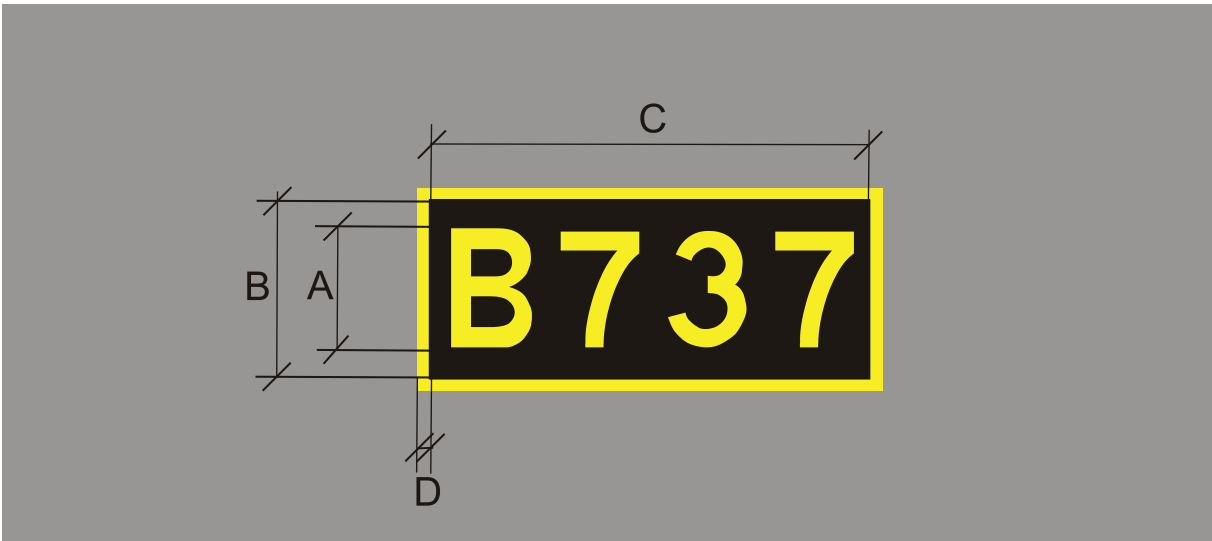
Dimensions	A	B
	0.2m min.	3.0m





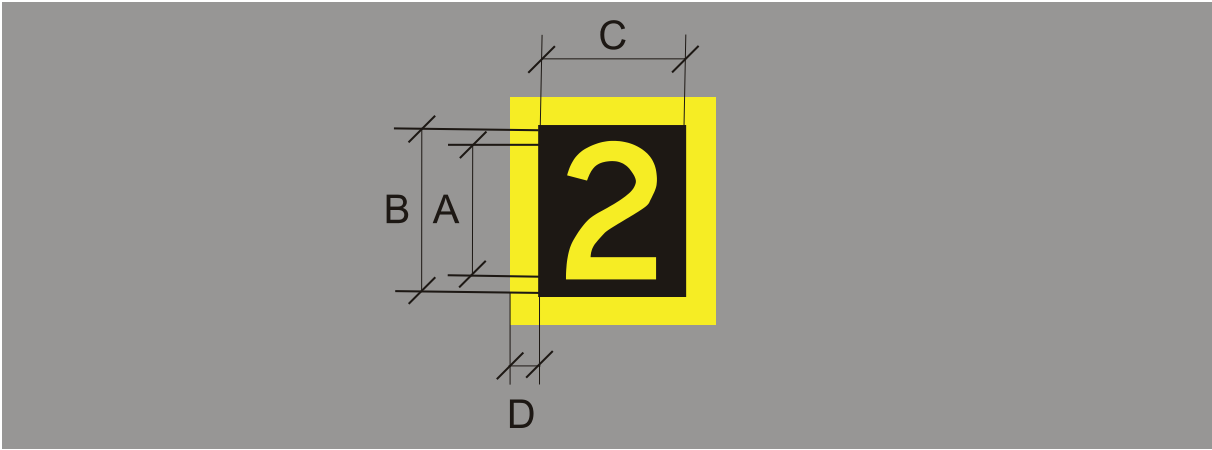
Colour	Centre line	Border
	Yellow	Black

Dimensions	A	B	C	D
	0.5m	0.75m	Acc. to character width	0.1m
	1.0m	1.5m	Acc. to character width	0.1m



Colour	Centre line	Border
	Yellow	Black

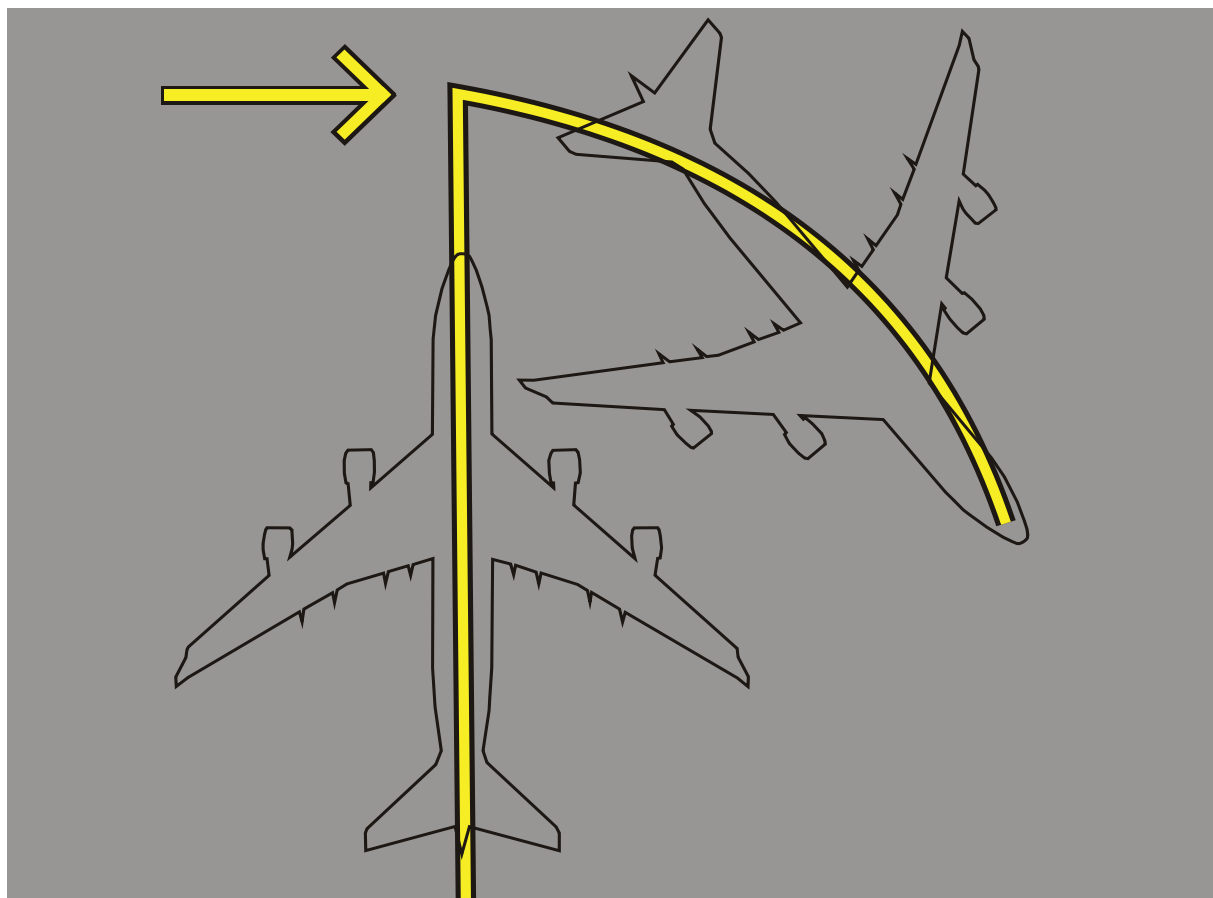
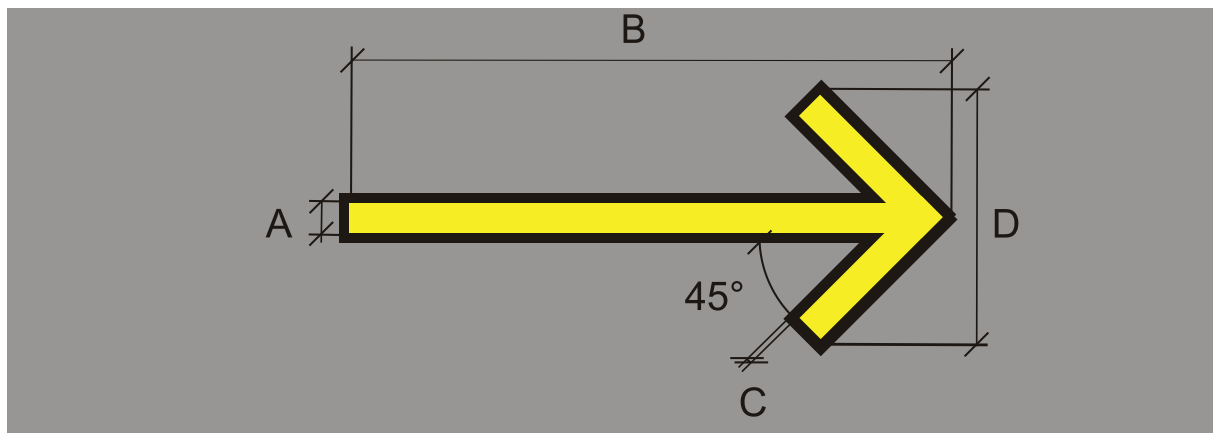
Dimensions	A	B	C	D
	0.5m	0.75m	Acc. to character width	0.1m
	1.0m	1.5m	Acc. to character width	0.1m



2.15 POWER OUT, TURN BAR AND ALIGNMENT LINE

The turn bar is used to advise the pilot of the position where the aircraft should commence turning when it leaves the stand (first illustration). The alignment line allows the pilot to align the aircraft on the centre line prior to bringing the aircraft to a stop or when the aircraft is under power, prior to leaving the stand (second illustration).

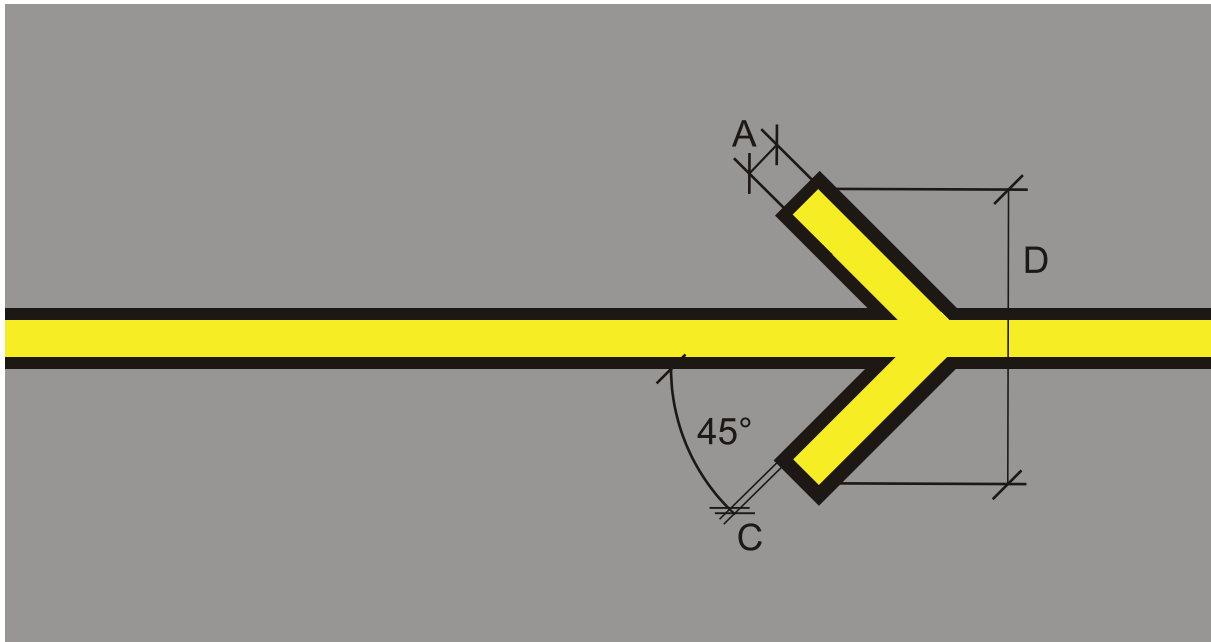
Colour	Centre line		Border	
	Yellow		Black	
Dimensions	A	B	C	D
	0.2m min.	6.0m	0.1m	2.0m min.



2.16 ONE WAY ARROW MARKING

Where it is intended that an aircraft proceed in one direction only, arrows pointing in the direction to be followed should be added as part of the lead-in and lead-out lines.

Colour	Arrow line		Border
	Yellow		Black
Dimensions	A	C	D
	0.2m min.	0.1m	2.0m min.



3

APRON MARKINGS FOR VEHICLES

3.1 BOUNDARY OF RESPONSIBILITY LINE

To display a boundary of responsibility (e.g. Airport – ATC) it is recommended to mark this in red colour with a width of not less than 0.3m.

Colour	Line	Border
	Red	White
Dimensions	A	B
	0.3m min.	0.1m

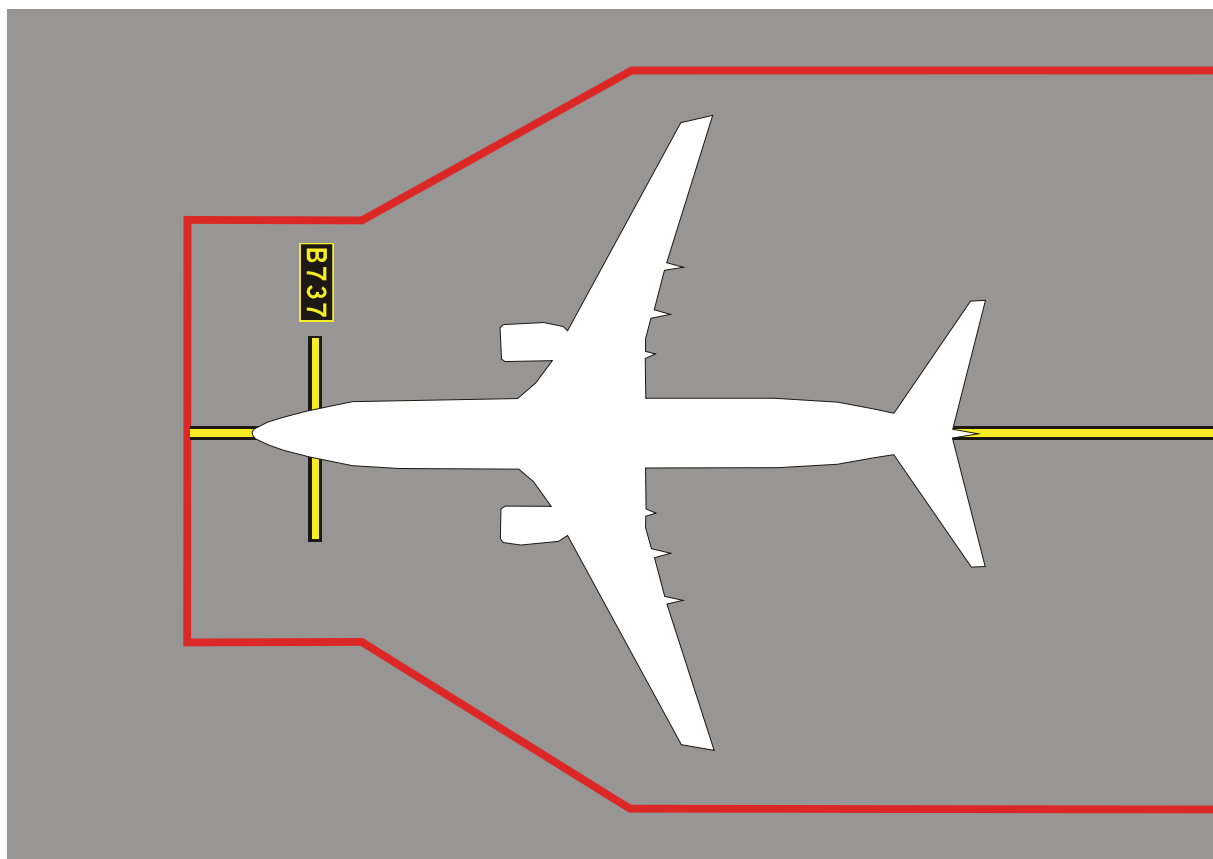


3.2 STAND SAFETY LINE

This line depicts the area that must remain free of staff, vehicles and equipment when an aircraft is taxiing (or being towed) into position or has started engines in preparation for departure. Once all engines have been shut down and the anti-collision lights have been switched off, vehicles may cross the line to service the aircraft.

The size of this area depends on the type of aircraft using the stand position. The area should be dimensioned to allow for a safety zone around jet engine intakes which must be kept free to avoid suction dangers. Aircraft manufacturers give guidance on safety zones required around engines operating on ground idle. A similar safety zone should also be provided on stands used by propeller-driven aircraft.

Colour	Line	Border
	Red	White
Dimensions	A	B
	0.2m min.	0.1m



3.3 RESTRICTED STAND-BY AREAS

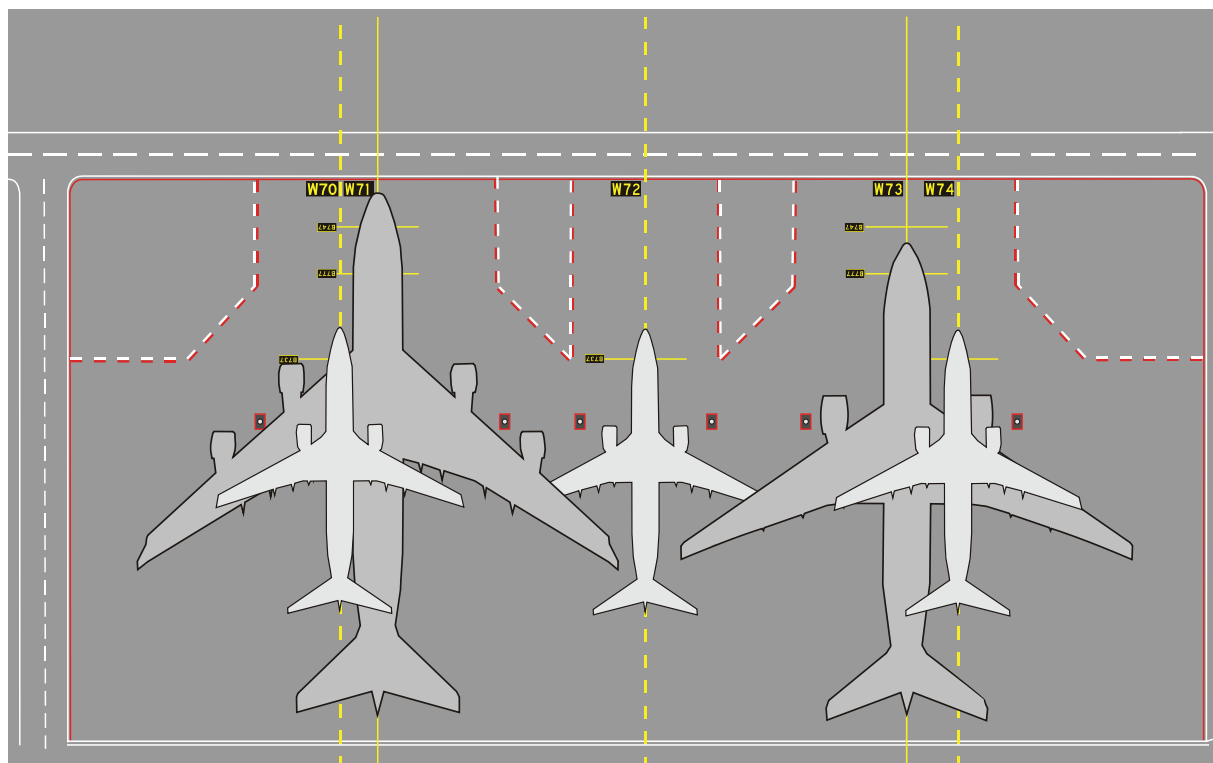
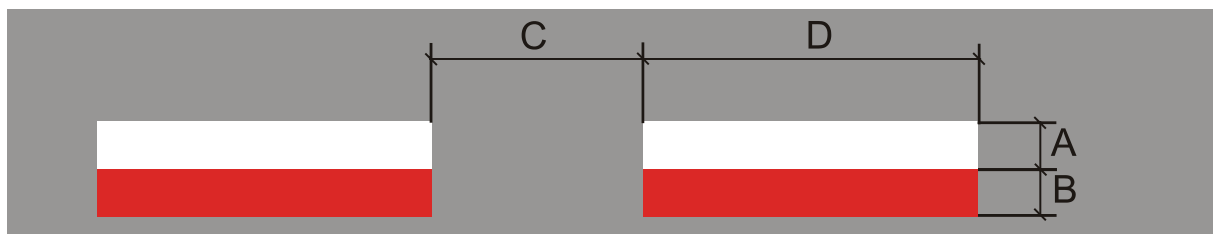
On aircraft parking stands where self taxiing-out of aircraft is possible it may be helpful to mark restricted stand-by areas. These areas indicate the safe distance to an in-taxiing aircraft where it is possible to position a vehicle and are marked with a dashed red and white line.

The size of these areas depends on the most critical aircraft using the parking stand and all minimum safety distances.

Prior to taxiing-out of an aircraft, such areas must be completely cleared.

Colour	Line		
	White - Red		

Dimensions	A	B	C	D
	0.1m min.	0.1m min.	0.5m	1.0m



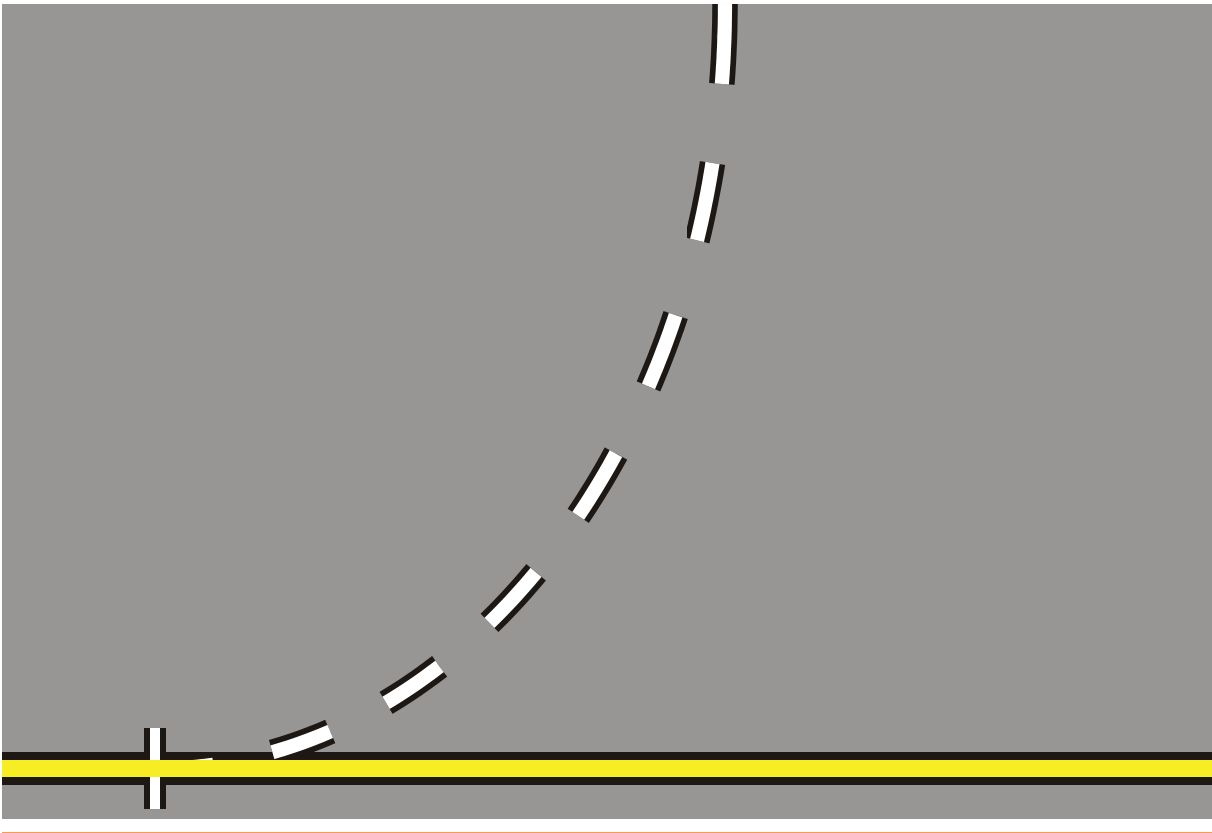
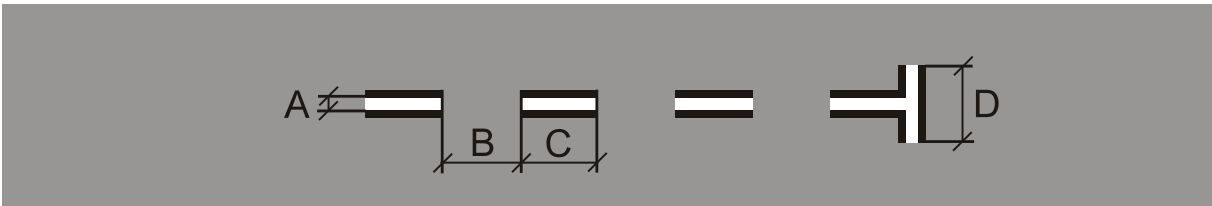
3.4 TRACTOR PUSHBACK LINE AND PUSHBACK LIMIT LINE (OPTIONAL)

This line marking is for the use of a tractor (tug) driver when pushing back an aircraft from a stand. It may be used to ensure sufficient obstacle clearance, on stands where clearances around manoeuvring aircraft are restricted.

A transverse bar indicates the position where the aircraft (nose wheel) is to be stopped, prior to being disconnected from the tractor (tug). A width of 0.1m is considered sufficient to be visible to tractor drivers; greater width may prove distracting to pilots.

The white colour used, and the broken line, should avoid confusion with markings for aircraft.

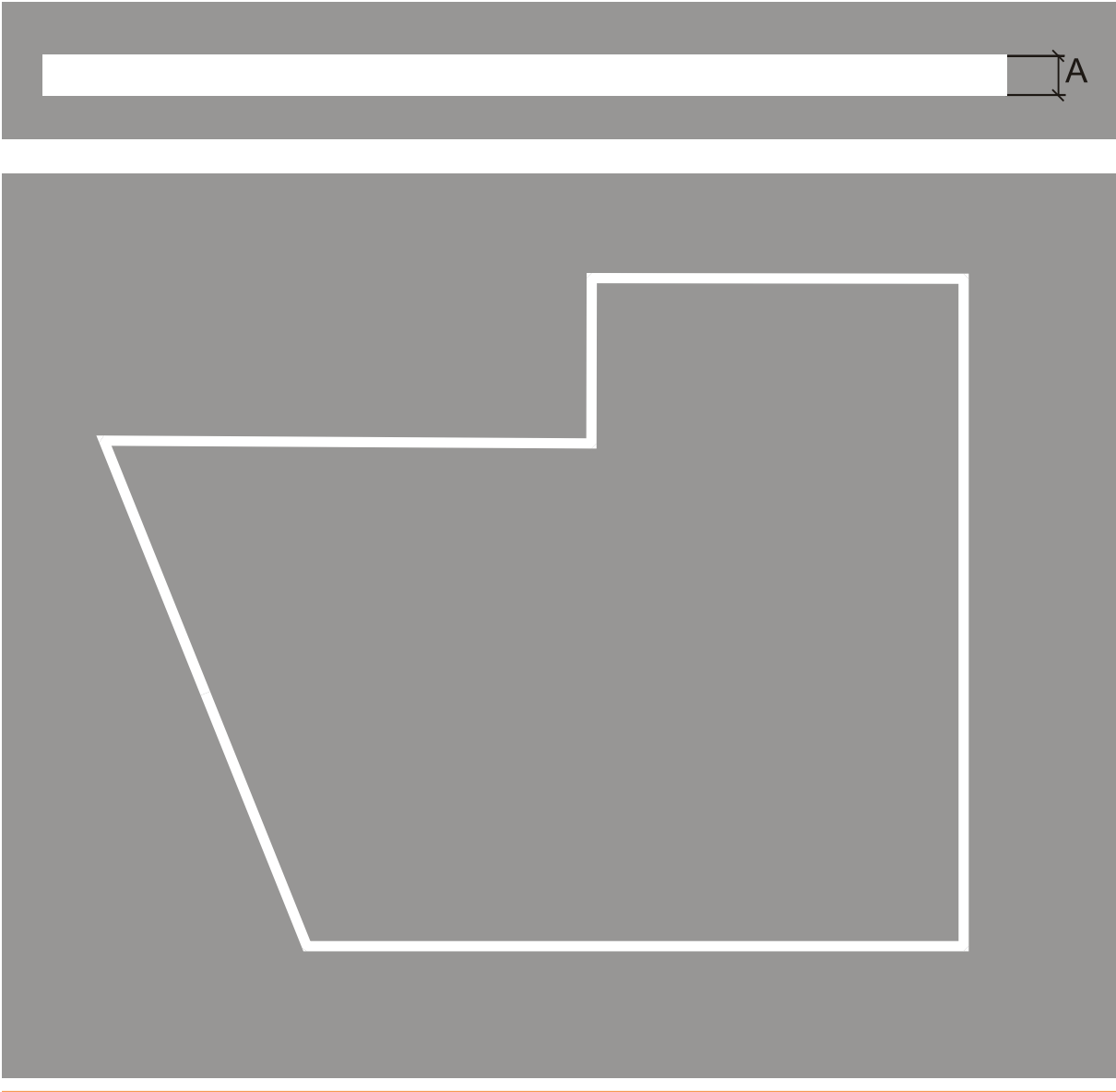
Colour	Centre line / Bar		Border	
	White		Black	
Dimensions	A	B	C	D
	0.1m min.	1.0m	1.0m	1.0m



3.5 EQUIPMENT PARKING AREA

This marking is used to delineate an area within which vehicles and equipment can park freely without infringing any stand areas or taxiways, including taxiway strip surfaces. However, vehicles should never block emergency egress from buildings, nor restrict access to fire fighting equipment, fuel shut-off valves and other life safety devices.

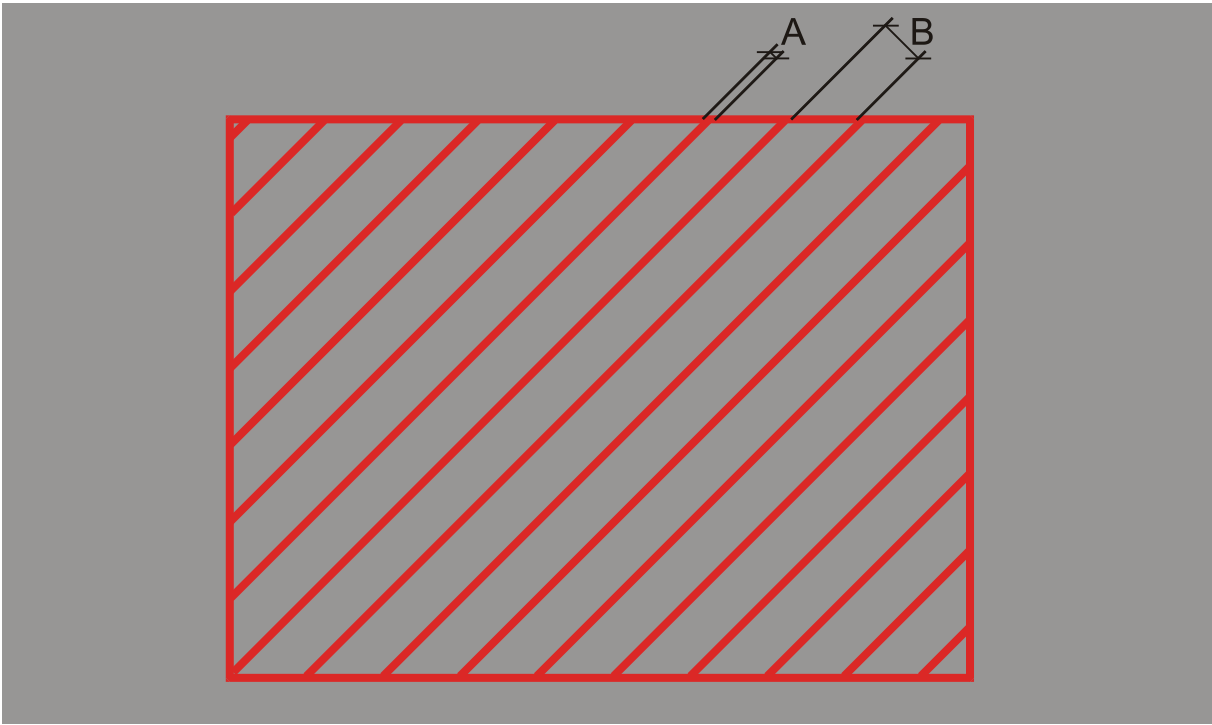
Colour	Line	Border
	White	Black
Dimensions	A	
	0.1m min.	



3.6 NO PARKING AREA

A no parking area for vehicles is indicated by red hatching within a red border.

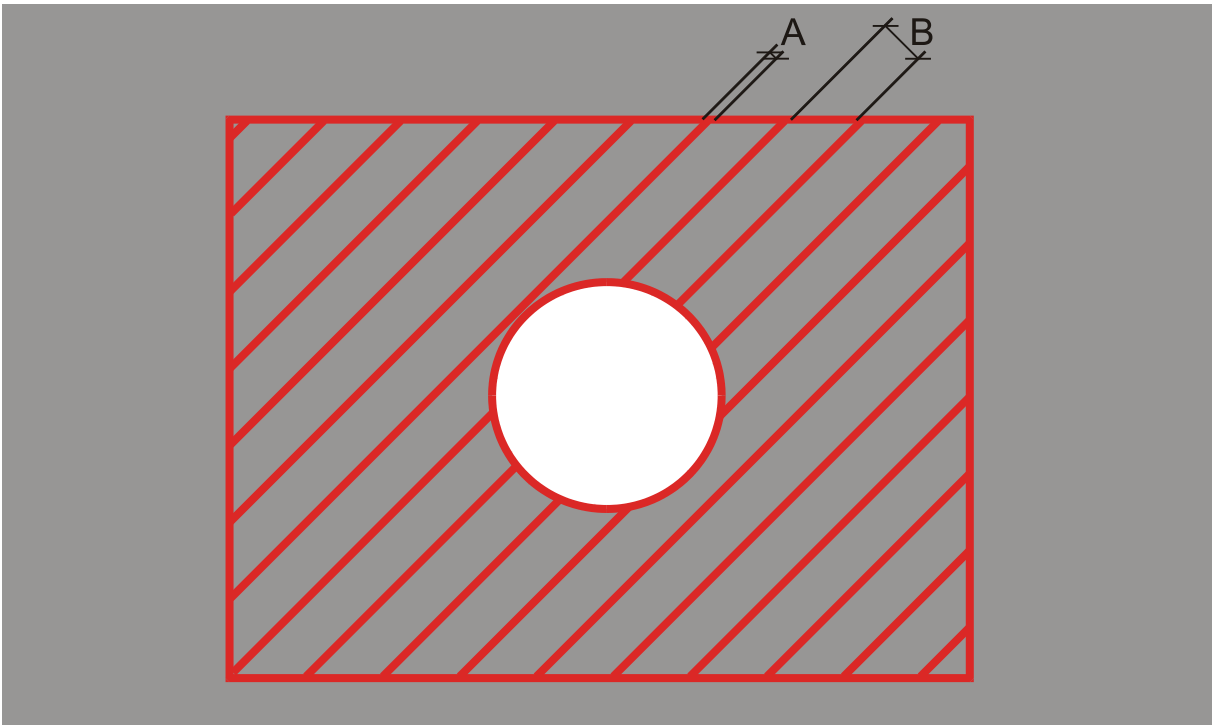
Colour	Border	Hatching
	Red	Red
Dimensions	A	B
	0.1m min.	0.5 - 1.0m



3.7 AIR BRIDGE WHEEL POSITION

The area under an air bridge has to be kept free of vehicles and equipment to ensure the safe operation of the air bridge. Wheel positions are recommended for the air bridge itself, using either a circle or a square, to locate the air bridge in a safe position when not in use and to allow aircraft to enter the stand safely.

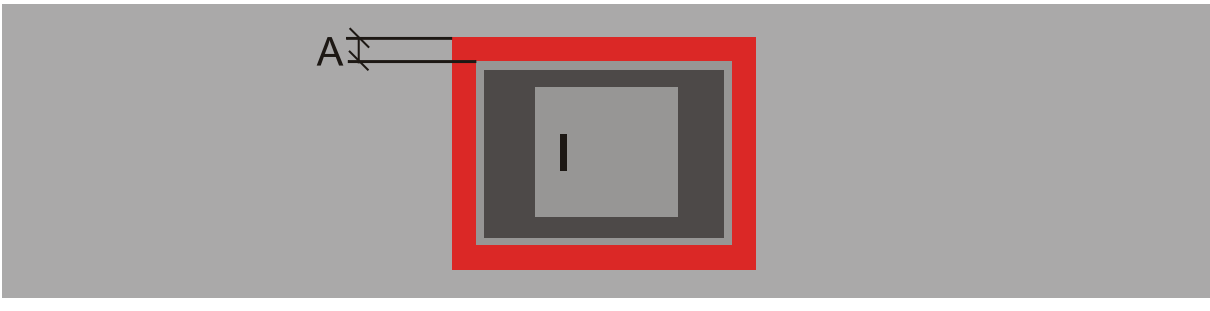
Colour	Border	Hatching	Parking circle
	Red	Red	White
Dimensions	A	B	
	0.1m min.	0.5 – 1.0m	



3.8 UNDERGROUND SERVICES INCLUDING FUEL HYDRANT MARKINGS

This marking is indicative of the markings recommended for use with all underground services. The size and shape of the markings depends on the size of the service opening. Any above ground projection, such as a lift-up hydrant connection system or cover, should preferably be painted red.

Colour	Border
	Red
Dimensions	A
	0.1m min.



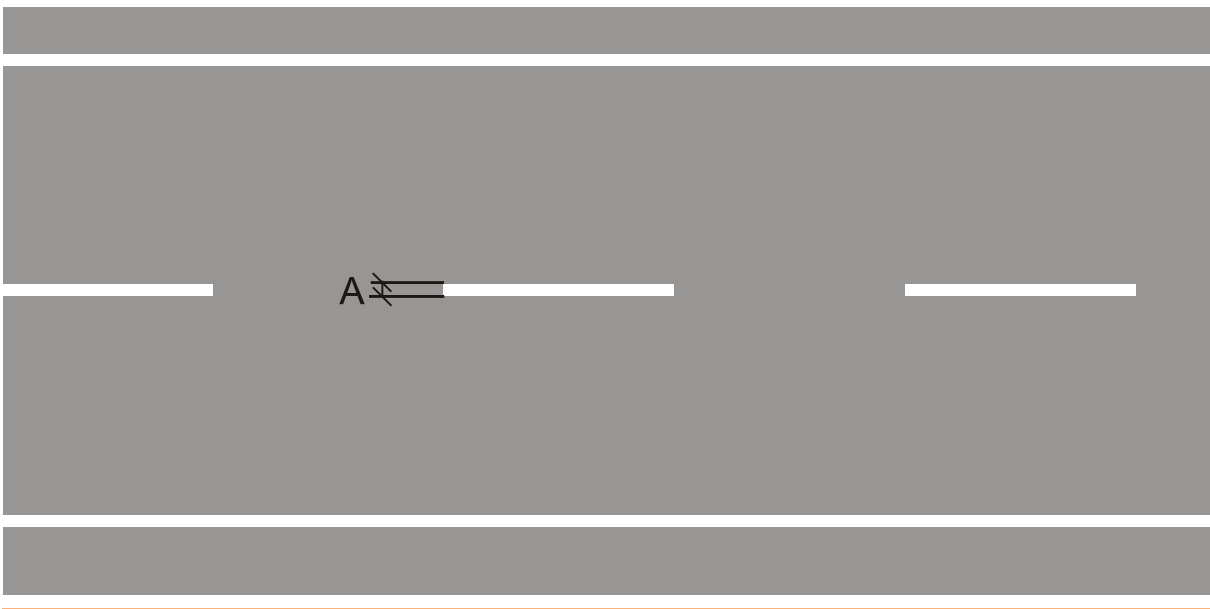
3.9 SERVICE ROAD

Each lane of a service road should be of a minimum width able to accommodate the widest equipment in use at that location e.g. emergency vehicles or ground support equipment. It is important to mark roads on apron areas, to keep vehicle traffic clear of aircraft and taxiways, and to minimize the risk of vehicle-to-vehicle accidents.

The side of the road on which vehicles drive and the dimensions of markings should conform to national roadway markings regulations.

Colour	Line
	White

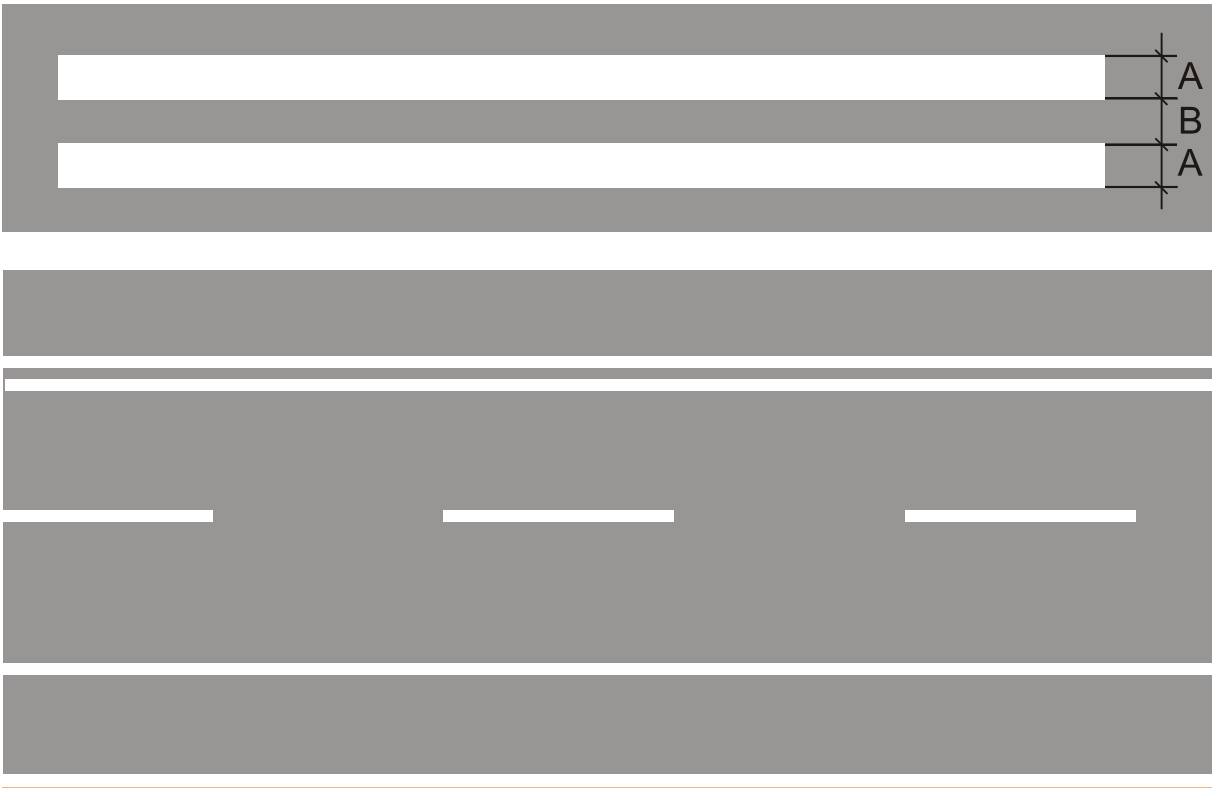
Dimensions	A
	0.1m min.



3.10 VEHICLE LIMIT LINE

Where a service road is also the limit of vehicle activity on an apron, this should be shown with a double white line. This indicates “**DO NOT CROSS**”. The reason for the limitation may vary, although the most common limitation is to provide adequate clearance for adjacent taxiing aircraft.

Colour	Line	
	White	
Dimensions	A	B
	0.1m min.	0.1m min.

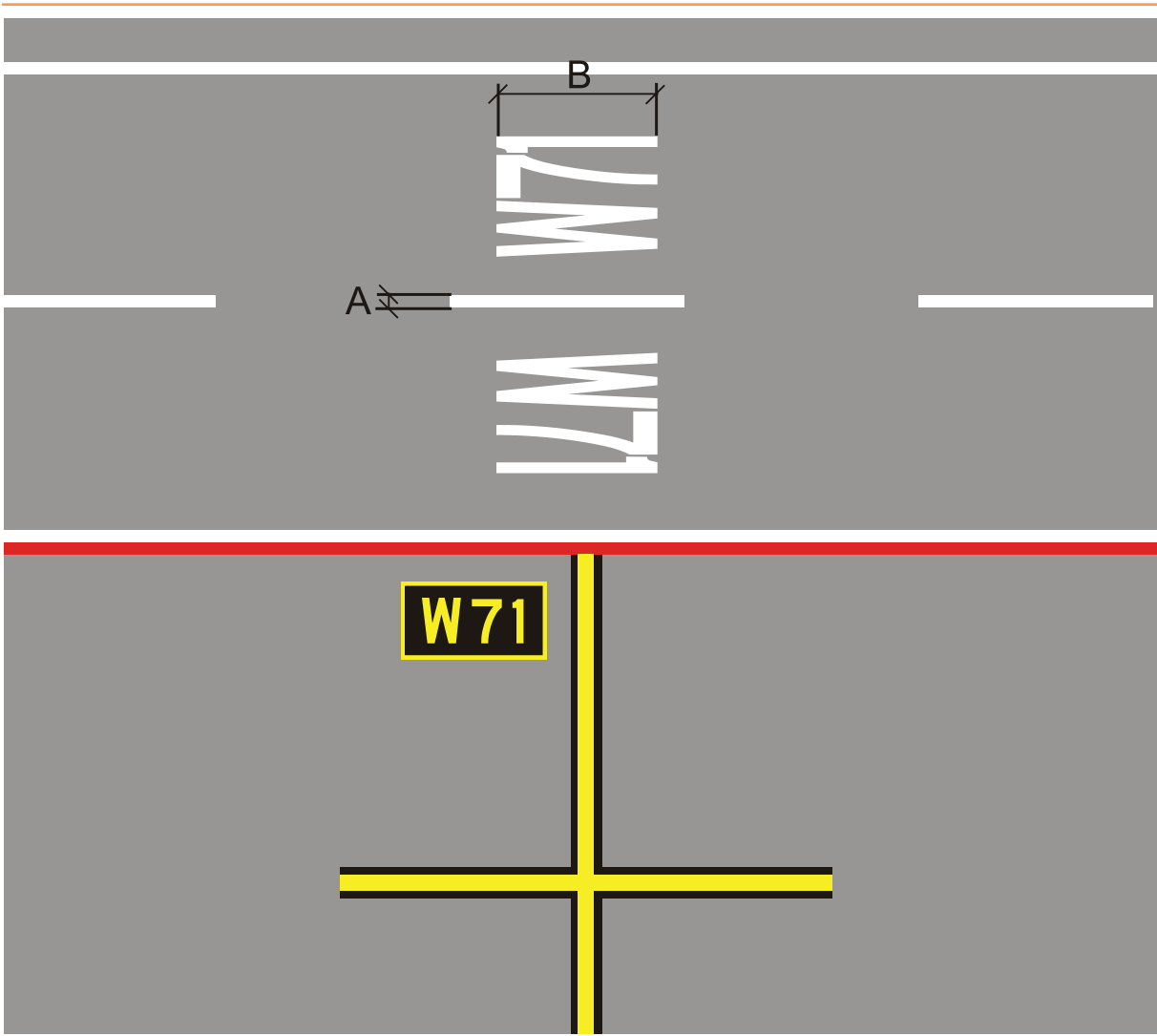


3.11 STAND IDENTIFICATION ON SERVICE ROAD

Stand identification markings on a service road serve to support drivers' positional awareness.

The side of the road on which vehicles drive and the location of these markings should conform to national roadway markings regulations.

Colour	Character	
	White	
Dimensions	A	B
	0.1m min.	2.0m



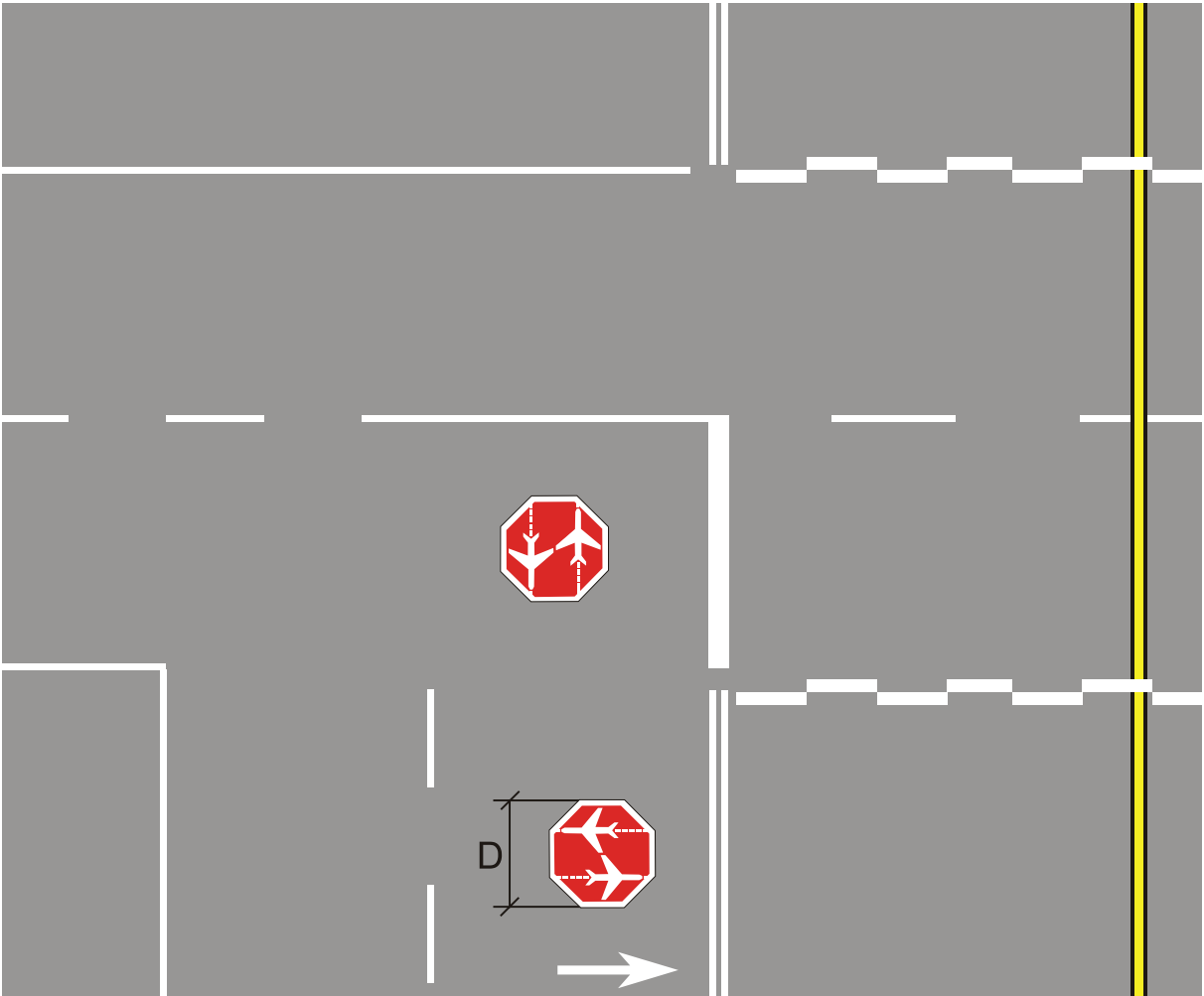
3.12 TAXIWAY AND TAXILANE CROSSING

The drawing below shows the recommended marking where a service road crosses a taxiway or aircraft stand taxilane. A separate sign may indicate that vehicles are required to stop.

The vehicle stop line should be located at a safe distance from the taxiway centre line, according to the wingspan of the largest category of aircraft using the taxiway (see ICAO Annex 14, Volume 1).

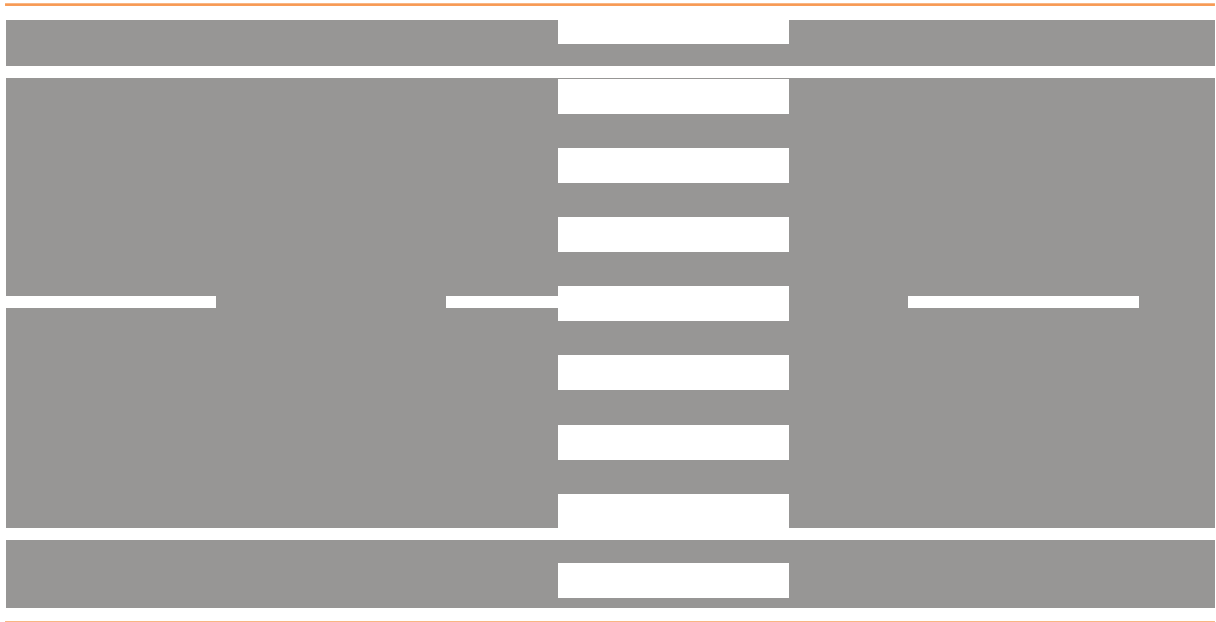
Colour	Line		
	White		

Dimensions	A	B	C	D
	1.0m	1.0m	0.1m min.	2.0m min.



3.13 PEDESTRIAN CROSSING

Colour and dimensions of markings should conform to national roadway markings regulations.



4

APRON SIGNS

4.1 STAND IDENTIFICATION SIGN FOR AIRCRAFT AT TERMINAL STANDS

This location sign should be placed as to be clearly visible from the cockpit of a parked aircraft on the associated parking stand. It may be used in conjunction with a Visual Docking Guidance System (if present).



W 71

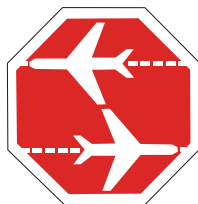
A rectangular black sign with the text "W 71" in large, bold, yellow capital letters.

4.2 NO ENTRY SIGN FOR AIRCRAFT



4.3 SIGN "ATTENTION TO CROSSING AIRCRAFT" FOR VEHICLES.

This sign (and/or painted markings on the ground) should be placed at taxiway and taxilane crossings.



4.4 JETBLAST SIGN FOR VEHICLES

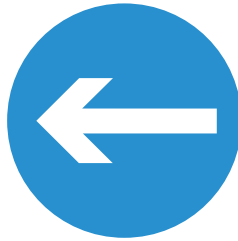
This sign (and/or painted markings on the ground) should be placed at appropriate locations such as service roads.



4.4 EXAMPLES OF ROAD AND OTHER TRAFFIC SIGNS

A series of typical road signs and markings used in different countries appear on the following pages. They should conform to national roadway markings regulations.

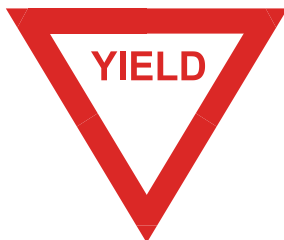
Mandatory turn



Speed limit



Give way



Pedestrians ahead



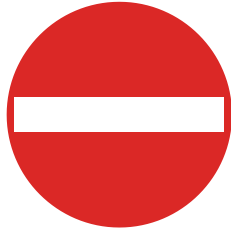
No smoking



Reduce speed



No entry



One way



Max. vehicle height



No parking



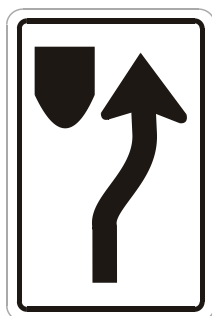
Stop ahead



Road narrows ahead



Keep right

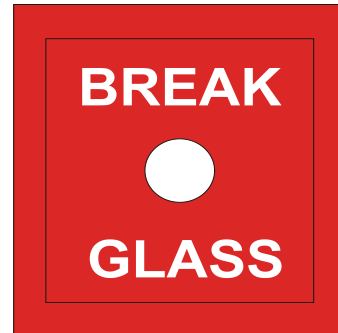


4.5 EXAMPLES OF EMERGENCY SIGNS

Emergency stop for fuel hydrant system



Alarm button

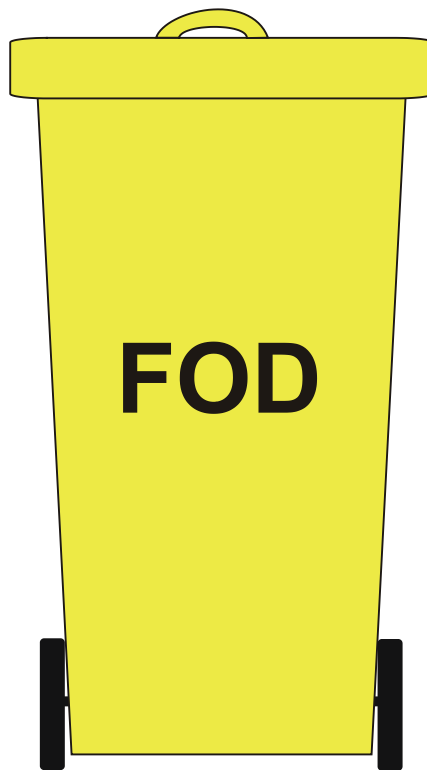


Emergency telephone



4.6 FOD BIN

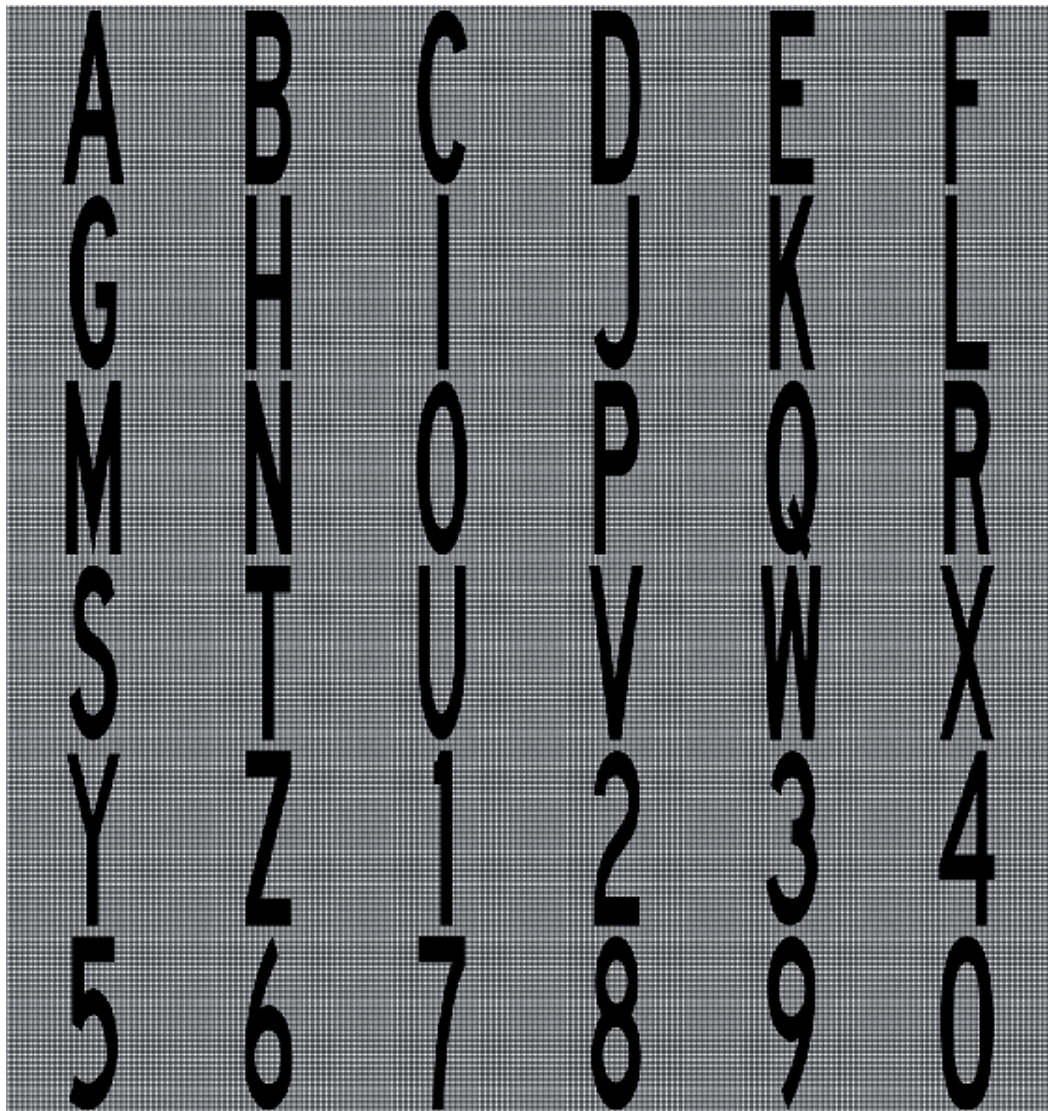
Safety on the apron does not end with signs and marking. Foreign Object Debris (FOD) is an ever present hazard to aircraft. Appropriately marked bins can assist in reducing this hazard by reminding staff of their obligation to collect and dispose of FOD correctly. They should be placed on or near each aircraft stand. FOD should not be deposited in garbage bins and garbage should not be deposited in FOD bins.



5

FORM AND PROPORTIONS OF LETTERS AND NUMBERS

5.1 CHARACTERS ACCORDING TO ICAO ANNEX 14 (VOL I) APPENDIX 3 FOR MARKINGS



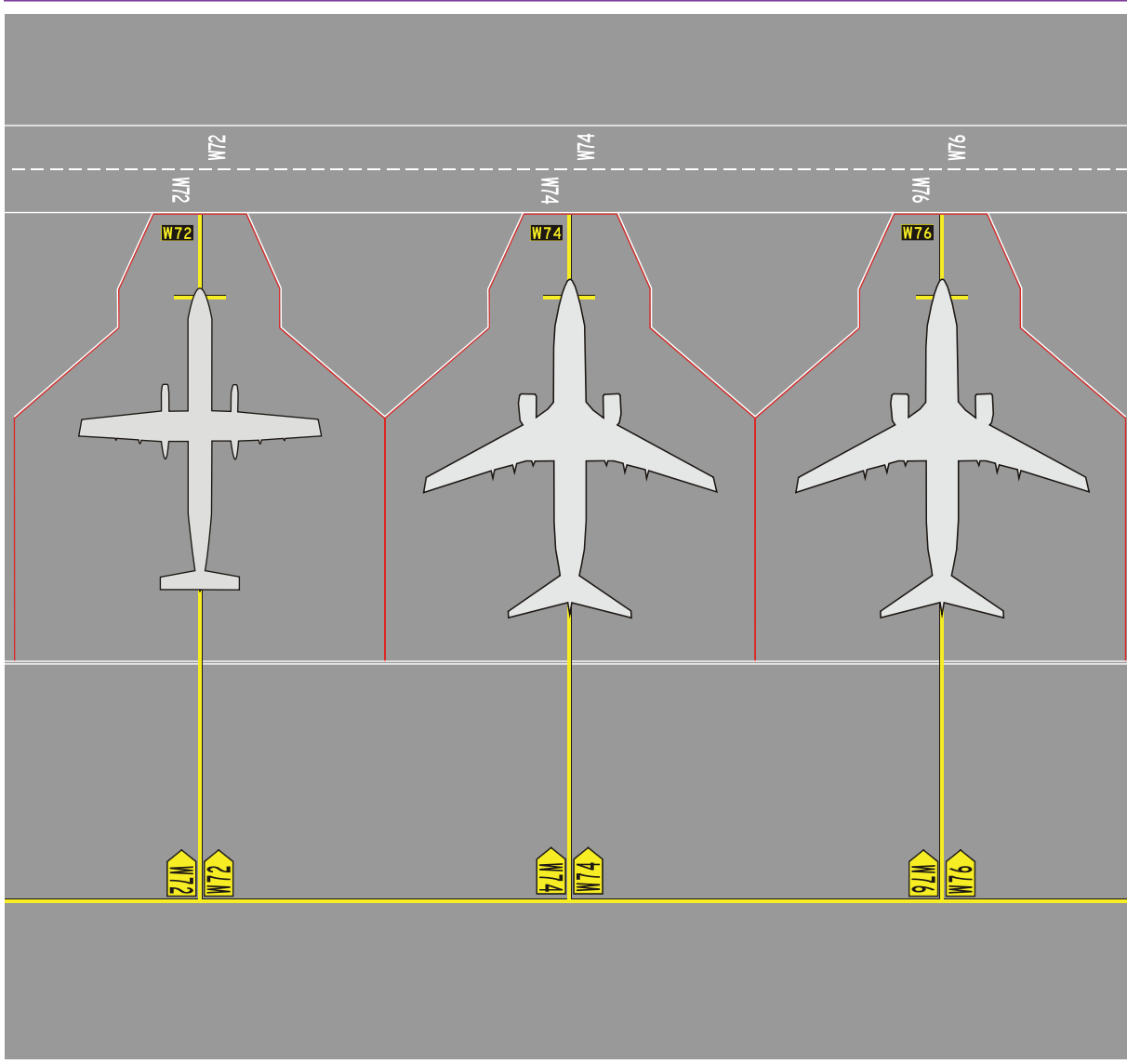
5.2 CHARACTERS ACCORDING TO ICAO ANNEX 14 (VOL I) APPENDIX 4 FOR SIGNS



6

EXAMPLES OF APRON MARKINGS

6.1 EXAMPLE 1



6.2 EXAMPLE 2

