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Conveyance of road vehicles on wagons - Technical organisation - Conditions for coding combined transport load units and combined transport lines

*Trafic de véhicules routiers sur wagons - Organisation technique - Conditions de codification des unités de chargement en transport combiné et des lignes de transport combiné
Huckepackverkehr - Technische Organisation - Bedingungen für die Codierung der Huckepackladeeinheiten und der Huckepackstrecken*



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Summary

The present leaflet sets out the coding and organisation of loading units in respect of road vehicles on wagons.

This coding is designed to ensure the compatibility of loading units (LU) with the permissible profile for combined transport lines.

The provisions in the present leaflet aim to facilitate LU identification in order thereby to speed-up international traffic movements. They are applicable to:

- semi-trailers
- swap bodies
- roller units

loaded on wagons or bogies in combined transport operations.

1 - General

1.1 - As a general rule, the rail conveyance of combined transport units on wagons, or in some cases on bogies, causes encroachment of the upper part of the loading gauge. The aim of the provisions that follow is to facilitate and speed up the conveyance of:

- semi-trailers (STs),
- swap bodies (SBs),
- roller units (see [List of abbreviations - page 69](#)),

loaded on specified wagons in international combined transport.

1.2 - The method is applicable to the transport of:

- semi-trailers which comply with the conditions set out in *UIC Leaflet 596-5* (see [Bibliography - page 70](#)), loaded on fixed-recess carrier wagons (pocket wagons) in accordance with *UIC Leaflet 571-4, point 2.1* (type 1a and 1b wagons) and on the other types of wagons in accordance with the provisions of [Table 1 - page 6](#)¹;
- semi-trailers on bogies (with or without adaptors) which comply with the conditions set out in *UIC Leaflet 597* (see [Bibliography - page 70](#));
- swap bodies which comply with the conditions set out in *UIC Leaflet 592-4* (see [Bibliography - page 70](#)) loaded on fixed-recess carrier wagons (pocket wagons) as specified in *UIC Leaflet 571-4, point 2.1* (type 1a and 1b wagons) and on other types of wagons in accordance with the provisions of [Table 1](#)¹;
- roller units which comply with the conditions set out in *UIC Leaflet 591* (see [Bibliography - page 70](#)) and which are loaded on carrier wagons as specified in *UIC Leaflet 571-4, point 3* (type 1 wagons).

1. For other types of wagon, bi- or multilateral agreements are required between the RUs concerned.

2 - Principle

2.1 - Load units (LU) used in international (rail-road) combined transport must be fitted with plates bearing a coding number in order to facilitate identification of load units, forwarding operations and the crossing of frontiers.

2.2 - This leaflet sets out the conditions for determining the coding and meaning of the data carried on the coding plates.

This coding is designed to ensure that each load unit is compatible with the loading gauge for the lines used for combined transport and with the RUs' safety requirements.

The coding plates shall be made of durable material in wear-resistant colour:

- either using metal with embossed markings, or
- in the form of adhesive, flexible, printed sheets.

They shall be affixed to the two side walls of LUs and shall be compliant with:

- Appendix A - page 19, in the case of semi-trailers (STs),
- points B.1 - page 22 and B.2 - page 23, in the case of swap bodies (SBs),
- points B.3 - page 25 and B.4 - page 26, in the case of roller units.

Wagon side raves are considered non-movable parts.

With the exception of roller units, a coding plate shall show the following details:

- on the upper line, the technical number(s) which is/are valid for railway operation;
- on the lower line, the 9-digit¹ registration number for identification of the LU.

The coding plates of roller units shall, as a rule, comply with this same arrangement; they shall however also contain other information specific to the system (see points B.3 and B.4), and particularly to the wagon's compatibility level.

In order to improve the loading capacity of wagons that carry swap bodies, the coding plates shall also include a code corresponding to the length (group number as per *UIC Leaflet 592-4*) which, by using the appropriate loading diagrams, enables the wagon to be optimally loaded.

The details given on the plate shall be assigned by the competent RU or, under its responsibility, by one or more bodies designated by it.

When coding plates cannot be made available at the time when the load units enter service, a provisional coding in indelible characters on waterproof paper (or a plastic-covered waterproof base) shall be carefully affixed.

1. See also note a. of points A.1 and A.2 and note b. of point B.1 (also valid for point B.2).

The provisional coding shall be valid for a maximum period of 3 months from the date to be marked on the day the plate is affixed.

In the absence of any marking, multilateral agreements must be concluded to cover the acceptance of such consignments for carriage.

3 - Technical number (TN)

3.1 - Purpose of the technical number

The purpose of the technical number is to code the key characteristics of the transport unit for rail conveyance. By reading the technical number, the shipper and RU inspection staff can ascertain on which carrier wagons and which combined transport routes the load unit, thus identified, can be conveyed in compliance with any specified operating conditions.

3.2 - Scope of use

3.2.1 - The use of the technical number (TN) presupposes that the load unit (LU) is carried on one of the following types of wagon:

- type 1a and 1b recess wagons or similar carrier wagons as specified in point [D.3 - page 31](#) for semi-trailers (STs);
- type 1a and 1b carrier wagons or similar standard designs that conform to points [D.1 - page 29](#) and [D.2 - page 30](#) for swap bodies (SBs);
- bogies (with or without adaptors) of the standard system for semi-trailers (STs);
- type 1 carrier wagons as specified in *UIC Leaflet 571-4, point 3* for roller units.

3.2.2 - The load unit must meet the conditions set out in the following UIC leaflets:

- *UIC Leaflet 591*: for horizontal-transferred roller units;
- *UIC Leaflet 592-4*: for grab-handled swap bodies;
- *UIC Leaflet 596-5*: for grab-handled semi-trailers suitable for conveyance on recess wagons;
- *UIC Leaflet 597*: for bimodal "semi-trailers on bogies" systems.

If certain specific points in these conditions cannot be met, a special study shall be carried out.

3.2.3 - The loading method must comply with the instructions in point [5 - page 12](#) for the wagon concerned (loading instructions).

3.2.4 - The load units shall be routed by the lines coded for combined transport ([see point 6 - page 13](#)).

3.3 - Comments regarding the technical number

3.3.1 - Allocation of the technical number

The technical number is made up of the wagon compatibility code (1 letter) and the standard combined transport profile number (2 or 3 digits), possibly the special combined transport profile number (2 or 3 digits preceded by letter S) and, for roller-unit appliances, the wagon compatibility level.

This number shall be allocated to each load unit by the competent RU or, under its responsibility, by one or more designated by it, in accordance with the standard provisions contained in this leaflet.

3.3.2 - Wagon compatibility code (WCC)

The WCC specifies the type of wagon (referred to in point 3.2.1 - page 5) on which the load unit can be loaded, as defined by its technical characteristics and by "the lower parts" of the combined transport profile mentioned in point 3.3.3 - page 7. The WCC is also used in the same way for semi-trailers conveyed on bogies.

For roller-units, the WCC shall be accompanied by the wagon compatibility level, because for these LUs, the WCC must match not only the characteristics of the roller-unit, but also the wagon compatibility level.

The WCC is defined as indicated in Table 1:

Table 1 : Compatibility code allocation

Wagon compatibility code	Load unit in combined transport	Carrier wagon suitable for combined transport
P	Semi-trailers as per <i>UIC Leaflet 596-5, point 1</i>	Type 1a and 1b recess wagons ^a with seating device
N	Semi-trailers as per <i>UIC Leaflet 596-5, point 2.1</i>	Type 1a and 1b recess wagons ^a as per <i>UIC Leaflet 571-4, point 2.1.5</i>
C	Swap bodies	Type 1a and 1b recess wagons ^b
K, R, T	Semi-trailers of systems specified in <i>UIC Leaflet 597</i>	Bogies of systems in <i>UIC Leaflet 597</i> with or without adaptors
B depending on the compatibility level	Roller unit depending on the compatibility level	Type 1 ^b carrier wagons depending on the compatibility level [Scsns(s)]

a. And bogie wagons complying with the stipulated working conditions and the limiting curve as per point D.3.

b. And bogie wagons complying with the stipulated working conditions and the limiting curve as per point D.1 as well as 2-axle carrier wagons complying with the stipulated working conditions and the limiting curve as per point D.2.

Wagons used in combined transport must be marked with the wagon compatibility code given in Appendix C - page 28.

3.3.3 - combined transport profile number (CTPN)

There are two types of combined transport profile, the "standard" profile and the "special" profile.

The **standard** CTPN (see also points [A.1 - page 19](#), [B.1 - page 22](#) and [B.3 - page 25](#)) comprises:

- | | |
|----------|--|
| 2 digits | for STs (P and N systems) up to a maximum width of 2.50 m for SBs and Roller-Units up to a maximum width of 2.55 m ^a |
| 3 digits | for STs (P and N systems) wider than 2.50 m but not wider than 2.60 m for SBs and roller-units wider than 2.55 m but not wider than 26.0 m |

The **special** CTPN (see also points [A.2 - page 20](#), [B.2 - page 23](#) and [B.4 - page 26](#)) comprises the letter S together with:

- | | |
|----------|---|
| 2 digits | For STs (P and N systems) wider than 2.50 m
For SBs and Roller-units with a maximum width of 2.55 m ^a |
| 3 digits | For STs (P and N systems) wider than 2.55 m but not wider than 2.60 m
For SBs and roller-units wider than 2.55 m but not wider than 2.60 m |

- a. SBs and roller-units 2 550 mm in width must, additionally to the coding number, receive an extra marking → 25,50 ← : for dimensions/colour/local securing - (see point [B.5 - page 27](#)).

The **special** CTPN is mandatory for traffic with Great Britain.

3.3.3.1 - Definition of the combined transport profile (CTP)

A CTP represents a completely closed envelope with specified shape and dimensions which a given load unit, in the loaded position on the wagon (see point [3.3.3.2 - page 9](#)), must not encroach.

Any CTP consists of a "lower part" and an "upper part":

- the "lower part" is defined by a lower outline specific to each type of wagon and by the "Technical conditions" applicable to each load unit (see also point [3.2.2 - page 5](#));
- the "upper part" or roof is specified in Appendices [E - page 32](#), [F - page 38](#) and [G - page 44](#) in which:
 - the half-widths are given in relation to the mean longitudinal vertical plane of the load unit and,
 - the heights are given, for each type of wagon (see point [3.2.1 - page 5](#)), in relation to its horizontal reference plane.

NB : Appendices [E](#), [F](#) and [G](#) are given for information purposes only. The combined transport profile must be determined at scales 1/10 and 1/1 by using standard-profile drawings.

The reference plane is a horizontal plane, characteristic of each type of wagon. Its height above rail level is given in Table [2 - page 8](#). The transport position of the load unit on wagon at the time of profile-number allocation is assumed to be that corresponding to the empty wagon when new.

Consequently, the profile number allocated to the load unit:

- is independent of the deflection under load and of the wear condition of the wagon;
- makes it possible for the specific height of the coded load unit to be readily assessed.

Using the heights of the roof angle above the reference plane, as given in Appendices E and F, 100 profiles numbered from 00 to 99 and 330 to 429 respectively in steps 10 - mm high can be identified.

Using the heights of the apex of the roof above the reference plane, as given in Appendix G, there are 100 special profiles numbered from S 00 to S 99 and S 330 to S 429, at intervals of 10 mm, which can be identified.

Table 2 : Characteristics of combined transport wagons and of semi-trailer-on-bogie systems

	Recess wagon	ST on bogies Kombirail system RoadTrailer system Transtrailer system	Carrier wagon for roller units for horizontal transshipment	2-axle carrier wagons for swap bodies
Code letter ^a	(P) / (N) / (C)	(K) / (R) / (T)	(B)	(C)
Total of lateral clearances	11,5 mm	11,5 mm	11,5 mm	23 mm
Distance between bogie centres or wheelbase for 2-axle wagons	See points D.1 and D.3	See Appendix J	See point D.1	See point D.2
Bogie wheelbase	See points D.1 and D.3	See Appendix J	See point D.1	
Height of reference plane above running surface for the conveyance of: a) STs b) SBs and Roller-units	330 mm 330 mm	330 mm	330 mm	330 mm
Maximum overhang of the load unit in relation to bogie centres and in relation to axles for 2-axle wagons: a) STs b) SBs ^b c) Roller-Units	2 000 mm 2 000 mm	Negligible for the calculation of reductions	2 000 mm	
Maximum off-centering position of the load unit as a result of centering tolerances - near the tyres - near the seating or bearing device - for STs on bogies For SBs and Roller-Units	10 mm 10 mm 10 mm	2 mm	10 mm	10 mm

a. See Appendix C.

b. Variable - See point D.2.

3.3.3.2 - Determination of the combined transport profile for a given load unit

This profile shall always be determined from the drawings of the load unit concerned.

To this end, the load unit shall be considered as being placed on a particular type of carrier wagon or bogie.

For the upper part of the load unit, the outer combined transport profile (tangent) shall be determined in accordance with Appendices **E - page 32**, **F - page 38** or **G - page 44**, bearing in mind the longitudinal tilt inherent in its design. According to the shape of this load unit, the outer dimensions (tangency) can depend on only one of these points (for example the point of contact of the tank dome or any other protruding point of the load unit).

NB : Appendices **E**, **F** and **G** are given for information purposes only. The combined transport profile must be determined at scales 1/10 and 1/1 by using standard profile drawings.

The number of this combined transport profile shall be allocated as the profile number of the load unit concerned.

The profile number allocated to the load units corresponding to each type of wagon must be associated with the corresponding compatibility code: "P" and "N" for semi-trailers, "K", "R" and "T" for semi-trailer-on-bogie systems, "C" for swap bodies and "B" for roller units.

In the case of special profiles, the profile number must be preceded by the letter S for each compatibility code.

3.3.3.2.1 - Coding of semi-trailers on recess wagons

In the case of semi-trailers on recess wagons, the load unit shall be placed on the type 1a recess wagon in its most favourable loading position for transport. In this position, the load unit - empty or fully loaded, with the pneumatic suspension deflated on semi-trailers with pneumatic suspension - must fit in the lower envelope of the type of wagon concerned.

There may be cases where a load unit tilts longitudinally due to this shape or the way it is positioned on the particular type of carrier wagon.

For the ST loading position on type 1a recess wagon, and consequently for determining the profile number matching this load unit:

- loading surfaces as per Appendix **O - page 67** shall be mandatory for compatibility code P;
- loading surfaces as per Appendix **P - page 68** shall be mandatory for compatibility code N.

When the height dimensions are directly checked on the ST loaded on type 1a recess wagon, Appendix **H - page 48** shall be used to allow for the camber of the wagon when empty.

In the case of semi-trailers, relevant calculations shall be made for the load unit in the empty and laden state. For semi-trailers with air-sprung suspension, the provisions of point **7.1.1 - page 15** shall apply. For purposes of profile-number allocation, the loading position and the height of the UIC seating plate or bearing pin shall mandatorily be fixed in accordance with the conditions set out in point **3.2.2 - page 5**.

An example of the calculation of the combined transport profile number is given in Appendix I - page 49.

3.3.3.2.2 - Coding of semi-trailers on bogies

The corresponding calculations for "STs on bogies" are described in Appendix J - page 53.

Some examples of the profile-number calculation are given in Appendix J.

3.3.3.2.3 - Coding of swap bodies (SBs) and Roller Units

The loading area shall be obtained by a vertical displacement of 845 mm above the reference plane of type 1a recess wagons for swap bodies and 1 070 mm for roller units.

For swap-body coding purposes, the decisive criterion shall always be the CT profile as per Appendices E - page 32, F - page 38 and G - page 44, within which the CT is contained or which is tangent to it when loaded on a type 1a recess wagon (as per Appendix K - page 58). This principle is also valid for the coding of roller units when loaded on wagons as specified in point 3.3.3.1, Table 2 - page 8 (see Appendix K).

Conveyance of such swap bodies or roller units secured to a semi-trailer underframe is not permitted in combined transport (bilateral agreements are possible).

Appendix K gives examples of the coding of swap bodies on recess wagons (and 2-axle carrier wagons) and coding of roller units on type 1 carrier wagons (Scsns(s)).

3.3.3.3 - Checking the combined transport profile number (CTPN)

The CTPN shall be checked by any suitable method, under the responsibility of the registering RU, for example:

- using the semi-trailer design drawings;
- by actually loading the semi-trailer to be coded, or a prototype, on the carrier wagon.

4 - Registration number

(See Appendices **A - page 19** and **B - page 22**)

The registration number is a means of identification specific to each load unit. Except for roller units, it shall include the following group of digits in the lower line of the coding plate:

- Digits 1 and 2:** Nationality number of the combined transport Company (see Appendix L - page 62).
- Digits 3 to 5:** Code number of the road-haulage firm within the national combined transport Company.
- Digits 6 to 9:** Individual serial number for the load units in each road-haulage firm (fleet number).

For each of the above-mentioned group of digits, a specific sequence of digits can only be allocated once within the limits given below:

- Digits 1 and 2:** To one combined transport company within the International Union of combined Road-Rail transport companies (UIRR) (see List of abbreviations - page 69).
- Digits 3 to 5:** To one road-haulage firm within the national combined transport Company.
- Digits 6 to 9:** To one transport unit within the vehicle fleet of the road-haulage firm, in relation to the specific number of the road-haulage firm (digits 6 to 8).

This will ensure that each registration number can only be allocated once in European combined transport.

The registration number shall be allocated to each load unit by the national combined transport company, subject to approval by the competent RU.

The competent RU must know the registration numbers which have been allocated, together, with the corresponding technical number.

For roller units, see point **B.3 - page 25**.

5 - Loading criteria

The coding shall only be valid if the specified loading conditions for each type of wagon are observed. These must be circulated by the RUs as instructions (loading instructions) based on the following criteria:

- the semi-trailer must not tilt transversally or exceed the cross-section shown on the drawings submitted with the application for registration;
- the prescribed longitudinal loading position, indicated by an arrow above the axles for semi-trailers on type 1a recess wagons, must be observed;
- the obligatory loading position with air suspension deflated in the case of semi-trailers with pneumatic suspension loaded on recess wagons shall be observed;
- the support on the seating plate or plates with UIC pins shall be observed for semi-trailers according to the type of coding used;
- the loading position specified for the "semi-trailer-on-bogie" system, i.e. semi-trailer axles locked in the high position for the semi-trailer loaded on the bogies of the system, shall be observed;
- the loading criteria for roller units, as specified in *UIC Leaflet 591, point 1*, shall be observed.

6 - Coding of combined transport lines

6.1 - General remarks

The road-vehicle dimensions authorised by European highway codes are liable to foul the railway gauge when these vehicles are conveyed on combined transport carrier wagons.

Permitted gauge encroachments shall be defined for each specific combined transport line considered by the RUs involved.

The coding of combined transport lines helps establish which of the combined transport profiles shown in Appendices [E - page 32](#), [F - page 38](#) and [G - page 44](#) can be allowed for given combined transport carrier wagons on the route under consideration.

In accordance with the recess wagons types 1a and 1b included in point [3.2.1 - page 5](#) and the wagons referred in point [3.3.2](#), Table [1 - page 6](#), notes a. and b. and in accordance with the profiles shown in Appendices [E](#), [F](#) and [G](#), common code numbers are allocated to each CT line, characterised by the letters "P"/"C", e.g.:

P/C 341 ; P/C 22 ; P/C S 340 ; P/C S 22

A code number shall be given for standard profiles and, where necessary, for special profiles.

It is permissible to carry out a separate coding for the "P" and "C" lines, in particular when the code number for profile "P" lines is subject to a restriction because of the roll due to the tyres of the load unit (ST) and when this restriction would not be applicable to C code numbers.

Special case of Great Britain

For gauge reasons lines in Great Britain can only be coded according to the special profiles. Consequently, load units destined for Great Britain must mandatorily carry plates conforming to points [A.2 - page 20](#) or [B.2 - page 23/ B.4 - page 26](#).

The standard design characteristics of other types of wagon given in point [3.2.1](#) (see point [3.3.3.1](#), Table [2 - page 8](#)) are defined in such a way that they can be ascribed either to line profile "P" or line profile "C", that is to say:

- if the line is **simultaneously coded P/C**, this coding applies also:
 - to bimodal systems "K", "R" and "T" and to the conveyance of STs coded "N",
 - to the carriage of roller units for horizontal transshipment "B"

e.g.:

P/C 365 $\hat{=}$ R 365 $\hat{=}$ T 365 $\hat{=}$ B 365 $\hat{=}$ N 365 ;

- if the lines are **separately coded "P" and "C"**:
 - the line code for "P" also applies to the bimodal systems "R" and "T" (see Appendix J - page 53) and coding "N",
 - the line code for "C" also applies to bimodal systems "K" (see Appendix J) and to the conveyance of roller units for horizontal transshipment "B" (see Appendix K - page 58).

e.g.:

P 341 $\hat{=}$ N 341 $\hat{=}$ R 341 $\hat{=}$ T 341 and C 346 $\hat{=}$ K346 $\hat{=}$ B 346

6.2 - Determination of the CTPN for a given CT route

To code a combined transport route, the highest profile allowed on that route shall be determined separately (as specified in Appendices E - page 32, F - page 38 and G - page 44) for each type of wagon referred to in point 6.1 - page 13, by applying the criteria laid down in Table 2 - page 8 for this type of wagon.

Since these criteria are specific to each type of wagon, the profile numbers used for a given type of wagon must be preceded by the code letter given in point 6.1, to which should be added letter "S" for the special profile. Example:

C 22 (standard profile). C S 33 (special profile)

The code letters for the line are identical to those of the wagon compatibility code (1st character of the technical number of the load unit).

The coding of the line shall be done by the competent RU, in accordance with its own regulations and by applying the combined transport profiles shown in Appendices E, F and G. The criteria to be observed in this connection are given in Table 2 (see point 3.3.3.1 - page 7).

The criteria and the calculation results for type 1a and 1b recess wagons automatically open-up the possibility of moving swap bodies on the wagons mentioned in point 3.3.2, Table 1 - page 6, note b., if the P code number of the line permits their conveyance on recess wagons.

7 - Special coding aspects

o 7.1 - combined transport load units

7.1.1 - Semi-trailers with air-suspension axles

Semi-trailers which are no wider than 2 500 mm may be fitted with pneumatic suspension.

Semi-trailers which are wider than 2 500 mm but no wider than 2 600 mm must be fitted with pneumatic suspension.

7.1.2 - Coding

The coding of semi-trailers with air-suspension axles can only be done in the "suspension deflated" position, both for empty and for loaded semi-trailers (bearing in mind, however, the dimension by which the pneumatic system is flattened when the semi-trailer is loaded).

To be sure of the "suspension deflated", loading position, the symbol shown in Appendix M - page 63 (see point 5 - page 12, paragraph 3) shall be affixed so that it is clearly visible from either side of the semi-trailer, directly to the right of the coding plate.

7.2 - Swap-body, roller-unit or semi-trailer carrier wagons

7.2.1 - Carrier wagons for swap bodies, roller units or semi-trailers with characteristics that do not comply with point 3.3.2 - page 6

Carrier wagons for swap bodies, roller units or semi-trailers with characteristics that do not comply with point 3.3.2 - and which cannot therefore be given compatibility code \triangle_C , \triangle_B or \triangle_P , may be used for the conveyance of swap bodies, roller units or semi-trailers under the terms stipulated in this leaflet on the basis of multilateral agreements between RUs, provided they bear the markings shown in point N.1, Fig. 7 - page 64 for swap bodies, point N.3, Fig. 11 - page 66 for roller units or point N.2, Fig. 9 - page 65 for semi-trailers on recess wagons.

Procedure

Requests sent by the applicant RUs to those which subsequently accept the agreement shall contain, in addition to the design characteristics of the wagon in question, as specified in point 3.3.3, Table 2 - page 8, at least the total number and codes of wagons destined to carry the standard cartouche.

Wagons identical in design to a series which is already covered by the procedure but **does not** carry the standard cartouche shall not be subject to this agreement.

The data given as an example for **swap bodies** (point N.1, Fig. 7) mean that:

- on SNCF - ÖBB - FS lines, the wagon may only be loaded with swap bodies that have a combined transport profile number which is at least 3 units **less** than the C profile numbers ... (2 - 3 digits) assigned to the whole route;
- on DB lines, the wagon may be loaded with swap bodies if the CT profile number is higher by a maximum of 2 units than the C profile numbers ... (2 or 3 digits) assigned to the whole route.

The data given as an example for **roller units** (point N.3, Fig. 11 - page 66) means that:

- on FS lines, the wagon may only be loaded with roller units that have a CT profile number at least 2 units **less** than the C profile numbers ($\hat{=}$ B) (2 - 3 digits) assigned to the whole route;
- on ÖBB and DB lines, the wagon may only be loaded with roller units assigned a CT profile number at least 3 units less than the C profile numbers ($\hat{=}$ B) (2 - 3 digits) assigned to the whole route.

The data given as an example for **semi-trailers** (point N.2, Fig. 9 - page 65) means that:

- on FS lines, the recess wagon may only be loaded with semi-trailers that have a CT profile number that is at least 2 units **less** than the P profile numbers ... (2 or 3 digits) assigned to the whole route;
- on SNCB, DB, DSB, NS, ÖBB, CFF and SNCF lines, the recess wagon may only be loaded with semi-trailers which have a profile number that is **no higher** than the P profile numbers ... assigned to the whole route (i. e. treated like a wagon with compatibility code P in accordance with point 3.3.2 - page 6).

7.2.2 - Carrier wagons for swap bodies, roller units or semi-trailers with characteristics that are more favourable than the conditions in point 3.3.2

Carrier wagons for swap bodies, roller units or semi-trailers with characteristics more favourable than those authorised under point 3.3.2 for compatibility code C, B or P (limit curves of points D.1 - page 29, D.2 - page 30 and D.3 - page 31) may, whilst taking account of the rules described in these points, be given an identification as per point N.1, Fig. 8 - page 64 for swap bodies, point N.3, Fig. 12 - page 66 for roller units or point N.2, Fig. 10 - page 65 for semi-trailers on recess wagon.

The information shown by way of example for **swap bodies** in point N.1, Fig. 8 means that for carrier wagons with a wheelbase $a = 13,5$ m or for 2-axle carrier wagons with a maximum wheelbase $a = 10$ m/9 m, the wagons have a loading plane of $1\ 175 - 230 = 945$ mm above the running plane.

The wagon can therefore run on all combined transport lines with swap bodies that have a CT profile number exceeding by a maximum of 23 units the C profile numbers ... (either 2 or 3 digits) assigned to the whole route.

The data given as an example for **roller units** in point N.3, Fig. 12 means that for a bogie-centre distance $a = 13,5$ m, the wagon has a loading plane situated at $1\ 400 - 60 = 1\ 340$ mm above rail level.

The wagon can therefore run on all combined transport lines with roller units that have a CT profile number exceeding by a maximum of 6 units the C profile numbers ($\hat{=}$ B) (either 2 or 3 digits) assigned to the whole route.

Procedure

In this case, it is possible to dispense with multilateral agreements. For these wagons, the owning or registering RU can display the most favourable characteristics for the transport of swap bodies, roller units or semi-trailers by applying a marking system as per point N.1, Fig. 8 - page 64, point N.3, Fig. 12 - page 66 or point N.2, Fig. 10 - page 65.

7.3 - Carrier wagons for swap bodies with 2-height loading planes

Conditions

- The use of 2-height loading planes is only permitted for carrier wagons where the highest loading plane complies at least with the conditions in point 3.3.2 - page 6.
- The marking corresponding to the highest loading plane must be in conformity with Appendix C - page 28 for swap bodies or with point N.1, Fig. 8.
- To avoid confusion occurring during traffic movements, relevant measures programmed during the construction phase must ensure that the 2 loading planes are not usable concurrently and that only the marking corresponding to the loading plane used is visible.
- The conditions as set out in point 7.2.2 - page 16 for swap bodies shall apply to the load-unit numbers for insertion in standard cartouches when determining the loading-plane heights; the last paragraph in this point ("Procédure") shall apply by analogy.

8 - Comments on practical application of the code calculation procedure

8.1 - Example

In accordance with point 6.2 - page 14, a route is coded as follows:

P/C 70 - P 395 / C 400

This route can carry, in combined transport, load units with a coding plate that has profile numbers in the upper line which are identical to or smaller than the line code, i.e.:

- a profile number **P** ≤ 70 or ≤ 395 for semi-trailers loaded on recess wagons with wagon compatibility code $\triangle P$;
- a profile number **C** ≤ 70 or ≤ 400 for swap bodies loaded on recess wagons or swap-body carrier wagons with wagon compatibility code $\triangle C$;
- a profile number **K** ≤ 70 or ≤ 400 for semi-trailers loaded on carrying bogies with wagon compatibility code $\triangle K$;
- a profile number **R** or **T** ≤ 70 or ≤ 395 for semi-trailers loaded on carrying bogies with wagon compatibility code $\triangle R$ or $\triangle T$.

o 8.2 - Allocation and dissemination of codes for CT lines

In accordance with point 6 - page 13, each RU shall allocate combined transport line-code numbers associated with code letters P and C to each route.

This allocation shall be shown schematically on drawings.

These drawings, together with any modifications, shall be sent:

- systematically to the UIRR and to the RUs concerned,
- to the combined transport companies, on request.

Furthermore, the limit-code numbers for combined transport routes shall be entered on the service documents so that each consignor may ascertain in advance what transport possibilities exist on the route concerned depending on the type of wagon used (thanks to the profile number of the load unit) and in order that RU staff may carry out the necessary checks.

Appendix A - Semi-trailer coding plate

A.1 - Semi-trailer coding plate for standard profile

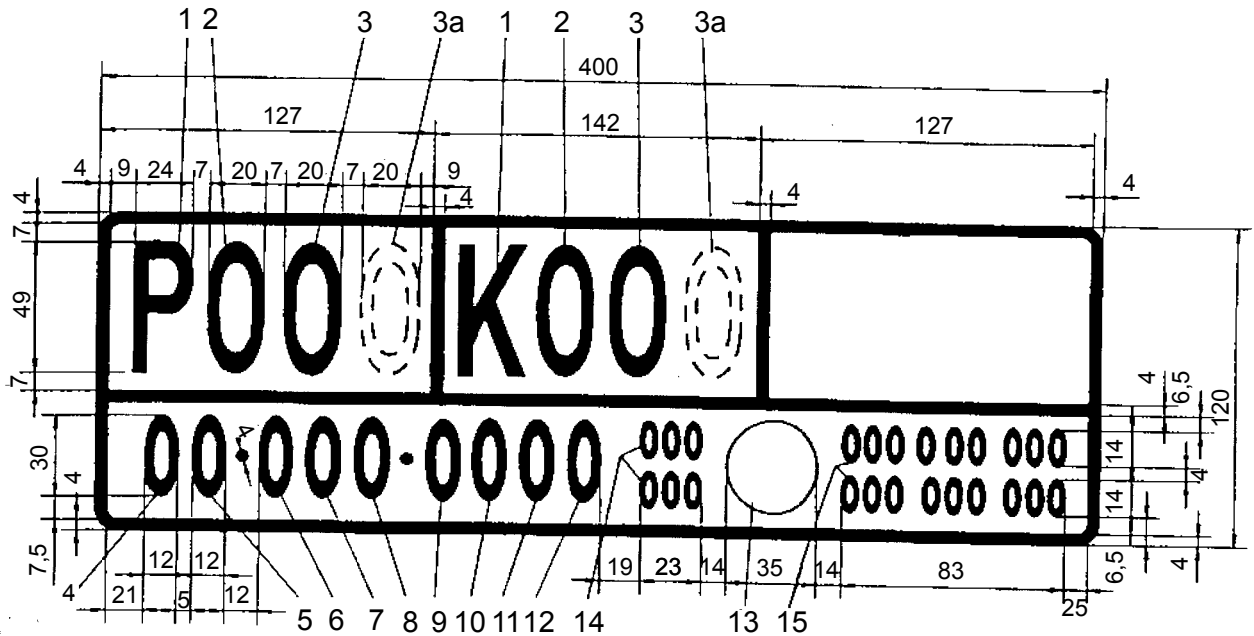


Plate background:	yellow
Markings:	black

Technical numbers

1	Wagon compatibility code
2, 3	For semi-trailers with 2,50 m maximum width
2, 3, 3a	For semi-trailers exceeding 2,50 m but not 2,60 m in width

Registration numbers

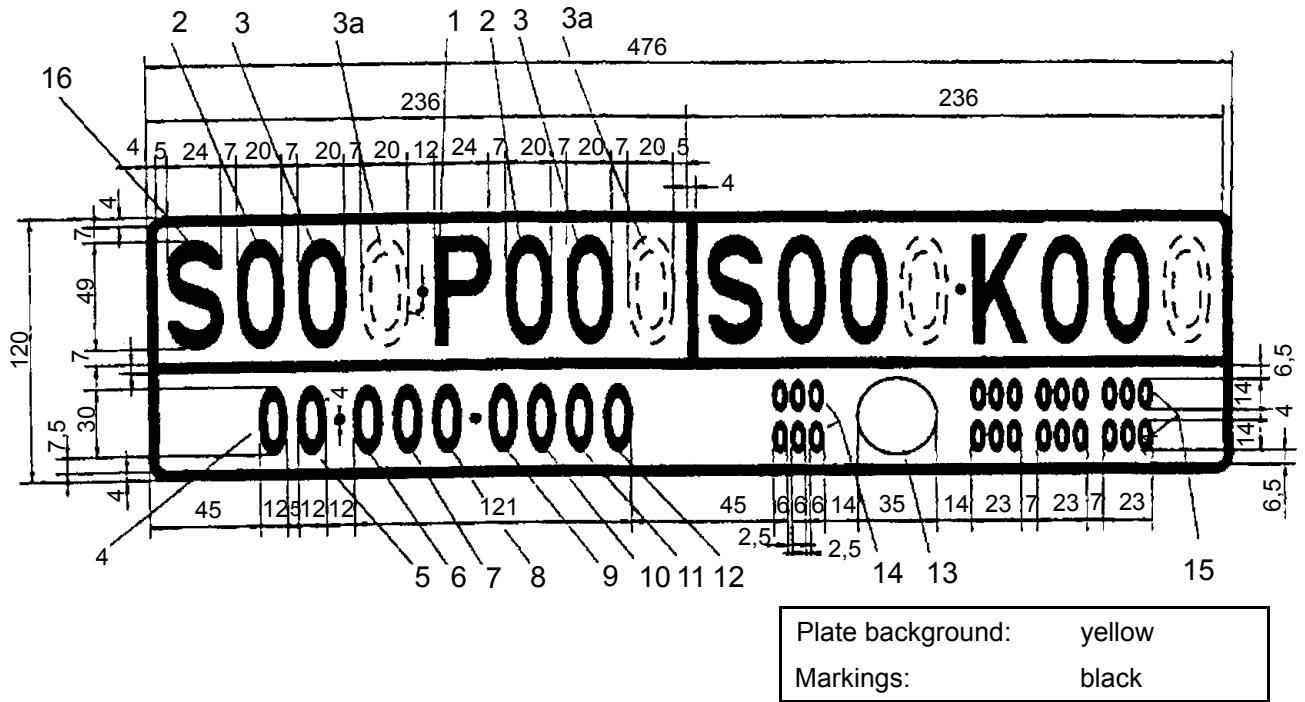
4, 5	Nationality No of CT Company
6, 7, 8	Code of road-haulage firm within National CT Company ^a
9, 10, 11, 12	Load-unit No. within CT Company ^a
13	Approval stamp
14	Approval No. within the RU (non-mandatory)
15	Underframe No. (mandatory indication of digits back to front)

a. If required, the 5-digit (maximum) code number of the road-haulage firm can be extended, likewise the 6-digit (maximum) load-unit number. If the extended registration number is used, it must be symmetrically introduced and, if necessary, the plate can be lengthened.

A.2 - Semi-trailer coding plate for special profile S

(as alternative, for flat-top roller units as per Appendix G - page 44)

A.2.1 - Coding plate for semi-trailers to be coded, with provision also for using special profile S



Technical numbers

1	Wagon compatibility code
2, 3	For semi-trailers with 2,50 m maximum width
2, 3, 3a	For semi-trailers exceeding 2,50 m but not 2,60 m in width

Registration numbers

4, 5	Nationality No. of CT Company
6, 7, 8	No. of road-haulage firm within National CT Company ^a
9, 10, 11, 12	Load-unit No. within CT Company ^a
13	Approval stamp
14	Approval No. within the RU (non-mandatory)
15	Underframe No. (mandatory indication of digits back to front)
16	Special profile as per Appendix G

a. If required, the 5-digit (maximum) code number of the road-haulage firm can be extended, likewise the 6-digit (maximum) load-unit number. If the extended registration number is used, it must be symmetrically introduced and, if necessary, the plate can be lengthened.

A.2.2 - Additional marking for all semi-trailers concerned, with a coding plate as per point A.1 that requires subsequently coding for special profile S

Also authorised as plastic sheet when existing semi-trailers are coded subsequently

Coding plate affixed to ST (see point A.1) (only one code must appear)

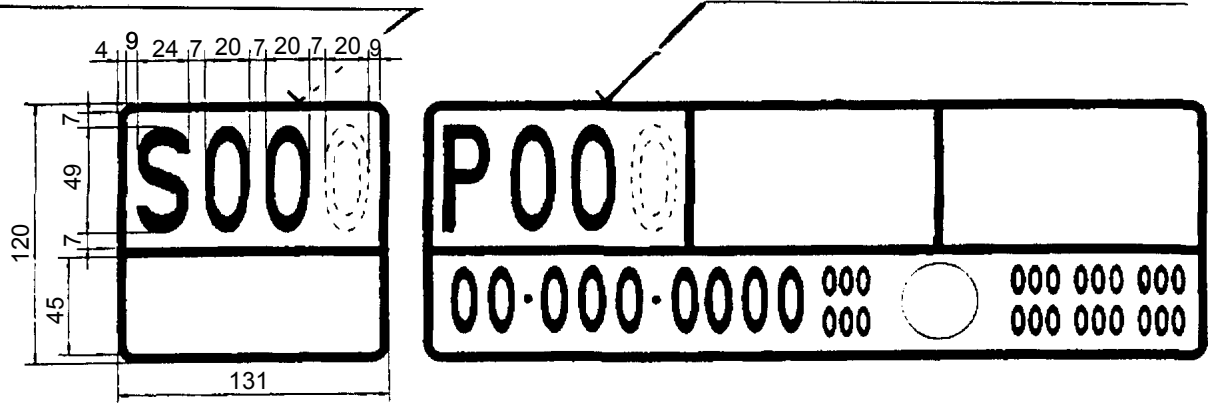


Plate background:	yellow
Markings:	black

Technical numbers

1	Wagon compatibility code
2, 3	For semi-trailers with 2,50 m maximum width
2, 3, 3a	For semi-trailers exceeding 2,50 m but not 2,60 m in width

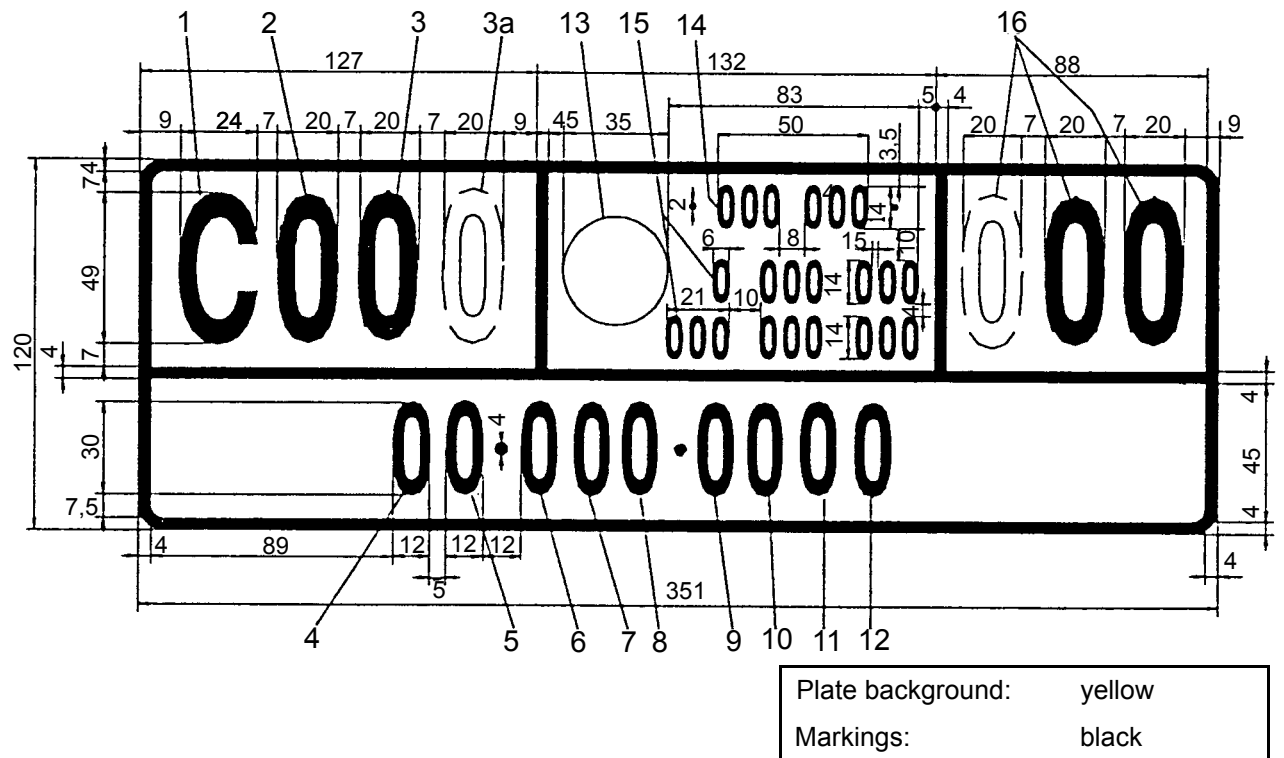
Registration numbers

4, 5	Nationality No. of CT Company
6, 7, 8	No of road-haulage firm within National CT Company ^a
9, 10, 11, 12	Load-unit No. within CT Company ^a
13	Approval stamp
14	Approval No. within the RU (non-mandatory)
15	Underframe No. (mandatory indication of digits back to front))
16	Special profile as per Appendix G

a. If required, the 5-digit (maximum) code number of the road-haulage firm can be extended, likewise the 6-digit (maximum) load unit number. If the extended registration number is used, it must be symmetrically introduced and, if necessary, the plate can be lengthened.

Appendix B - Swap-body and roller-unit coding plate

B.1 - Swap-body coding plate for standard profile



Technical numbers

1	Wagon compatibility code
2, 3	For swap bodies with 2,55 m maximum width ^a
2, 3, 3a	For swap bodies exceeding 2,55 m but not 2,60 m in width ^a

Registration numbers

4, 5	Nationality No. of CT Company
6, 7, 8	Code No. of road-haulage firm within National CT Company ^b
9, 10, 11, 12	Load-unit No. within CT Company ^b
13	Approval stamp
14	Approval No. within the RU (non-mandatory)
15	Underframe No. (mandatory indication of digits back to front)
16	Length code (group number as per <i>UIC Leaflet 592-4</i>) for swap bodies

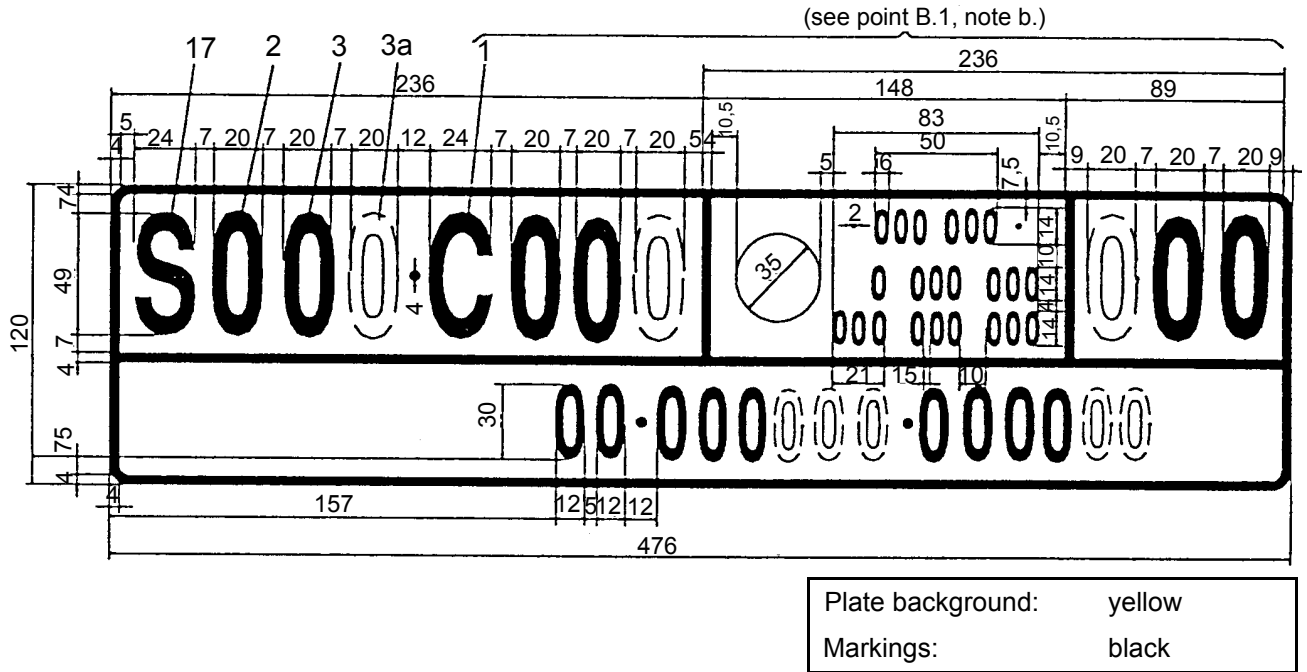
a. In conjunction with the additional plate, as per point B.5.

b. If required, the 5-digit (maximum) code number of the road-haulage firm can be extended, likewise the 6-digit (maximum) load-unit number. If the extended registration number is used, it must be symmetrically introduced and, if necessary, the plate can be lengthened.

B.2 - Swap-body coding plate for special profile S

(as alternative, for flat or tent-top swap bodies as shown in Appendix G - page 44)

B.2.1 - Coding plate, mandatory for all swap bodies concerned built since February 1995



Technical numbers

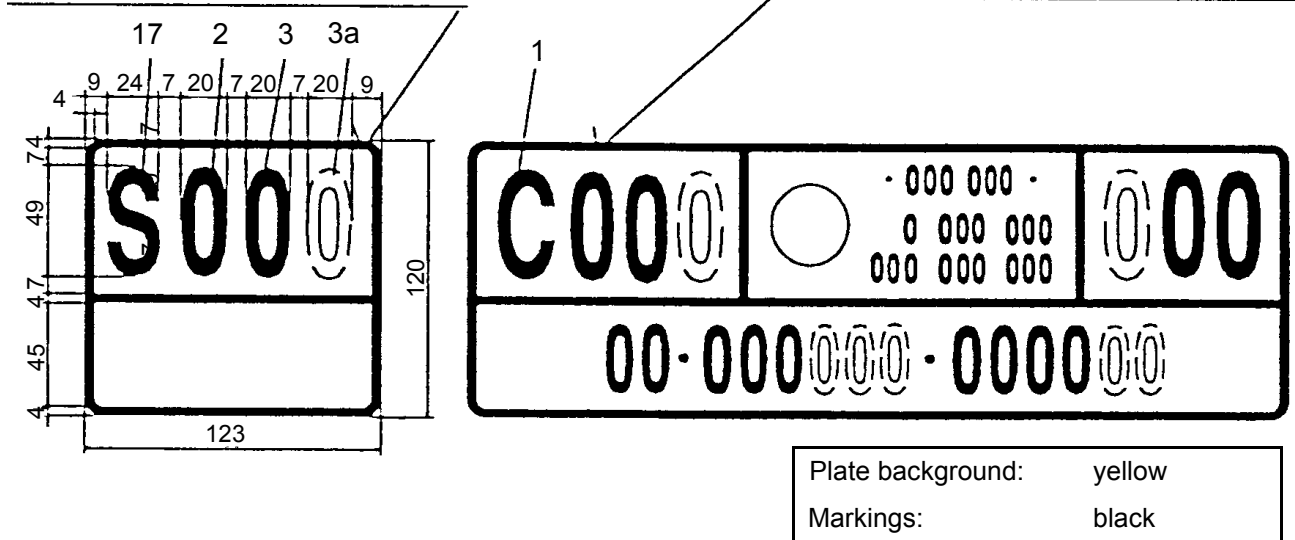
1	Wagon compatibility code
2, 3	For swap bodies with a 2,55 m maximum width as per Appendix G ^a
2, 3, 3a	For swap bodies exceeding 2,55 m but not 2,60 m in width as per Appendix G ^a
17	Special profile as per Appendix G

a. In conjunction with the additional plate, as per point B.5.

B.2.2 - Additional marking for all swap bodies concerned, with a coding plate as per point B.1 that requires subsequent coding for special profile S

Also authorised as plastic sheet when existing swap bodies are coded subsequently

Coding plate affixed to the SB (see point B.1, note b.)

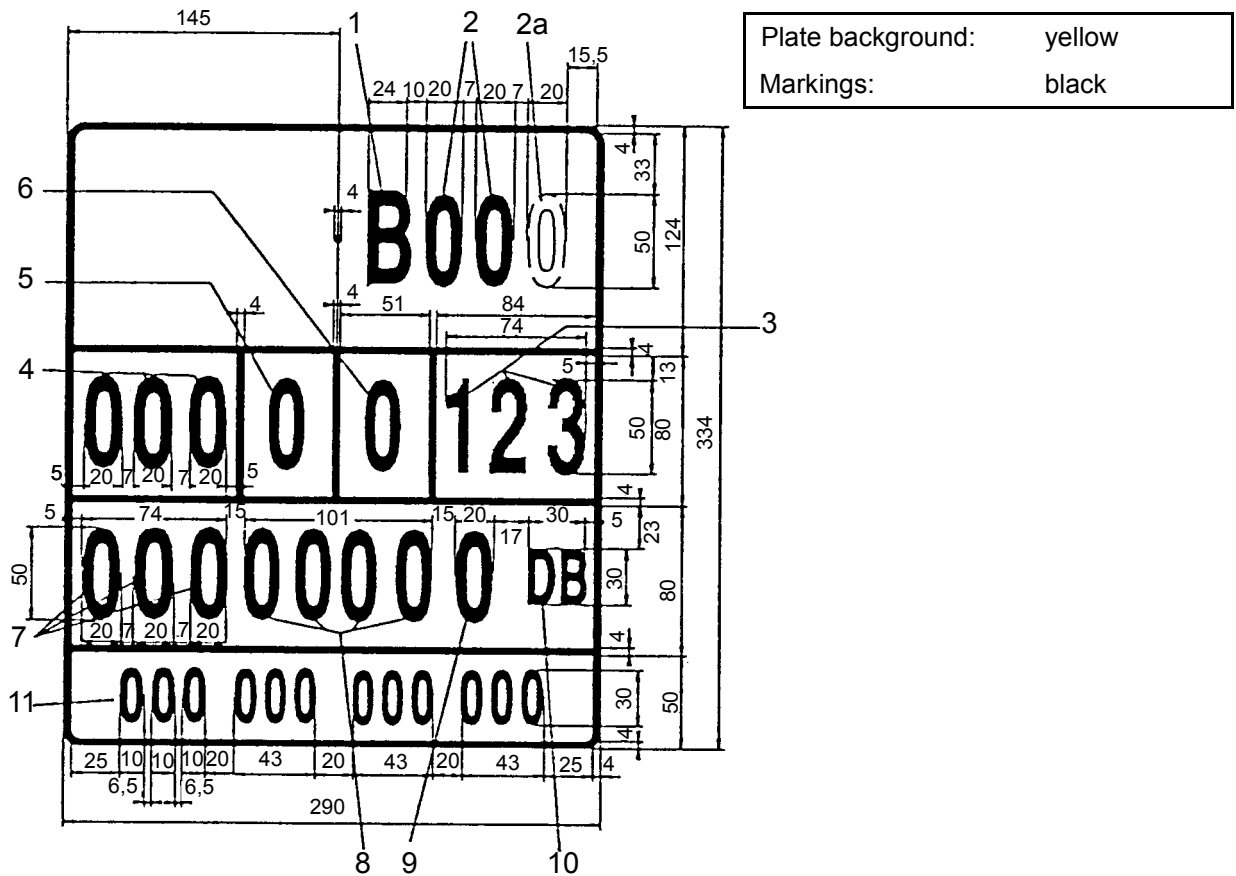


Technical numbers

1	Wagon compatibility code
2, 3	For swap bodies with a 2,55 m maximum width as per Appendix G ^a
2, 3, 3a	For swap bodies exceeding 2,55 m but not 2,60 m in width as per Appendix G ^a
17	Special profile as per Appendix G

a. In conjunction with the additional plate, as per point B.5.

B.3 - Roller-unit coding plate for standard profile



Technical numbers

1	Wagon compatibility code
2	For horizontally-transferred roller units with a maximum width of 2,55 m ^a
2, 2a	For horizontally-transferred roller units with a maximum width > 2,55 m and ≤ 2,60 m ^a
3	Compatibility level

Registration numbers

4	Approving RU
5	Type of grab ^b
6	Type of locking ^b
7	Owner
8	Number on owning organisation
9	Check digit
10	Registering RU control plate
11	Underframe number (12 digits maximum)

a. In conjunction with the additional plate, as per point B.5.
 b. Explanations: see UIC Leaflet 591, Appendix 3, Sheets 2a/2b.

B.4 - Roller-unit coding plate for special profile S

(as alternative, for flat-top roller units as per Appendix G - page 44)

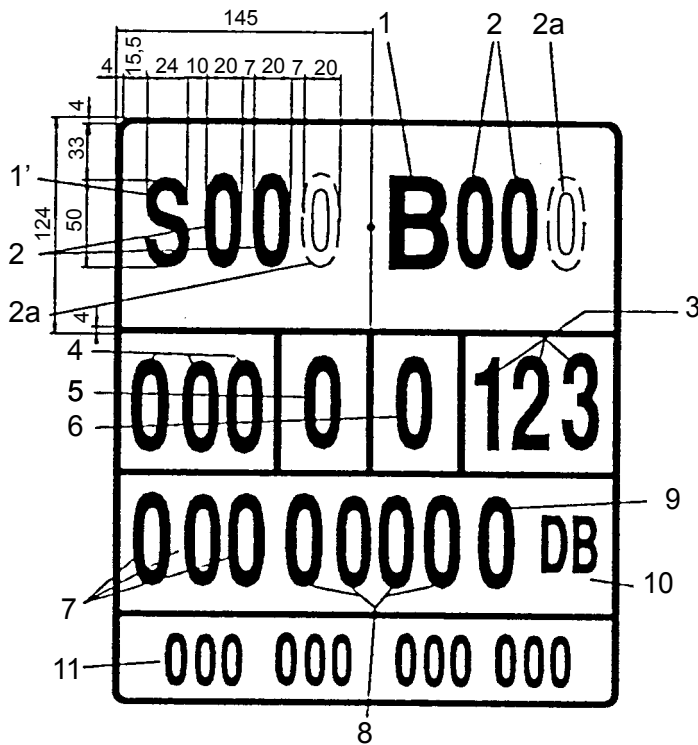


Plate background:	yellow
Markings:	black

Technical numbers

1	Wagon compatibility code
1'	Special profile as per Appendix G
2	For horizontally-transferred roller units with a maximum width of 2,55 m ^a
2, 2a	For horizontally-transferred roller units with a maximum width > 2,55 m and ≤ 2,60 m ^a
3	Compatibility level

Registration numbers

4	Approving RU
5	Type of grab ^b
6	Type of locking ^b
7	Owner
8	Number on owning organisation
9	Check digit
10	Registering RU control plate
11	Underframe number (12 digits maximum)

a. In conjunction with the additional plate as per point B.5.

b. Explanations: see UIC Leaflet 591, Appendix 3, Sheets 2a/2b.

B.5 - Additional plate for swap bodies and roller-units 2 550 mm in width

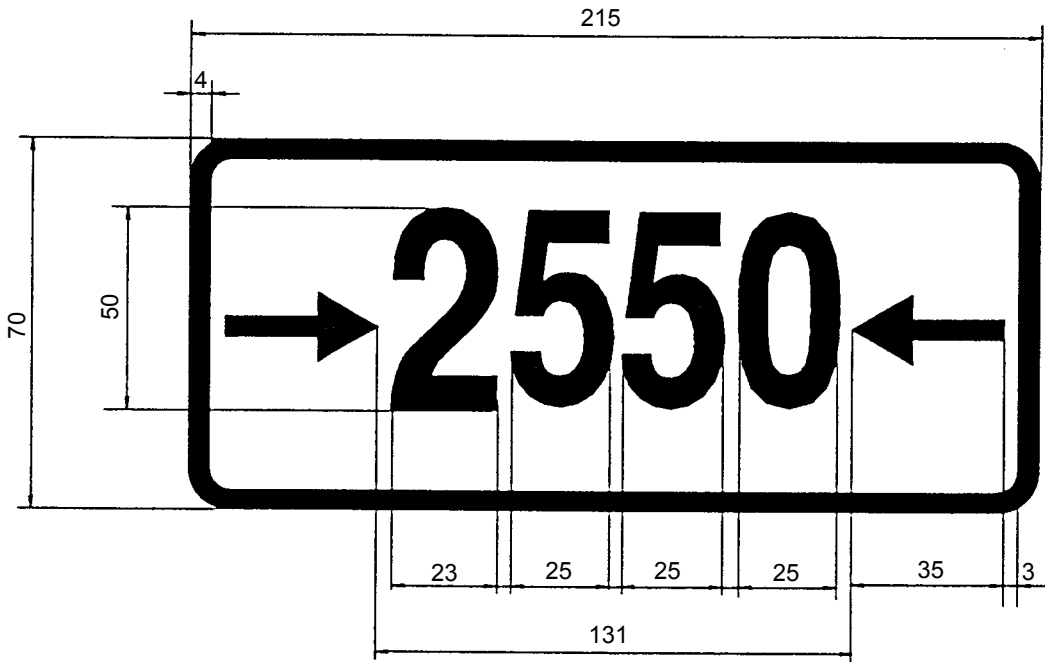
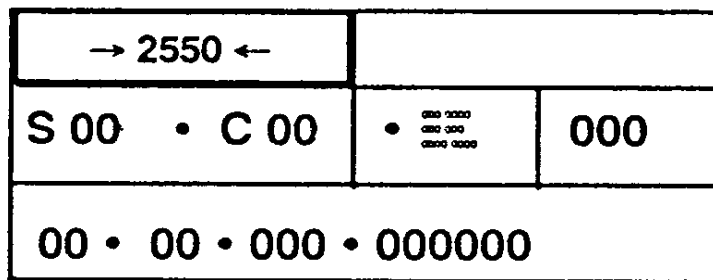


Plate background:	yellow
Markings:	black

It is recommended that the additional plate be incorporated into the coding plate as shown below:



Separate fitting of the plate in an appropriate place is also permitted

Material : same material as for the coding plate; plastic film also permitted in case of separate fitting.

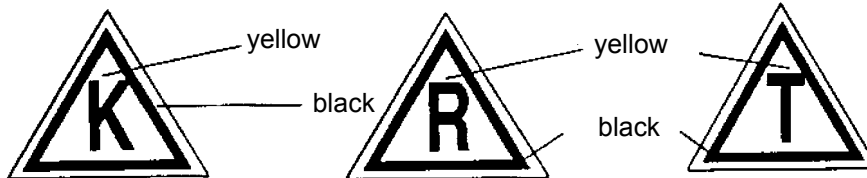
Appendix C - Marking of wagons used in combined transport and bogies (with or without adaptors) for semi-trailer-on-bogie systems



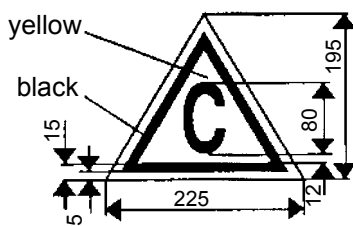
Type 1a and 1b recess wagon fitted with seating



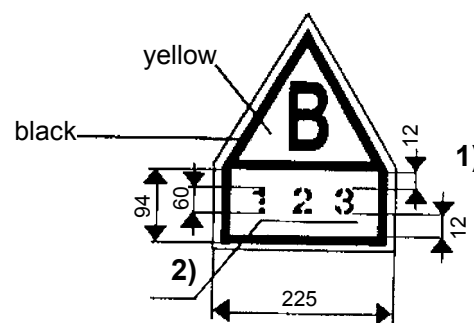
Type 1a and 1b recess wagon as per UIC Leaflet 571-4, point 1.1.5



ST on bogies
 K = Kombirail system
 R = RoadRailer system
 T = Trans-railer system



Standard recess wagon or wagon complying with point 3.3.2, Table 1, note b.



Type 1 carrier wagon as per UIC Leaflet 571-4, point 3 or carrier wagon as per point 3.3.2, Table 1, note b.

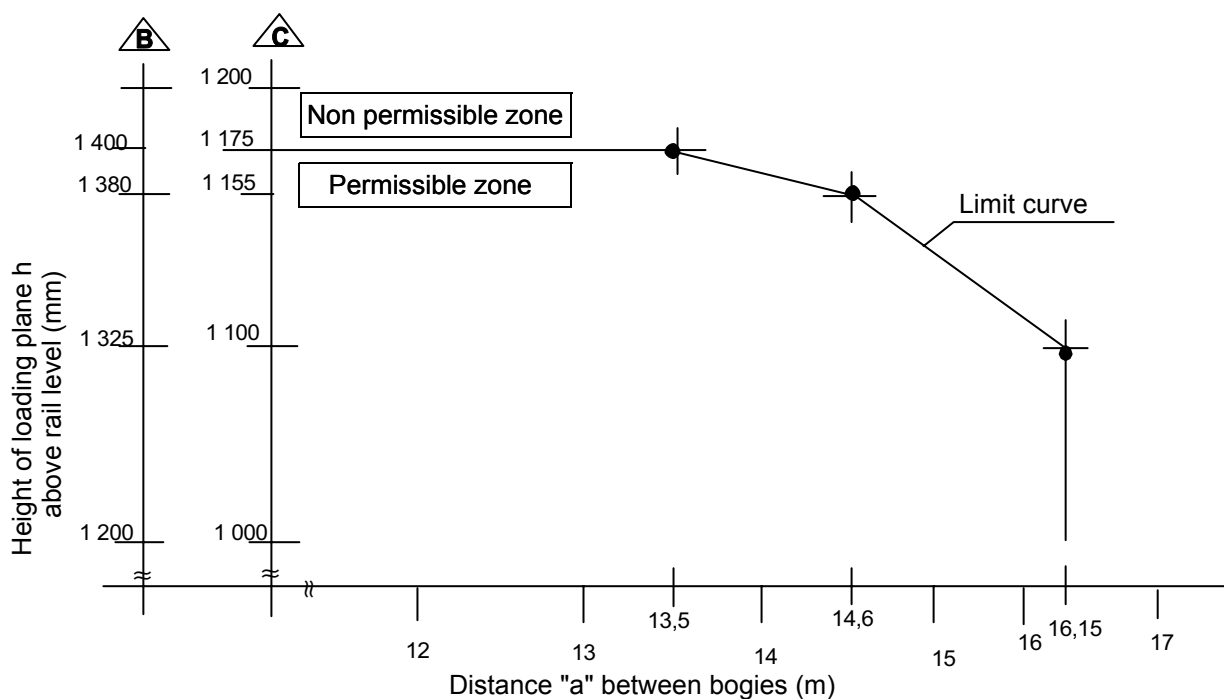
Caption:

- 1) Key to figures: see UIC Leaflet 571-4, point 4.2.7 and UIC Leaflet 592, point 2.2.
- 2) Digits to be symmetrically arranged in the frame.

Appendix D - Calculation of equivalence curves for bogie wagons and 2-axle carrier wagons

D.1 - Bogie wagons for the conveyance of swap bodies and roller units

- Swap bodies which can be grab-handled and suitable for wagon compatibility code $\triangle C$.
- Horizontally-transferred roller units suitable for affixing with wagon compatibility code $\triangle B$ (valid for SBs and Roller Units up to 2 600 mm. maximum width)

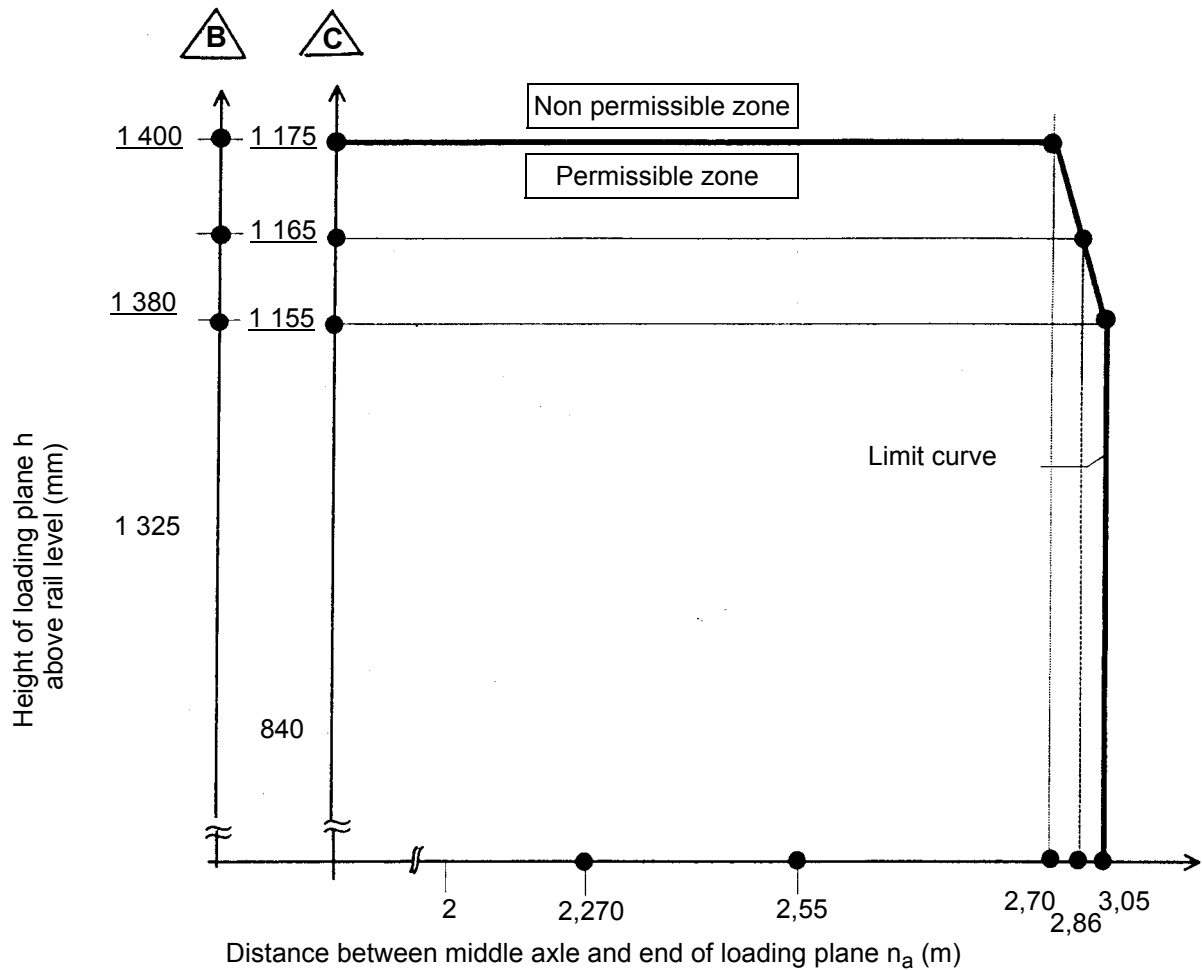


This limit curve may be applied under the following preconditions:

- reduction $E_i \geq E_a$ ^{a)}
 - compliance with conditions in Table 2 ^{b)}
 - Bogie wheelbase 2 000 mm
- a. E_i in relation to the wagon centreline - E_a in relation to the end of the loading plane.
- b. For new wagons or modified wagons with a transom play of 9_0^{+2} mm, it is possible using the cartouche in point N.1, Fig. 7 - page 64, for RUs to agree over a profile improvement.

D.2 - 2-axle carrier wagons for the conveyance of swap bodies

Grab-lifted swap bodies suitable for affixing with compatibility code $\triangle C$
 (valid for SBs up to 2 600 mm maximum width)

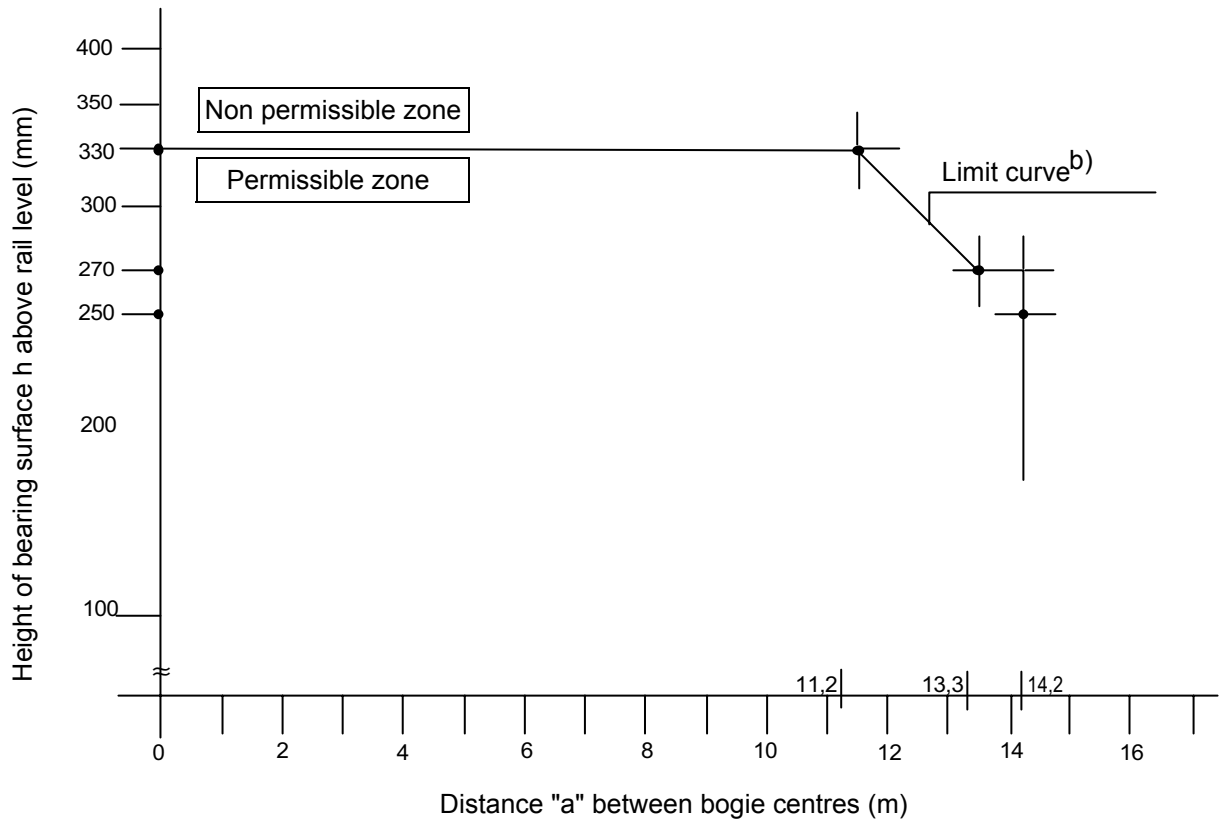


This limit curve may be applied under the following preconditions:

- valid for 2-axle wagons with $a = 9$ m et $a = 10$ m
- for wagons with a wheelbase $a = 9$ m, the loading overhang must not exceed $n_a = 2,55$ m
- compliance with the conditions in point 3.3.3.1, Table 2 - page 8
- The provisions of *UIC Leaflet 502-2* are not affected by the above dimensions
- $E_a > E_i$
- for wagons with a wheelbase $a = 8$ m, the loading overhang must not exceed $n_a = 2,270$ m

D.3 - Bogie wagons for the conveyance of semi-trailers

Semi-trailers suitable for affixing with wagon compatibility code $\triangle P$
 (valid for STs up to 2 600 mm maximum width)



This limit curve may be applied under the following preconditions:

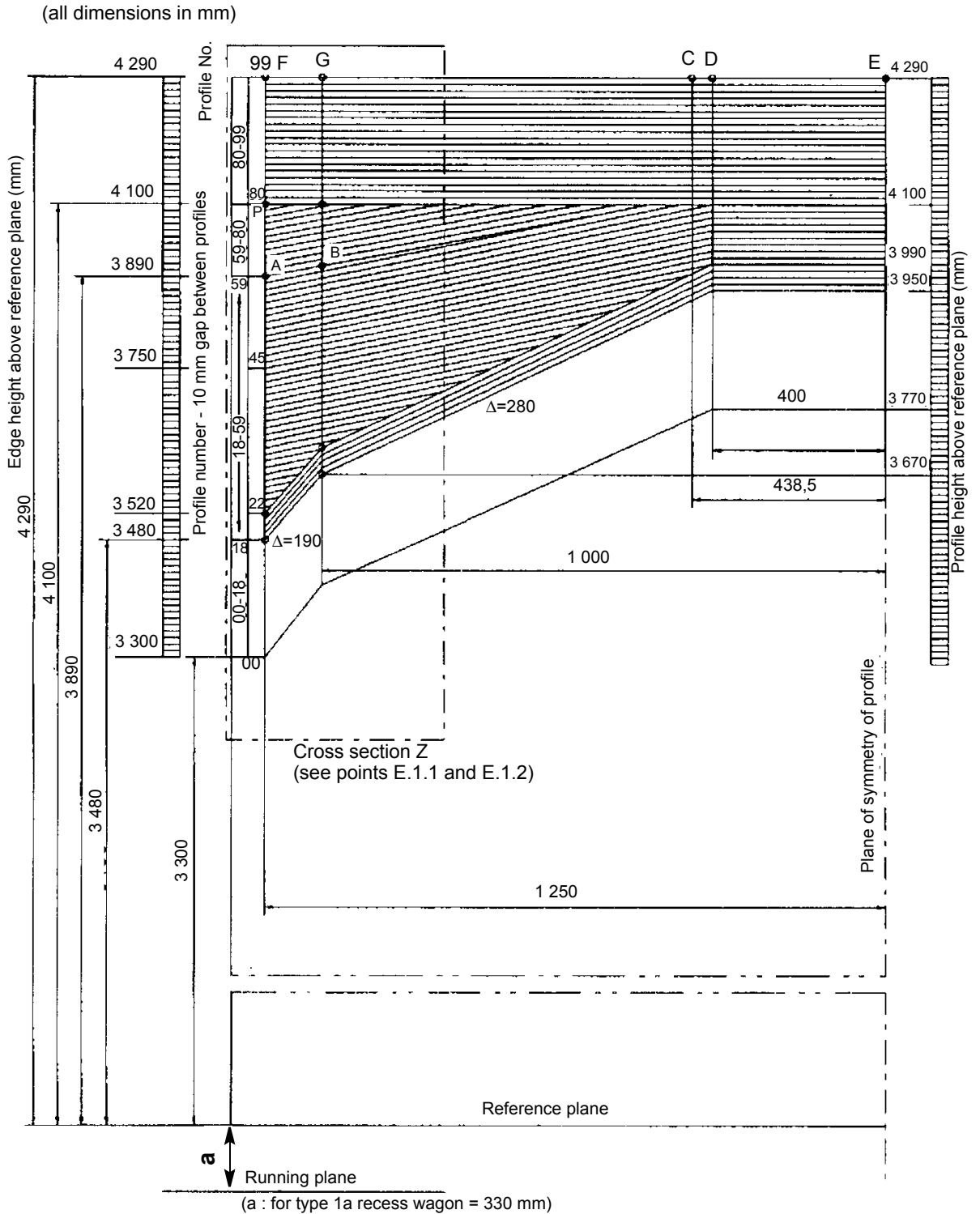
- ST centering using centering gear identical or similar to recess wagon 1a
- total maximum lateral play: 11,5 mm
- Bogie wheelbase: 2 000 mm maximum
- reduction $E_i \geq E_a$ ^{a)}

a. E_i in relation to wagon centreline - E_a in relation to end of loading plane.

b. the lower gauge of wagons as per *UIC Leaflet 505-1* must be observed.

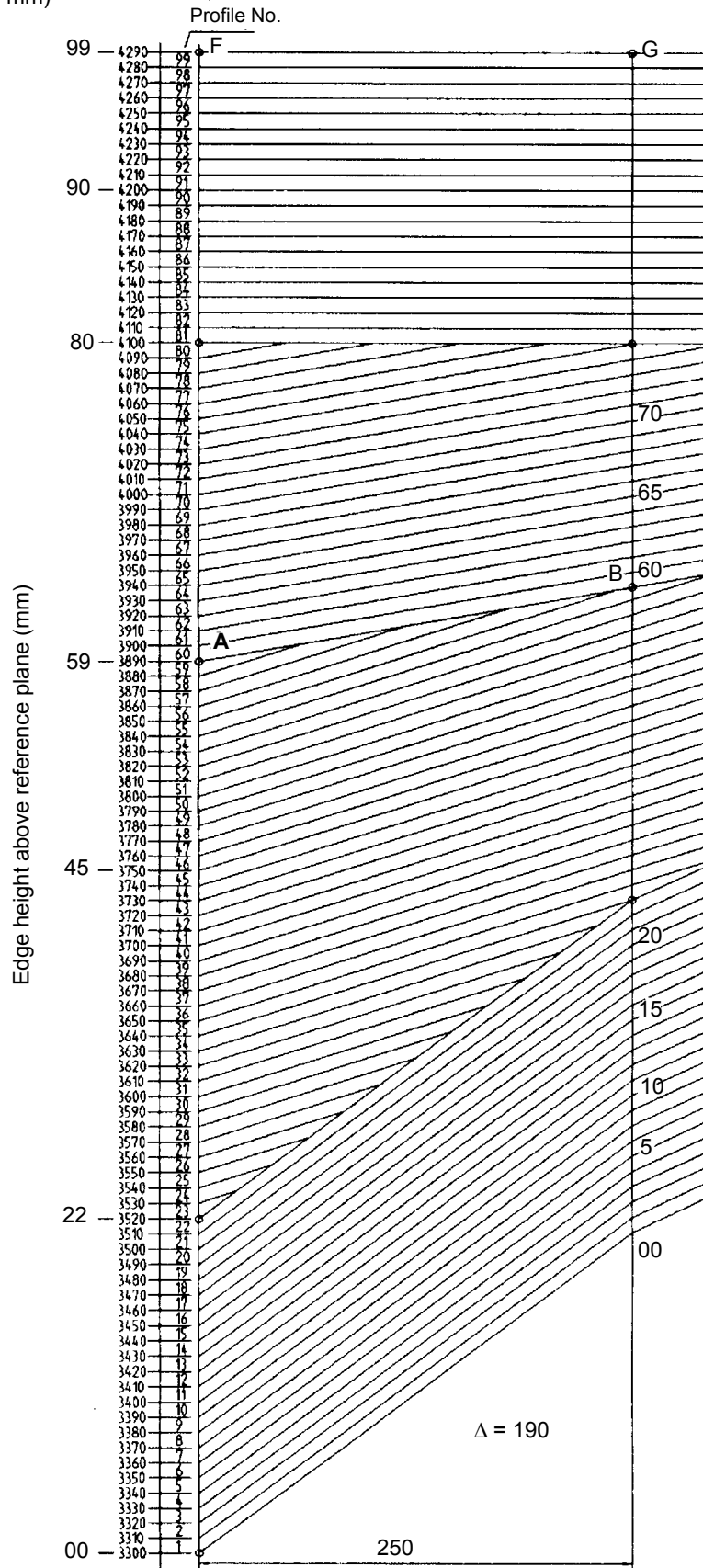
Appendix E - Combined transport profile - Conditions for coding semi-trailers

E.1 - Conditions for coding semi-trailers up to 2 500 mm maximum width

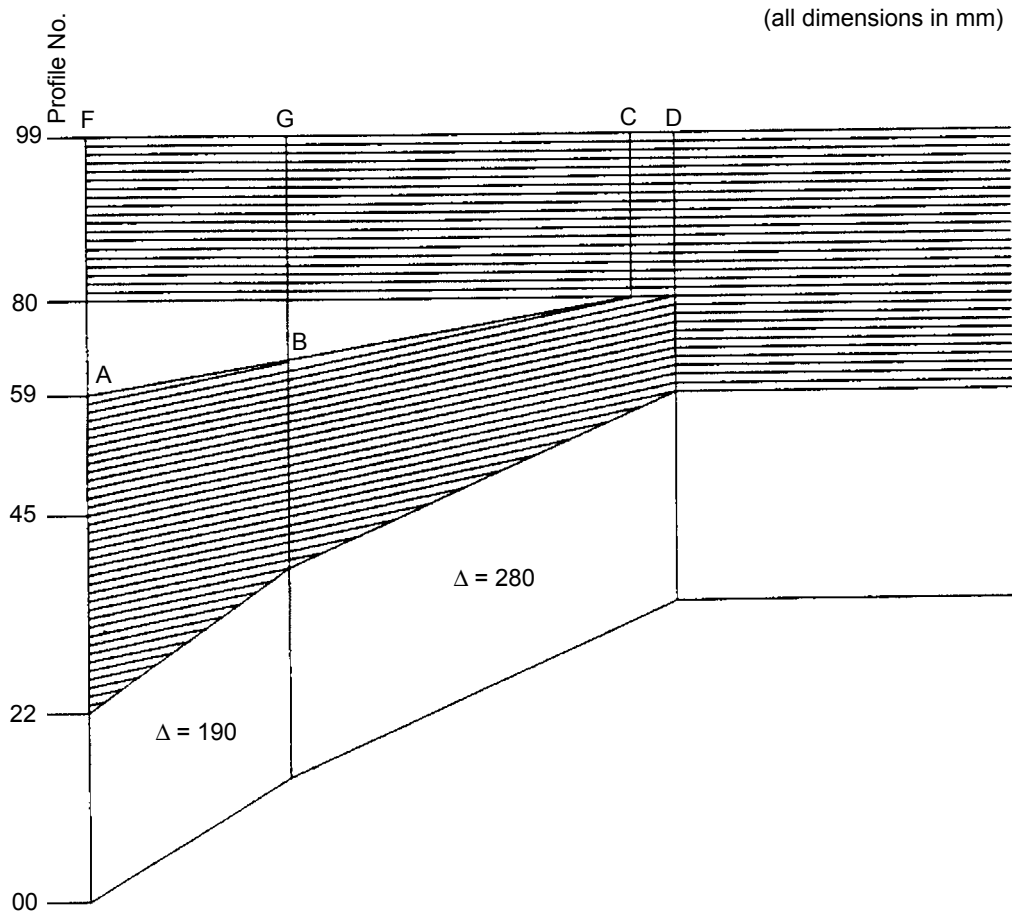


E.1.1 - Cross section Z on CT profile

(all dimensions in mm)



E.1.2 - Cross section Z on CT profile - Profiles 22 to 59 and 80 to 99



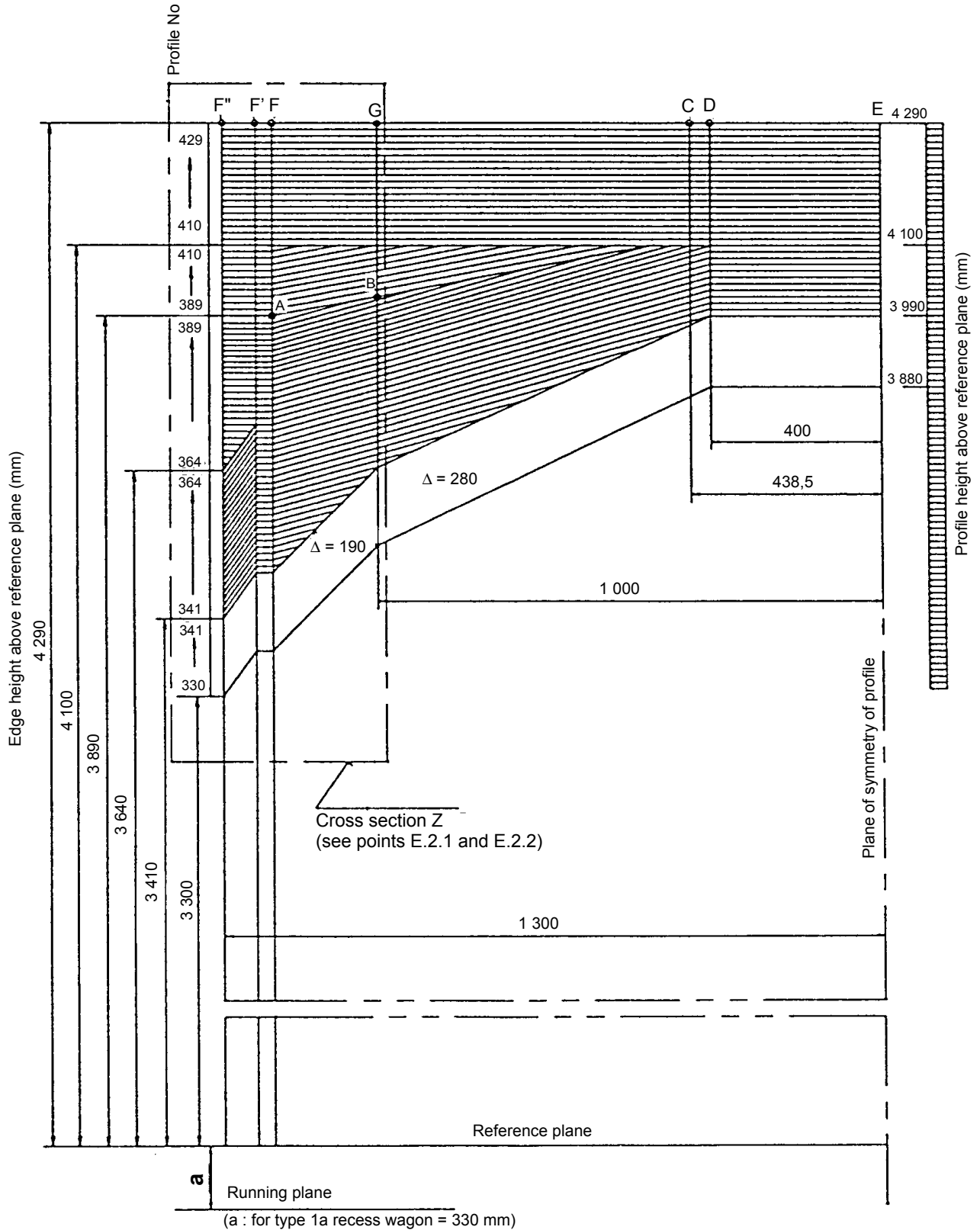
Incline P n° 22 ÷ 58 → determined by P n° 45

Incline P n° 59 ÷ 79 → determined by P n° 59

Incline P n° 80 ÷ 99 → determined by P n° 80

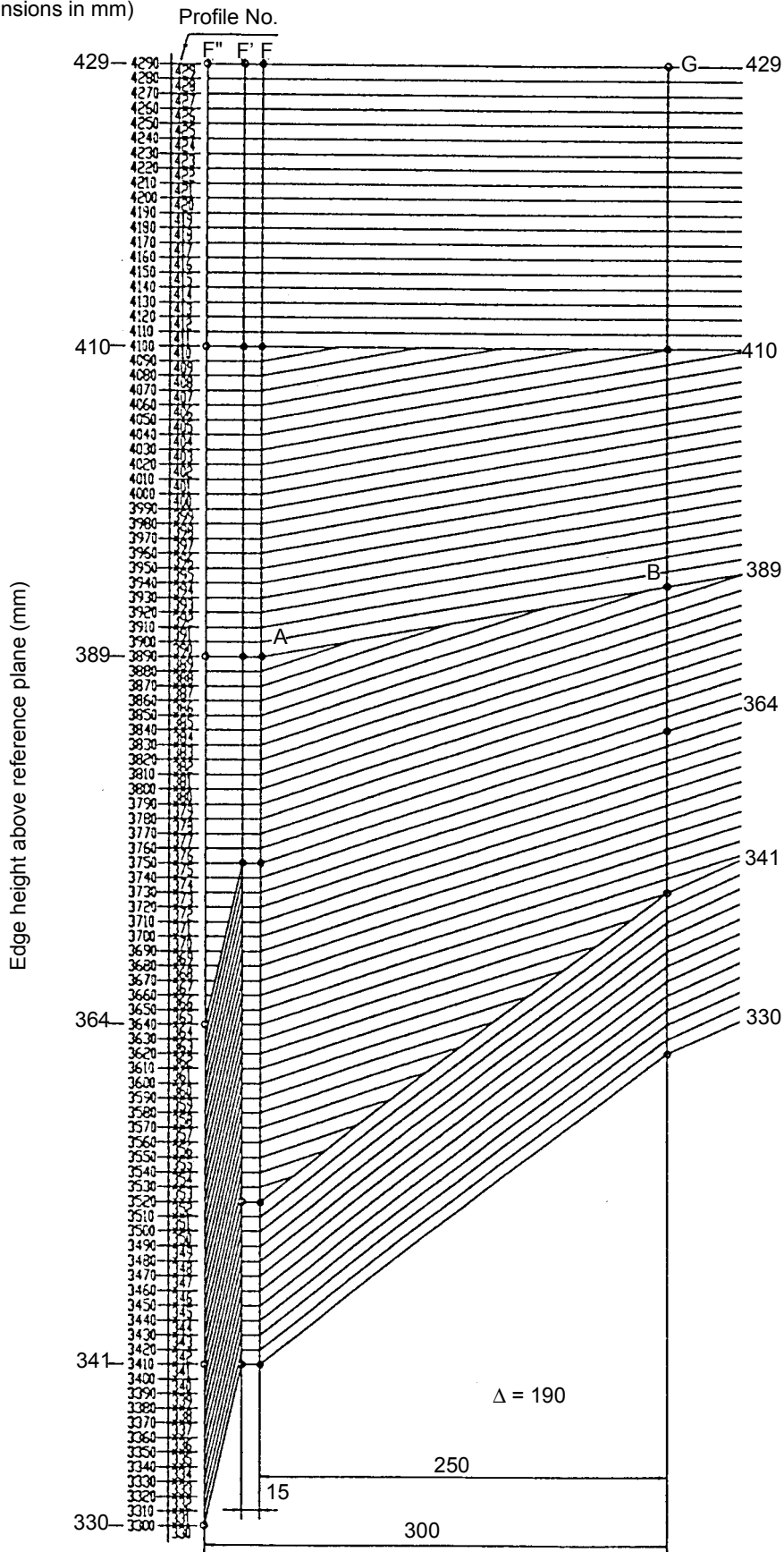
E.2 - Conditions for coding semi-trailers of width greater than 2 500 mm and less than or equal to 2 600 mm

(all dimensions in mm)



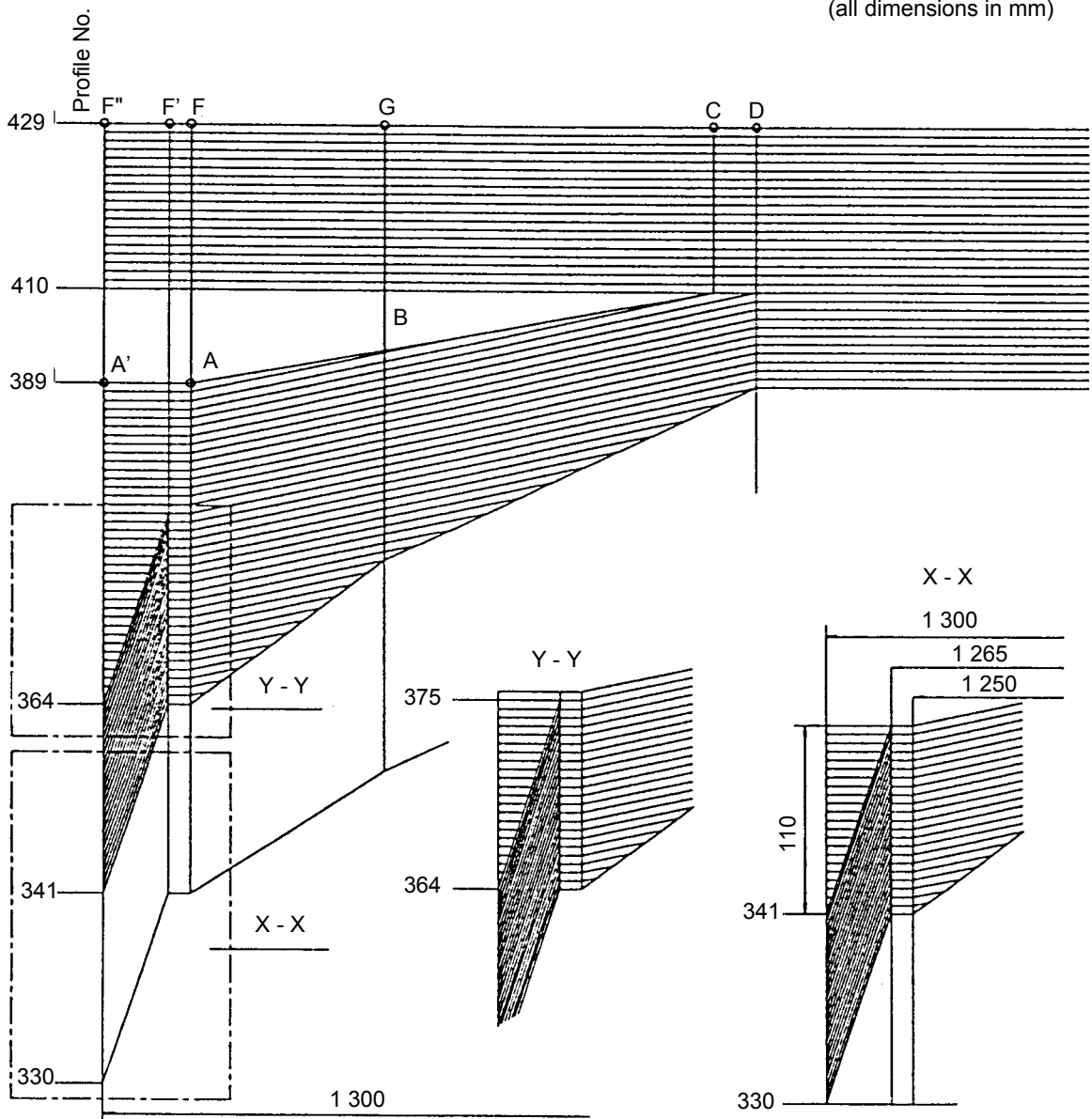
E.2.1 - Cross section Z on CT profile

(all dimensions in mm)



E.2.2 - Cross section Z on CT profile - Profiles 341 to 389 and 410 to 429

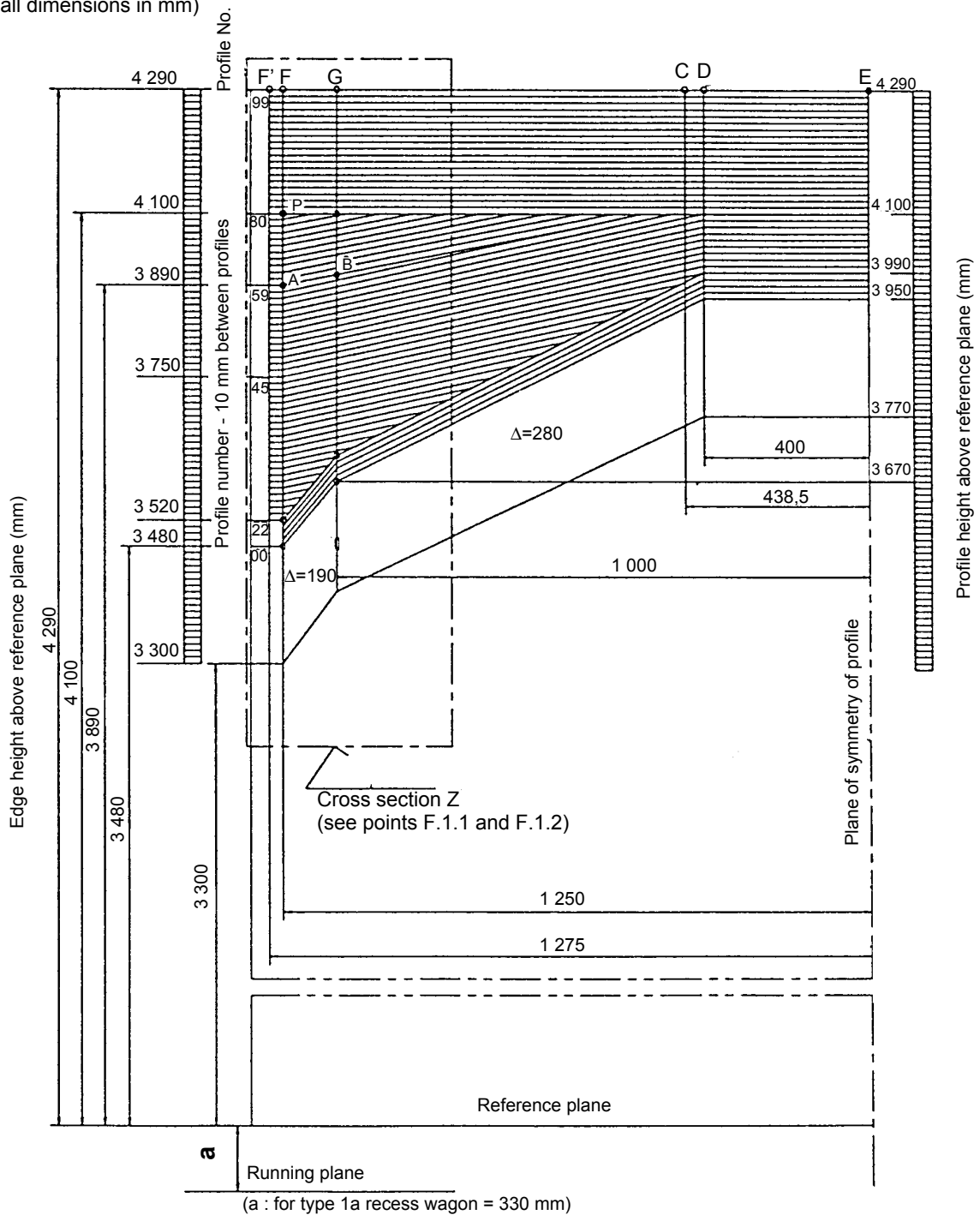
(all dimensions in mm)



Appendix F - Combined transport profile - Conditions for coding swap bodies and roller units

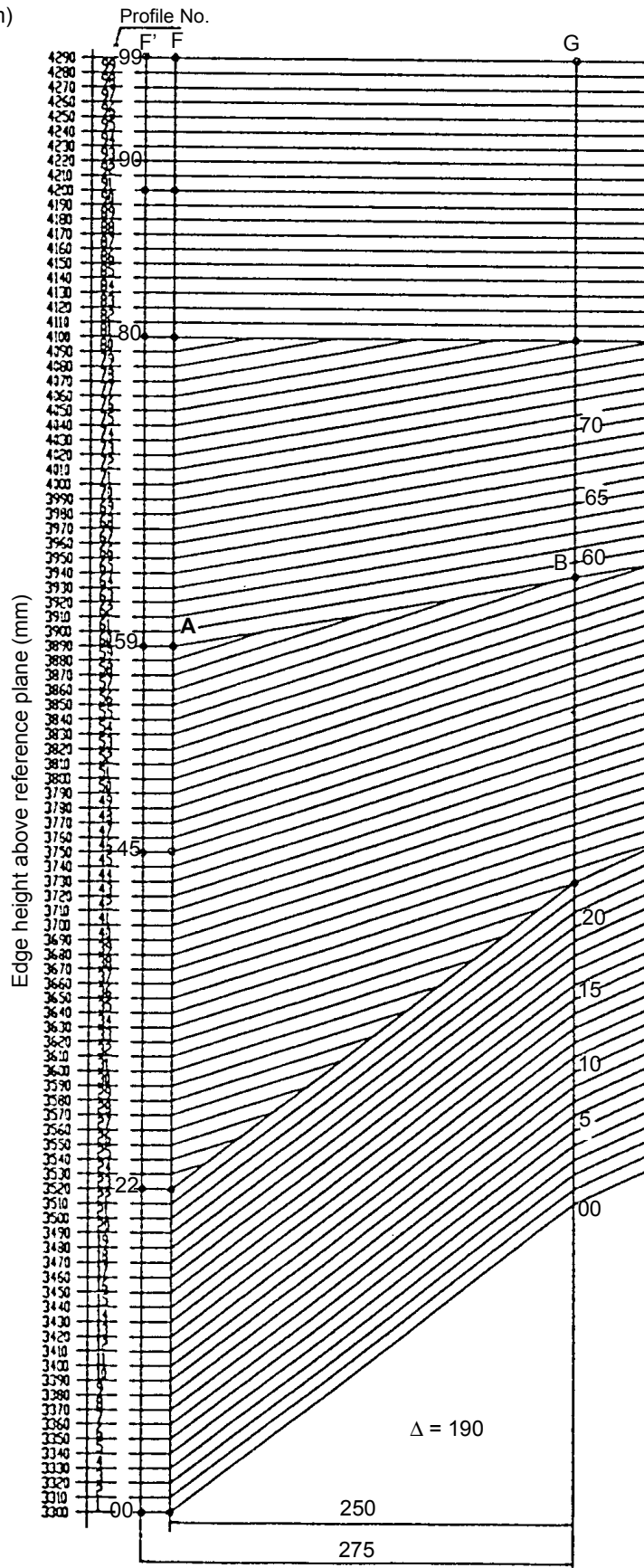
F.1 - Conditions for coding swap bodies and roller units up to 2 550 mm maximum width

(all dimensions in mm)

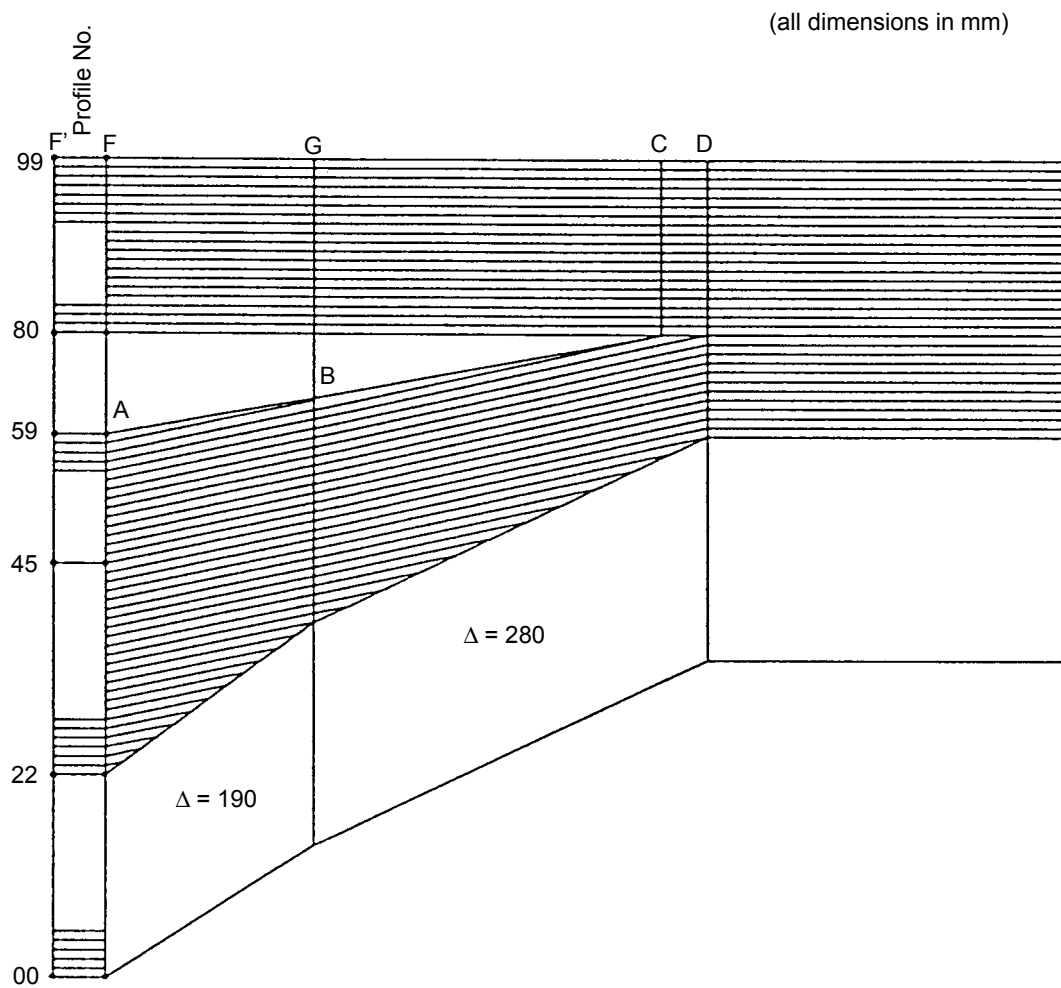


F.1.1 - Cross section Z on CT profile

(all dimensions in mm)



F.1.2 - Cross section Z on CT profile - Profiles 22 to 59 and 80 to 99



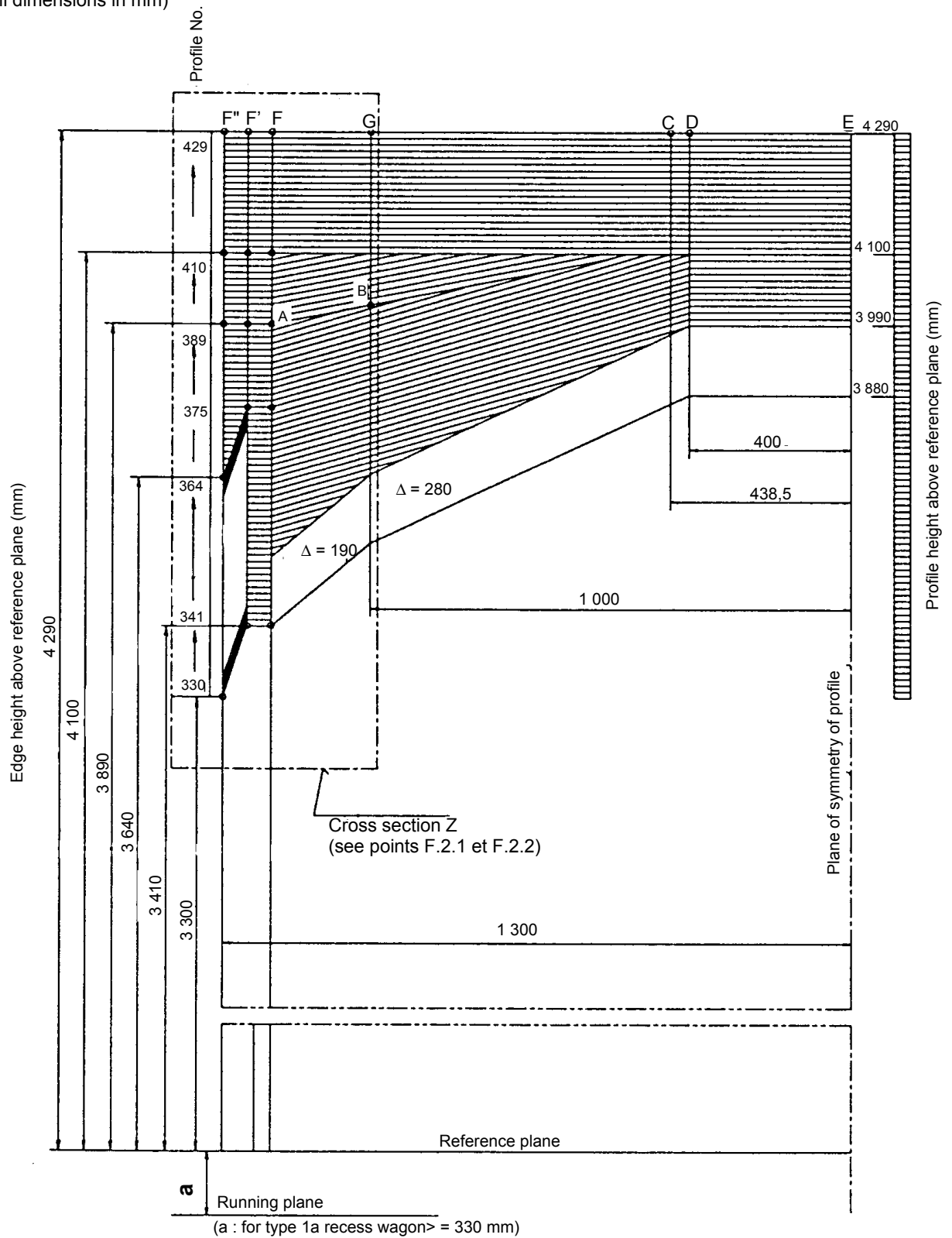
Incline P n° 22 ÷ 58 → determined by P n° 45

Incline P n° 59 ÷ 79 → determined by P n° 59

Incline P n° 80 ÷ 99 → determined by P n° 80

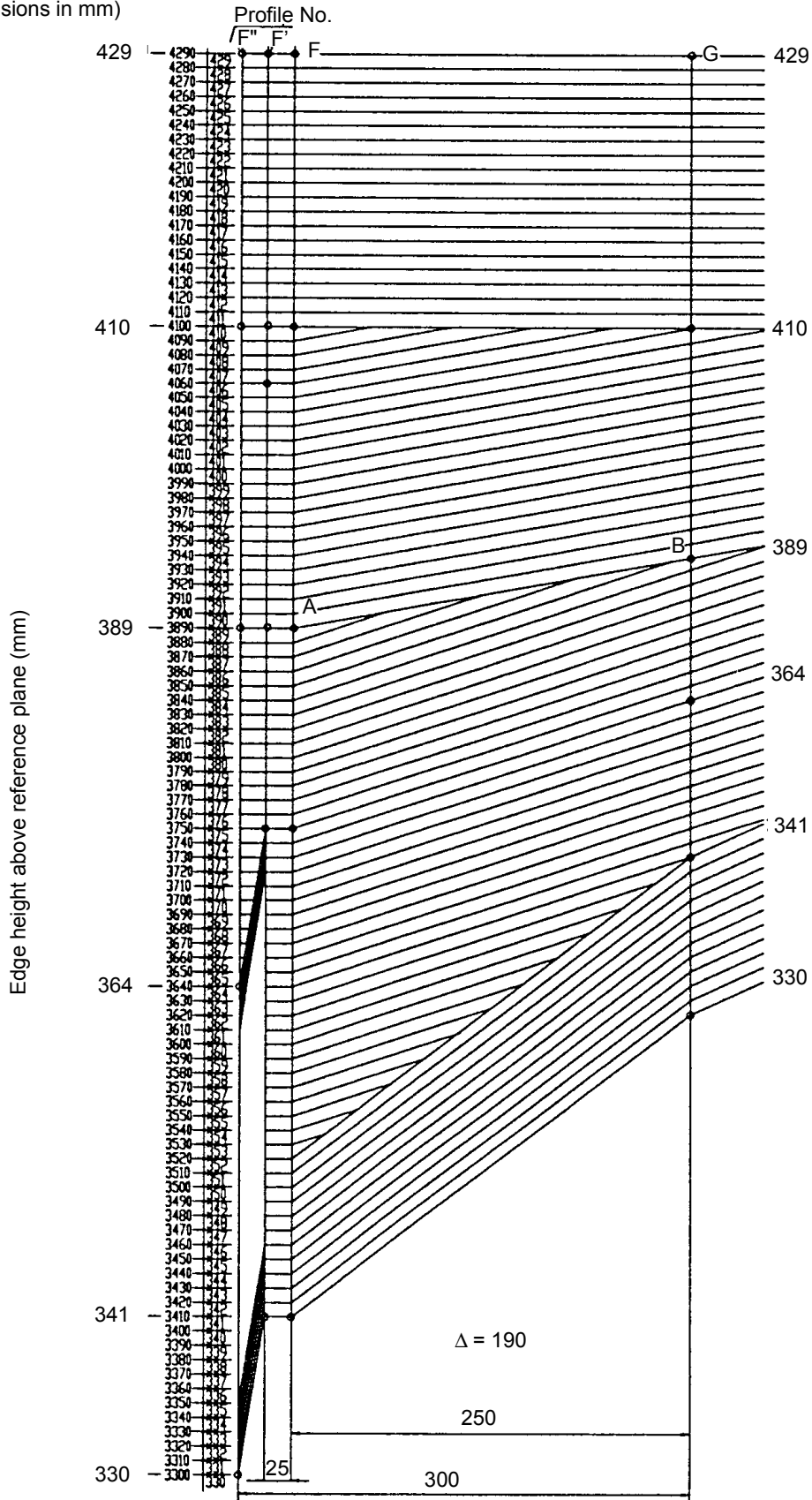
F.2 - Conditions for coding swap bodies and roller units of width greater than 2 500 mm and less than or equal to 2 600 mm

(all dimensions in mm)



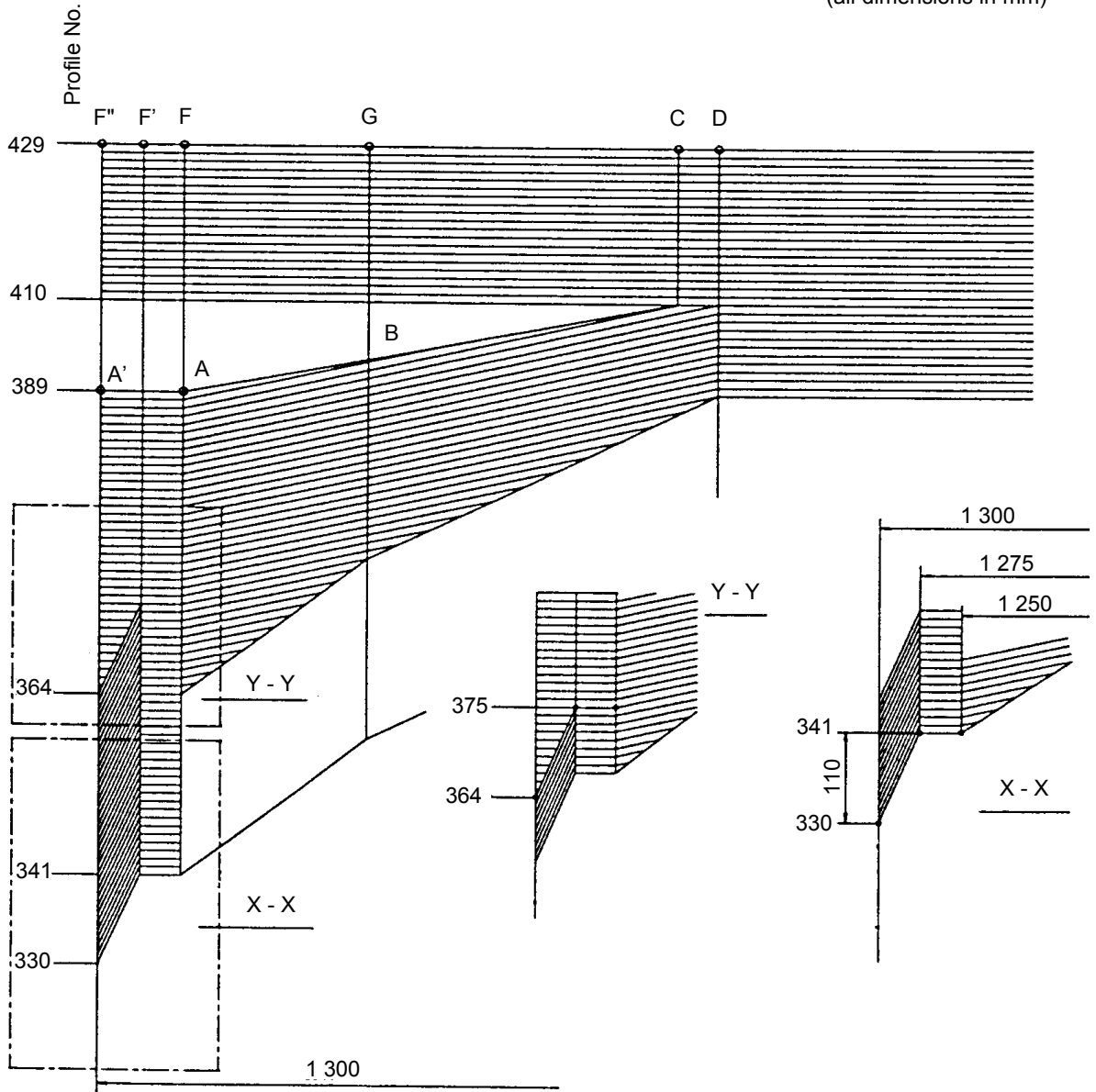
F.2.1 - Cross section Z on CT profile

(all dimensions in mm)



F.2.2 - Cross section Z on CT profile - Profiles 341 to 389 and 410 to 429

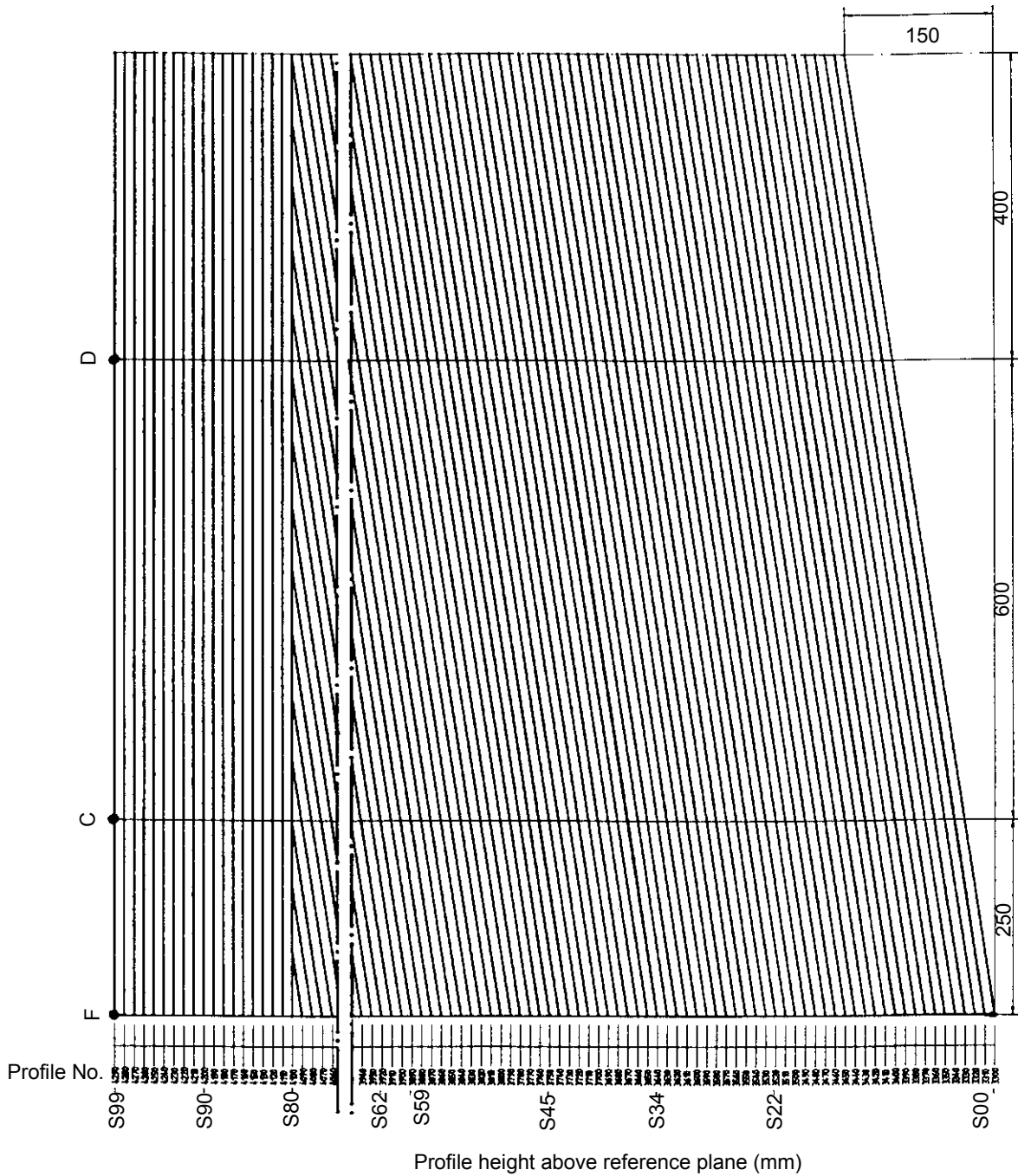
(all dimensions in mm)



Appendix G - Special combined transport profiles (S)

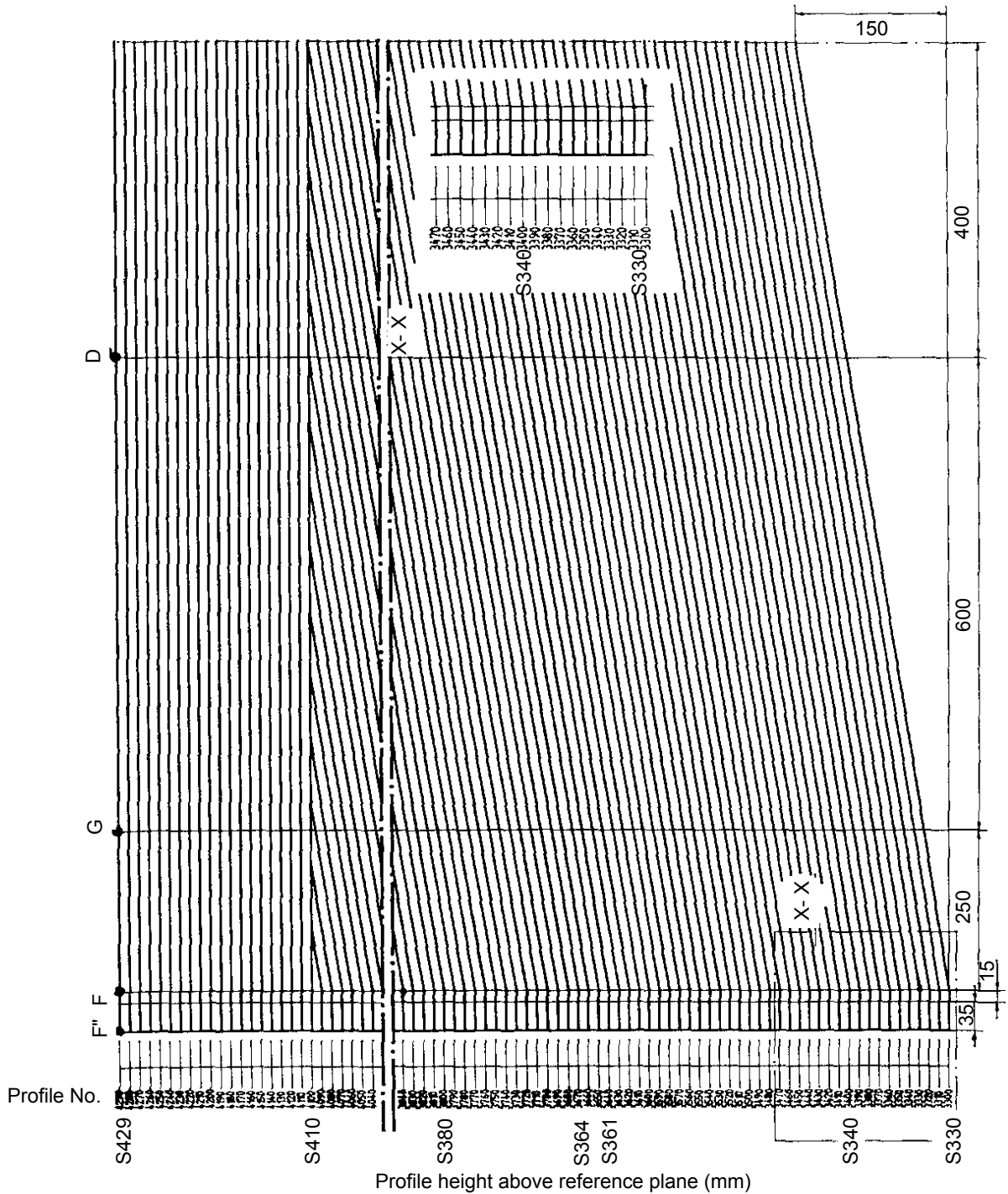
G.1 - Alternative conditions for coding semi-trailers for special flat-roof profile - Maximum width 2 500 mm

(all dimensions in mm)



G.2 - Alternative conditions for coding semi-trailers for special flat-roof profile - Width greater than 2 500 mm and less than or equal to 2 600 mm

(all dimensions in mm)



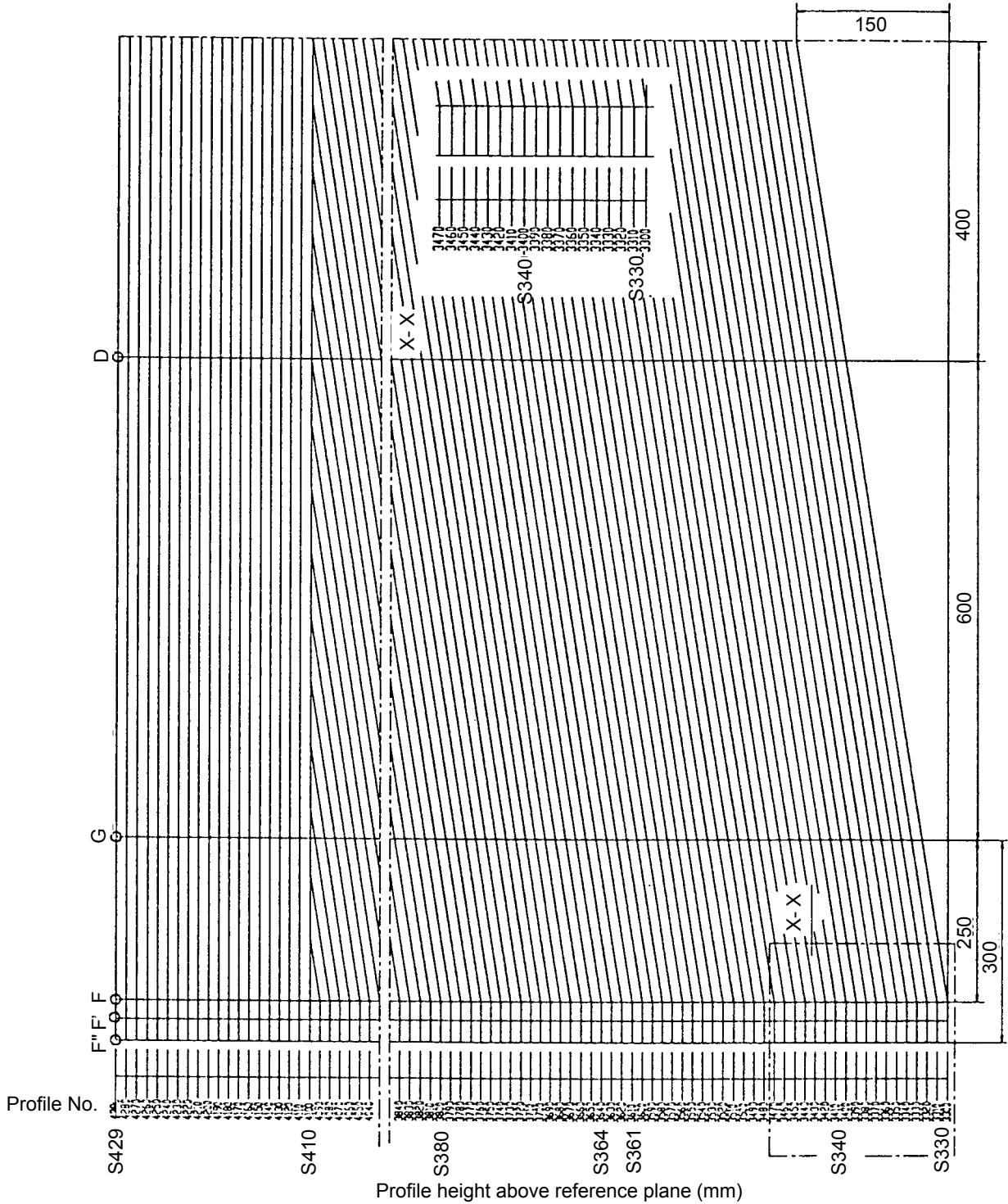
G.3 - Alternative conditions for coding swap bodies and roller units for special flat-roof profile - Maximum width 2 550 mm

(all dimensions in mm)



G.4 - Alternative conditions for coding swap bodies and roller units for special flat-roof profile - Width greater than 2 550 mm and less than or equal to 2 600 mm

(all dimensions in mm)



Appendix I - Example for calculating the technical coding for a tank semi-trailer on recess wagon

I.1 - General

Firm X, manufacturer of tanks, has submitted a file with drawings (1/10th scale) for examination and determination of the technical number.

I.2 - Results of examination of the drawings submitted

I.2.1 - The check showed that this particular semi-trailer meets all the technical conditions for loading on type 1a (P) recess wagon.

I.2.2 - Because of the longitudinal inclination of the semi-trailer in the loaded position, cross section AA is critical for determining the profile number.

The height of the handrail on top of the tank is always of critical importance.

I.3 - Method of calculation of the technical coding

For type 1a recess wagon (see Fig. 1 - page 50, 2 - page 51 and 3 - page 52)

Dimensions	Height above reference plane (mm)	
	semi-trailer empty	semi-trailer loaded
A = lower edge of tyres (mean value)	0	0
B = lower edge of ST seating device	1 130	1 130
C = B + 1 230	2 360	2 360
D = A + 2 305 (empty)/A = 2 225 (loaded)	2 305	2 225
$F = C + \frac{1\ 000}{7\ 100} (C - D)$	2 368	2 379
G = F + (1 320 - 42)	3 646	3 657
Profile number	-	30
Technical coding	-	P 30

I.4 - Remarks

I.4.1 - In view of the coding adopted for certain stretches of line, it is recommended that the handrail height (in relation to tank centre) should be reduced from 1 320 mm to 1 250 mm.

I.4.2 - The technical coding calculated is then modified as follows:

For type 1a recess wagons: $G = 2\,379 + (1\,250 - 114) = 3\,515$ mm above the reference plane.

Technical coding P 22.

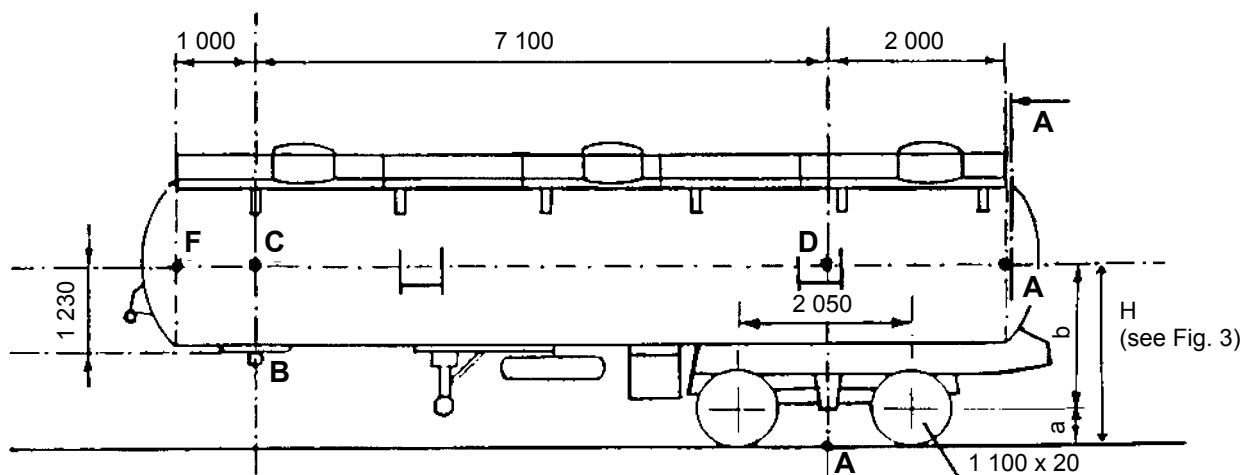


Fig. 1 - Semi-trailer in horizontal position

Table for calculating dimension H (see Fig. 3)

Wagon type		a	b	H
ST empty	P	540	1 765	2 305
ST loaded	P	500	1 725	2 225

a = distance between lower edge of tyres and axle centre (with 110 x 20 X tyres).
 b = distance between axle centre and tank centreline.

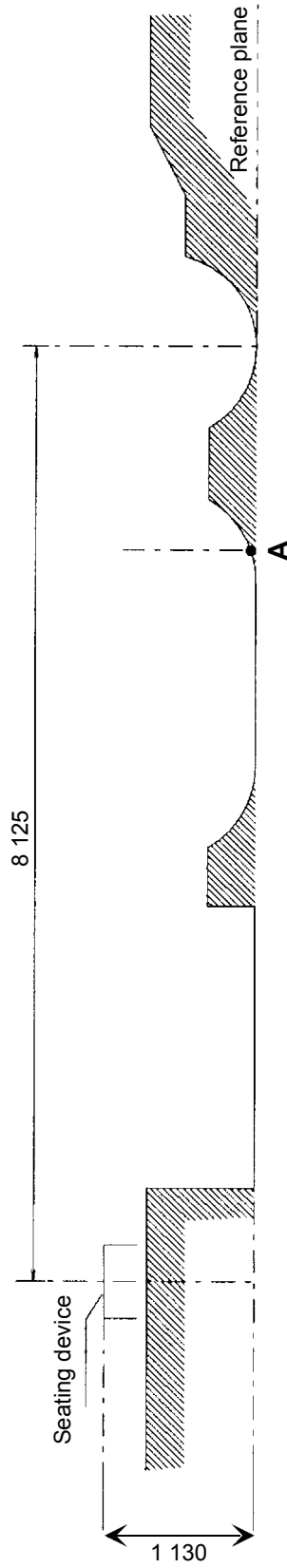
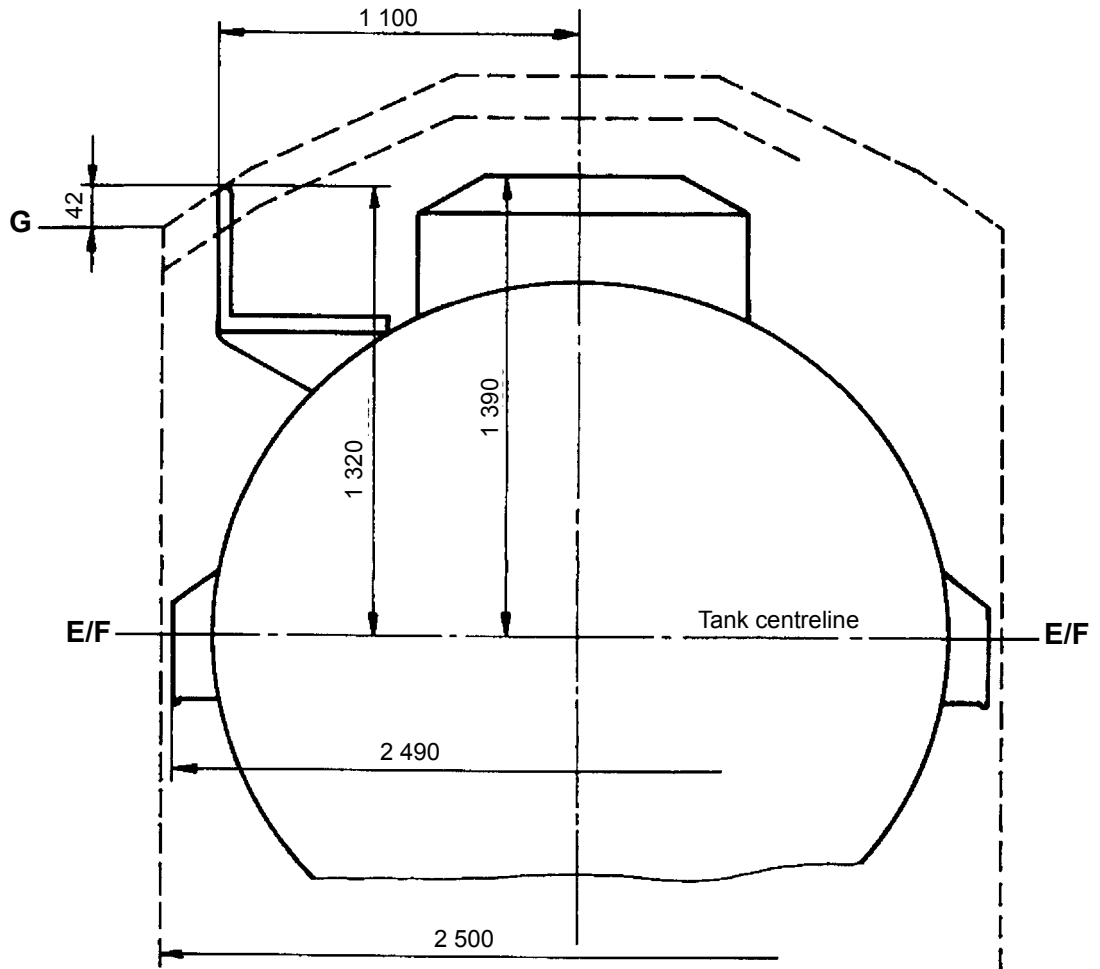


Fig. 2 - Type 1a recess wagon



CT profiles as per Appendix E,
vehicle width of 2 500 mm
not exceeded.

(all dimensions in mm)

Fig. 3 - Cross section A - A

Appendix J - Coding procedure for semi-trailers on bogies

J.1 - Explanations/Arrangements

J.1.1 - The critical dimension is the height of the roof (for example the height of the edges and of the top) of an empty semi-trailer - placed with its front part on an end bogie, the tyres of which are not worn, measured at the "critical height" above rail level in the least favourable section of the semi-trailer (Fig. 4), with the rear part of the semi-trailer placed on an intermediate bogie or an end bogie.

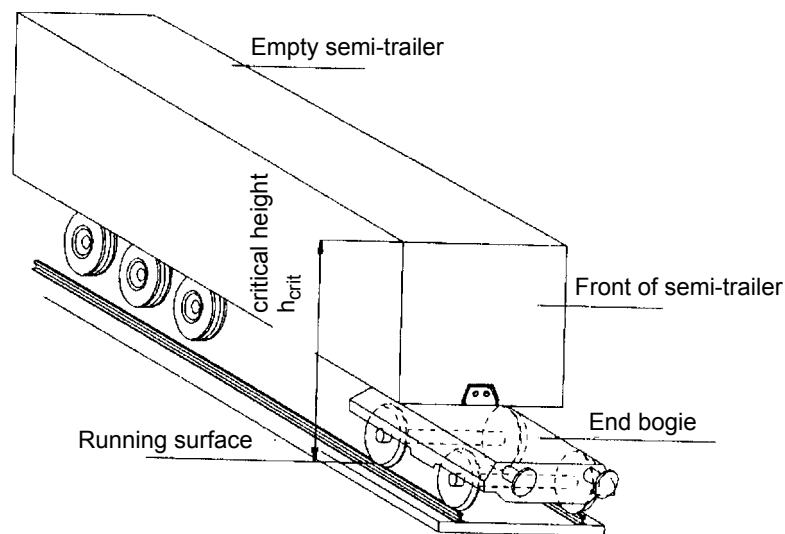


Fig. 4 - Semi-trailer on bogies

J.1.2 - The introduction of the "semi-trailer-on-bogie" systems in the coding procedure implies, among other things:

- the unqualified validity of the profile curves specified in Appendices E - page 32 to G - page 44;
- the assignment of a wagon compatibility code (see point 3.3.2 - page 6 and Appendix C - page 28) for each system
 - "Kombirail" system → K
 - "RoadRailer" system → R
 - "TransTrailer" system → T

J.2 - Generally-applicable coding conditions

J.2.1 - By using:

- the 2-digit profile number for semi-trailers ≤ 2,5 m wide and
- the 3-digit profile number for semi-trailers > 2,5 m and ≤ 2,6 m wide

(see also point 3.3.3 - page 7), the following condition is generally applicable (see Fig. 4 - page 53 and Fig. 5):

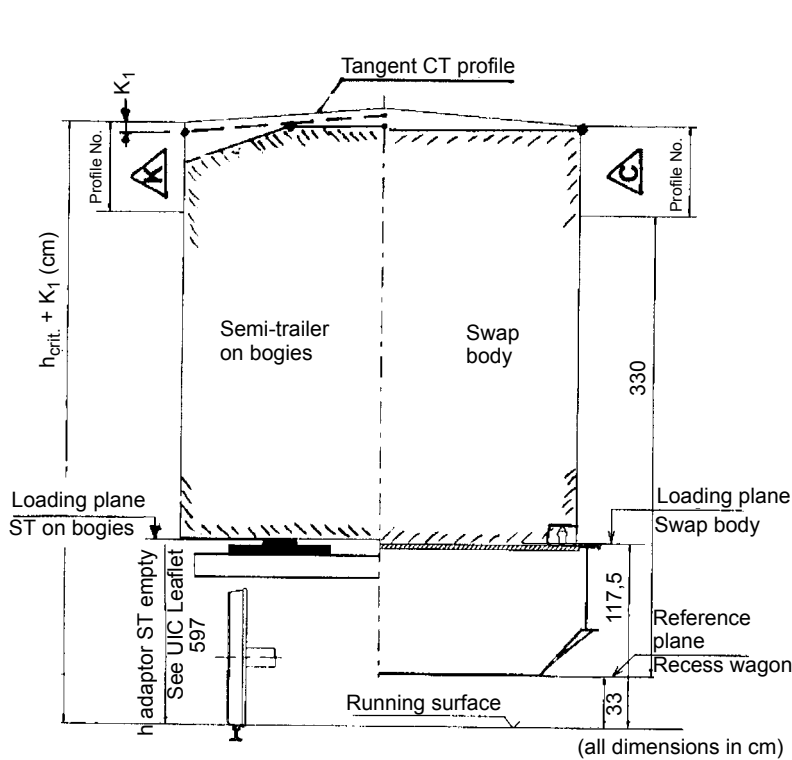
If SR ≤ 2,5 m wide:

If SR > 2,5 m and ≤ 2,6 m wide:

$$\text{Profile number } \Delta = h_{\text{crit.}} - 33 - 330 + K_1$$

$$\text{Profile number } \Delta = h_{\text{crit.}} - 33 + K_1$$

in which: Profile number Δ = profile number for the system in question, for example Kombirail : K 45 or K 364.



$h_{\text{crit.}}$ = By measurement, above the running surface, for allocation of the profile number for the edge height of the tangent profile determined in cm (see also the figure of point K.1 - page 58) ^a.

33/330 = Constant values in cm (conversion for the base of the set of profiles; recess wagon 1a = reference wagon).

K_1 = Correction factor in cm for the variation of the wheelbase compared to that of a wagon with 13,5 m wheelbase (see point J.2.2 and Fig. 6 - page 55).

Fig. 5 - Cross section of the semi-trailer

- a. Calculation of this critical height " $h_{\text{crit.}}$ " is based on bogies with unworn tyres (see point J.1.1 - page 53). To be able, if required, to use bogies with worn tyres as well for the calculation of " $h_{\text{crit.}}$ ", it is necessary in this case to increase the profile number obtained as specified in point J.2.1 - page 54, by the value in cm of the wear as measured on the tyres of the bogie supporting the front of the semi-trailer.

Formula:

$$\text{Incremental factor } K_v = \frac{\varnothing_{\text{new wheel}} - \varnothing_{\text{actual wheel}}}{2} = \frac{92 - \varnothing_{\text{actual wheel}}}{2} \text{ cm}$$

J.2.2 - Calculation of the correction factor

Where the profile is concerned, the correction factor K_1 takes account of just the wheelbase of the various "semi-trailer-on-bogie" systems. The limit curve for swap bodies as specified in Appendix D - page 29 is used to calculate this factor (see Fig. 6).

NB : In spite of the arrangement specified in point J.2.3.2 - page 56, it is also permissible to calculate K_1 , as specified in point J.2.3 for the 3-point support systems.

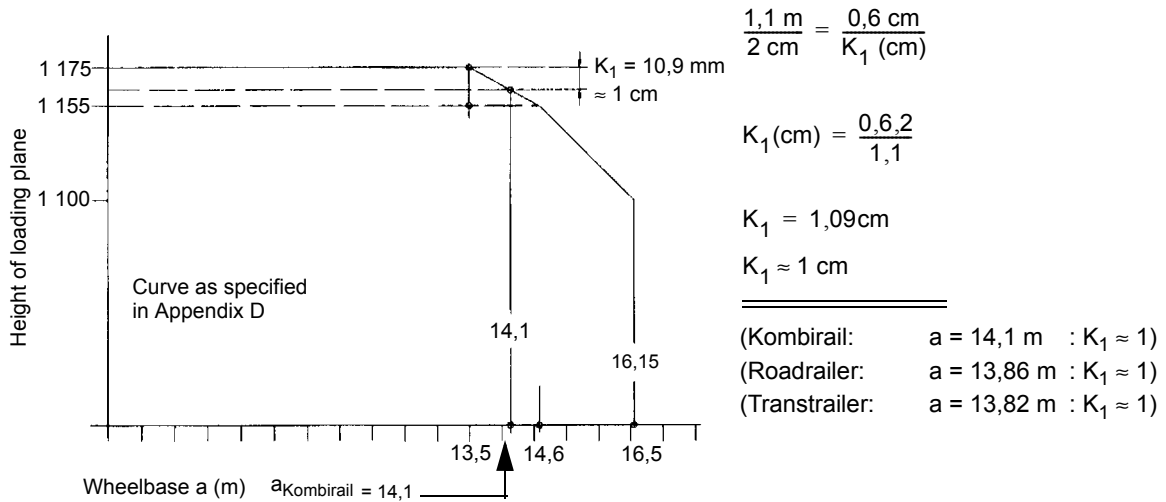


Fig. 6 - Example for a 14,1 m wheelbase for the Kombirail system

NB : If the wheelbase "a" of the semi-trailer is changed, then the correction factor K_1 is altered.

J.2.3 - Allocation of the coding for lines

The coding for the lines to be used (P or C) takes account, where the profile is concerned, of the torsion of the semi-trailer of the "ST-on-bogie" system in the case of a 3-point lateral support compared to a 4-point lateral support.

J.2.3.1 - Systems with 4-point lateral support

The 4-point lateral support of the ST - as for example in the Kombirail system - in liaison with the maximum general off-centering of the systems of $\pm 2 \text{ mm}$ (swap body $\pm 10 \text{ mm}$) means that systems supported on 4 points should be treated like swap bodies as far as the coding of lines is concerned.

It follows that with regard to the profile numbers, the CT line coding for swap bodies (2,55 m and 2,6 m wide) can be used as is.

As a result, for the coding of lines:

- route A-B has "C 45"; therefore "K 45";
- route A-B has "C 364"; therefore "K 364";

J.2.3.2 - Systems with 3-point lateral support

The 3-point lateral support of the ST - as for example in the RoadRailer or TransTrailer systems - combined with the maximum general off-centering of the systems of ± 2 mm (swap body ± 10 mm), as well as the checks carried out to determine the torsional behaviour of the representative STs mentioned above (curtainsider), mean that the 3-point support system should be treated like semi-trailers on recess wagons as far as the line coding is concerned (in fact, these systems are a little more favourable than the semi-trailer unit on a recess wagon). It follows that with regard to the profile numbers, the CT line coding for semi-trailers on recess wagons (2,55 m and 2,6 m wide) can be used as is.

As a result, for the coding of lines:

- route A-B has "P 50", therefore "T 50" or "R 50" ;
- route A-B has "P 366", therefore "T 366" or "R 366".

J.3 - Coding examples

J.3.1 - Example 1

Suppose an ST with 4-point lateral support (3-point lateral support); 2,50 m wide; flat roof; $h_{crit.} = 4,08$ m - measured above running plane; ST empty; front of ST on end bogie - ; wheelbase 14,1 m; diameter of front bogie tyres = 880 mm.

Calculation of the profile number:

ST profile number:
$$\text{Profile No } \Delta = h_{crit.} - 33 - 330 + K_1 + K_v$$

with: $K_1 = 1$ cm for a wheelbase $a = 14,1$ m

$$K_v = \frac{\text{actual } 92 - \text{Ø wheel}}{2} = \frac{92 - 88}{2} = 2 \text{ cm}$$

Profile No $\Delta = 408 - 33 - 330 + 1 + 2$

Profile No $\Delta = 48$

Allocation of line codes: Can run in combined transport line profile C 48 (P48).

J.3.2 - Example 2

Suppose an ST with 4-point lateral support (3-point lateral support); 2,60 wide; edge height 3,87 m and overall height 4,02 - measured above the running surface, ST empty; front of ST on end bogie - ; wheelbase 14,1 m; \varnothing of tyres of front bogie = 920 mm; new wheelsets.

Calculation of profile number:

ST profile number:
$$\text{Profile No } \Delta = h_{\text{crit.}} - 33 + K_1 + K_v$$

with: $K_1 = 1 \text{ cm}$ for a wheelbase $a = 14,1 \text{ m}$

$$K_v = \frac{\text{actual } 92 - \varnothing \text{ wheel}}{2} = \frac{92 - 92}{2} = 0 \text{ cm}$$

$$\text{Profile No } \Delta = 387 - 33 + 1$$

$$\text{Profile No } \Delta = 355$$

Height $H_{\text{crit.}}$ is determined either from the ST edge height or from the overall height. Suppose that $H_{\text{crit.}}$ is imposed by the edge height, the profile No $\Delta = 355$ is calculated, since the curve of profile 355 as per point **E.2 - page 35** allows a different overall height 4,02 m - height of cant rail 3,87 $\hat{=}$ 150 mm, the hypothesis is validated and the profile number is indeed equal to 355.

NB : If the converse had been true, it would have been necessary to calculate H_{crit} from the overall height.

Allocation of line codes: Can run in combined transport line profile C 355 (P355).

Appendix K - Example for calculating the technical coding

- of grab-lifted swap bodies (SBs) and
- of horizontally-transferred roller units.

K.1 - General

Swap bodies (SBs) in combined transport may be loaded on:

- recess wagons and
- carrier wagons mentioned in point 3.3.2, Table 1 - page 6, note b.

The height of the reference plane is defined for swap-body carrier wagons as per point 3.3.2 as 330 mm above rail level. The bottom of the swap body on the wagon is, however, 1 175 mm above the running plane.

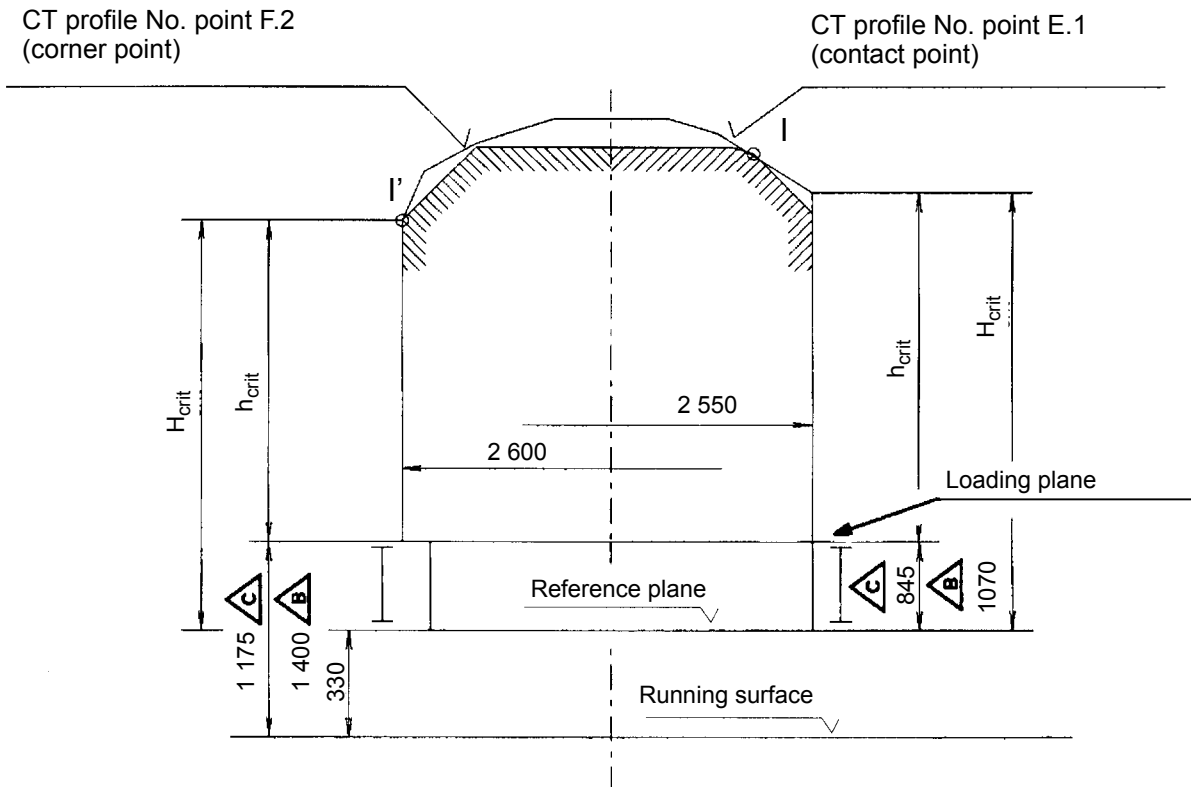
Since the calculation of the profile number is generally based on the reference plane, it is also necessary when coding swap bodies to consider the dimensional difference between the actual bottom of the swap body (1 175 mm above running plane) and reference plane (330 mm above running plane).

It is understood that the CT profile selected shall be that which is tangent to the SB roof line.

Roller units are carried in combined transport on:

- type 1 wagons, as per *UIC Leaflet 571-4, point 3* and
- carrier wagons mentioned in point 3.3.2, Table 1, note b.

Otherwise the above explanations apply in principle. However, the dimensional difference between the roller-unit loading plane (1 400 mm above running plane) and the reference plane (330 mm above running plane) is 1 070 mm.



Allocation of the CT profile number to swap bodies is determined by height:

$$H_{crit. \triangle C} = 845 + h_{crit.}$$

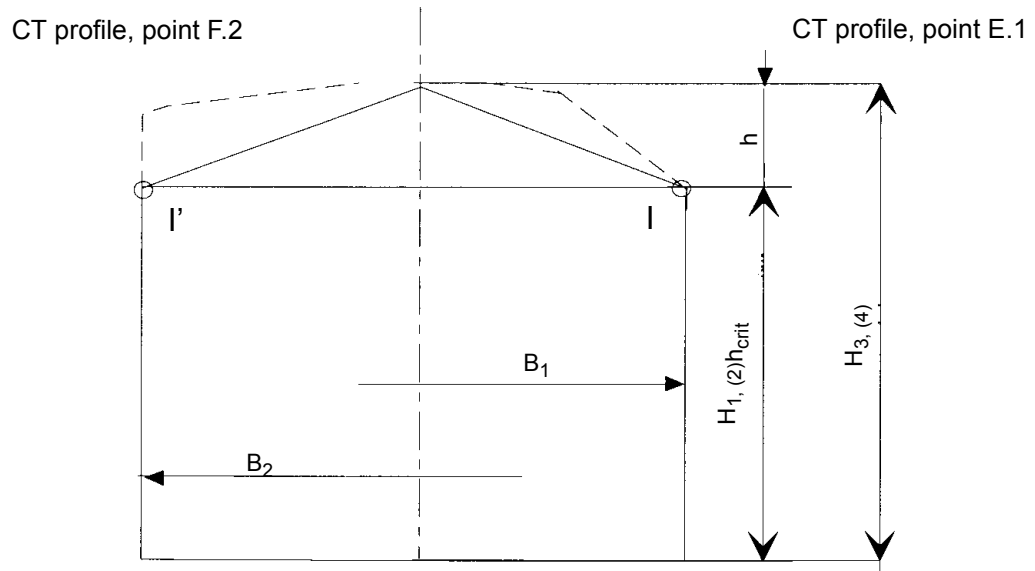
Allocation of the CT profile number to roller units is determined by height:

$$H_{crit. \triangle B} = 1\,070 + h_{crit.}$$

K.2 - Example

K.2.1 - Example A (indications in brackets below apply to roller units)

The following dimensions are taken from a drawing of two SBs (Roller Units):



SB (Roller Unit) No. 2	SB (Roller Unit) No. 1
B ₂ = 2 600 mm	B ₁ = 2 550 mm
H ₁ = H ₂ = 2 600 mm	
H ₃ = H ₄ = 2 710 mm	

The profile number in this case is determined by the edge height (points I and I' respectively) where the SB (Roller Unit) is tangent to the CT profile.

$$H_{\text{crit. } \triangle C} = h_{\text{crit.}} + 845 = 2\,600 + 845 = 3\,445 \text{ mm}$$

$$H_{\text{crit. } \triangle B} = h_{\text{crit.}} + 1\,070 = 2\,600 + 1\,070 = 3\,670 \text{ mm}$$

SB No. 1 is allocated to profile number **15** and consequently technical coding C 15 (see point F.1.1 - page 39).

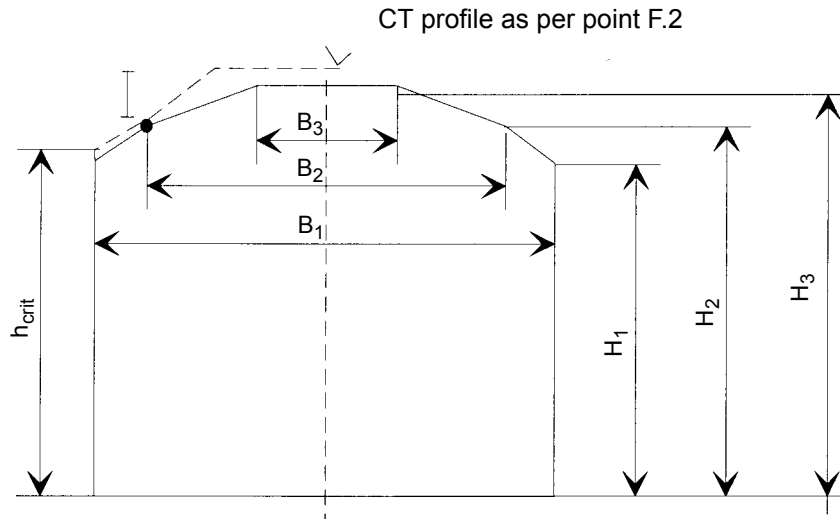
SB No. 2 is allocated to profile number **345** and consequently technical coding C 345 (see point F.2.1 - page 42).

RU No. 1 is allocated to profile number **37** and consequently technical coding B 37 (see point F.1.1 - page 39).

RU No. 2 is allocated to profile number **367** and consequently technical coding B 367 (see point F.2.1 - page 42).

K.2.2 - Example B (indications in brackets below apply to roller units)

The following measurements are taken from a drawing of two SBs (Roller Units):



- $B_1 = 2\,500\text{ mm}$
- $B_2 = 2\,400\text{ mm}$
- $B_3 = 900\text{ mm}$
- $H_1 = 2\,600\text{ mm}$
- $H_2 = 2\,700\text{ mm}$
- $H_3 = 2\,780\text{ mm}$

Here the profile number is the CT profile number which is tangent to point I.

$$H_{\text{crit. } \triangle C} = h_{\text{crit.}} + 845$$

$$(H_{\text{crit. } \triangle B} = h_{\text{crit.}} + 1\,070)$$

$$H_{\text{crit. } \triangle C} = (2\,600 + 62) + 845 = 3\,507\text{ mm}$$

$$(H_{\text{crit. } \triangle B} = (2\,600 + 86) + 1\,070 = 3\,756\text{ mm})$$

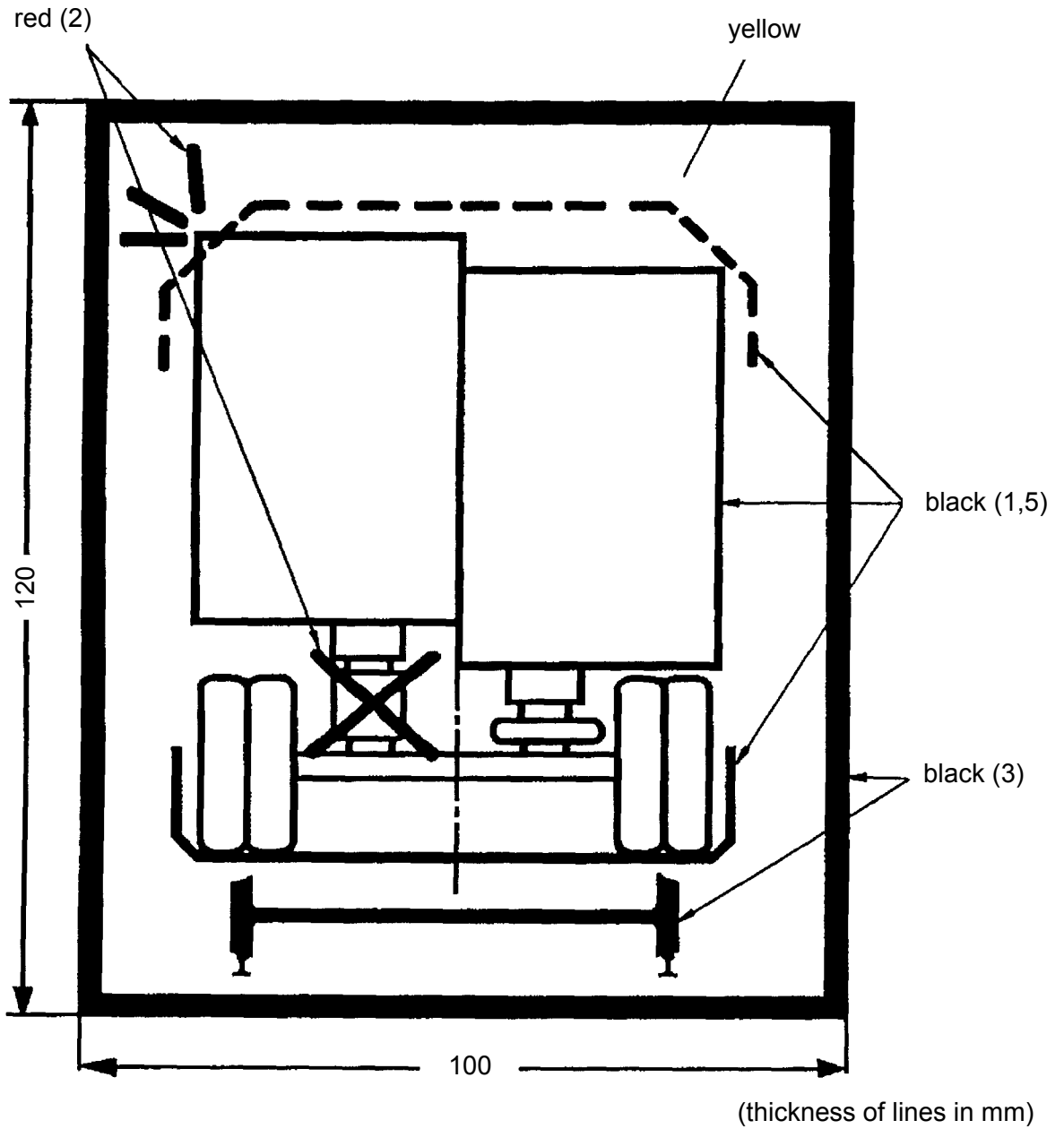
The SB is allocated profile number **21** and consequently technical number C 21.

The RU is allocated profile number **46** and consequently technical number B 46.

Appendix L - Nationality numbers of the RU and combined transport companies

The list of nationality numbers may be found on the UIC Website:
[http://www.uic.asso.fr/ Activities/Technology & Research/Products](http://www.uic.asso.fr/Activities/Technology%20&%20Research/Products).

Appendix M - Symbol denoting semi-trailers authorised for use in combined transport only with deflated air suspension



Appendix N - Standard cartouche and marking with a loading level

N.1 - Swap-body carrier wagons

NB : Standard cartouche applying to all SBs, maximum width 2,60 m.
All markings must be the same colour and in total contrast with the plate background.

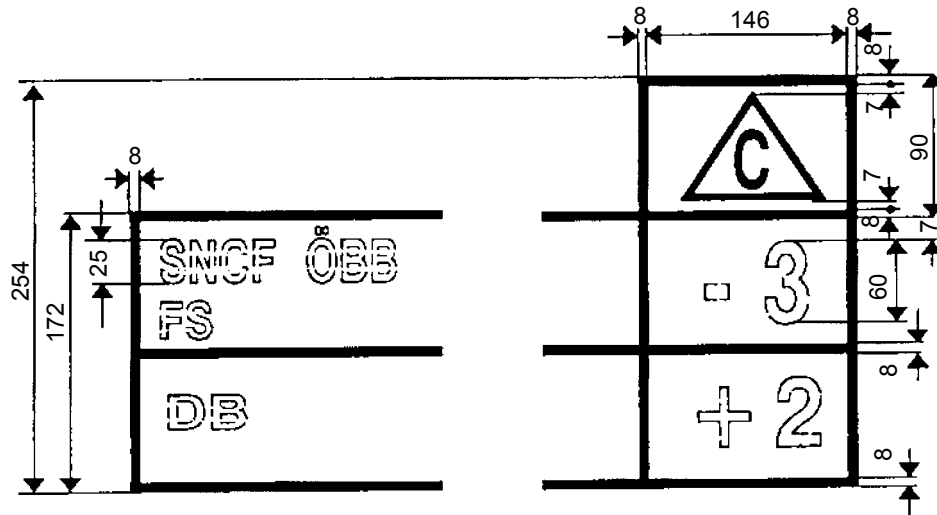


Fig. 7 - Standard cartouche and markings for swap-body carrier wagons not meeting the conditions of point 3.3.2

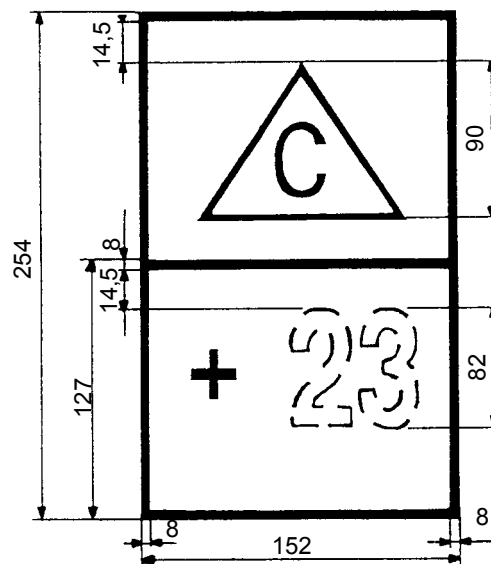


Fig. 8 - Standard cartouche and markings for swap-body carrier wagons with characteristics more favourable than the conditions of point 3.3.2

N.2 - Recess wagons

NB : Standard cartouche applicable to all SBs, maximum width 2,60 m.
All markings must be the same colour and in total contrast with the plate background.

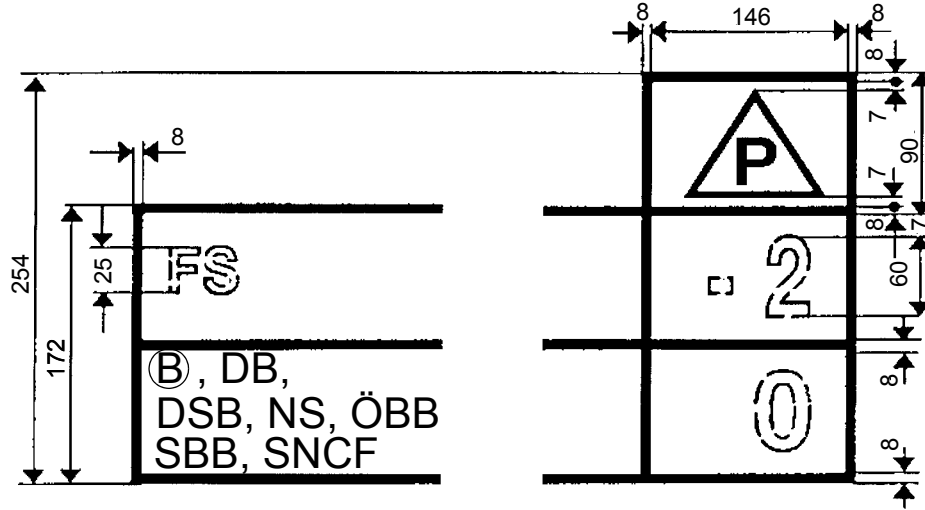


Fig. 9 - Standard cartouche and markings for recess wagons not meeting the conditions of point 3.3.2 for conveyance of semi-trailers

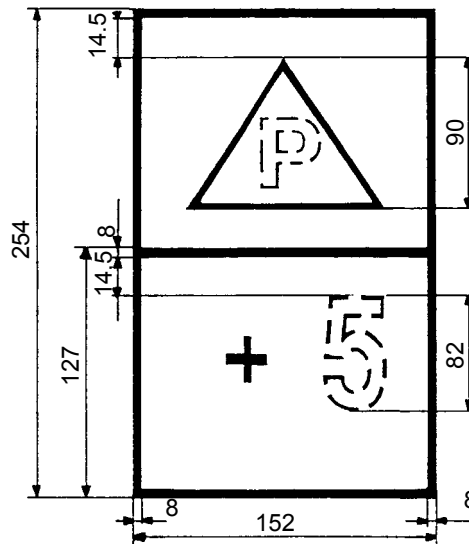


Fig. 10 - Standard cartouche and markings for recess wagons with characteristics more favourable than the conditions of point 3.3.2 for conveyance of semi-trailers

N.3 - Roller-unit carrier wagons

NB : Standard cartouche applicable to all SBs, maximum width 2,60 m.
All markings must be the same colour and in total contrast with the plate background.

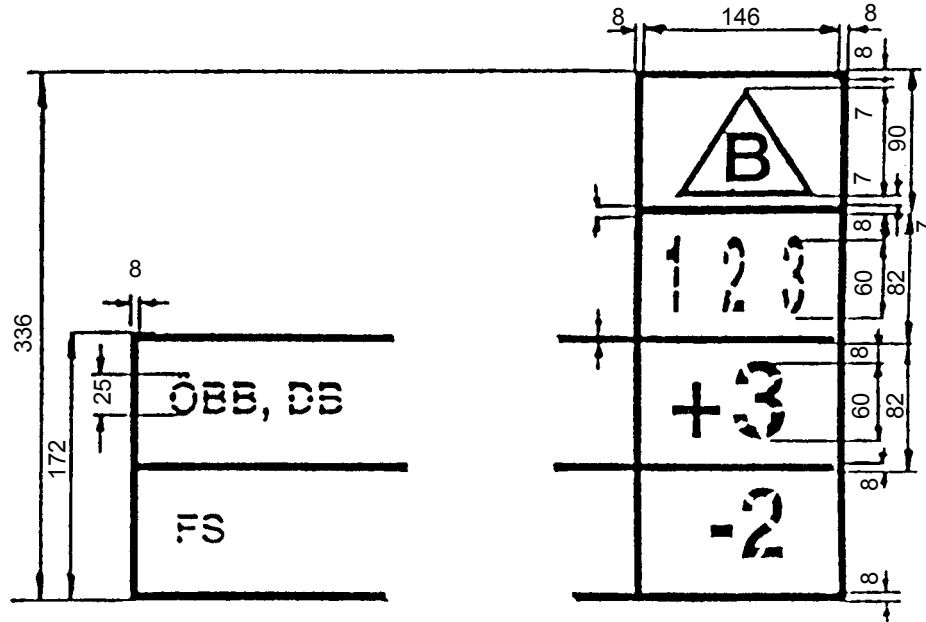


Fig. 11 - Standard cartouche and markings for roller-unit carrier wagons not meeting the conditions of point 3.3.2

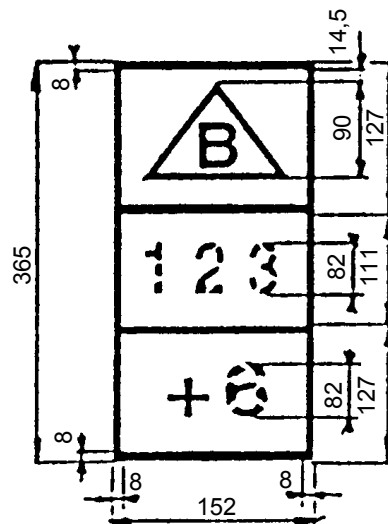
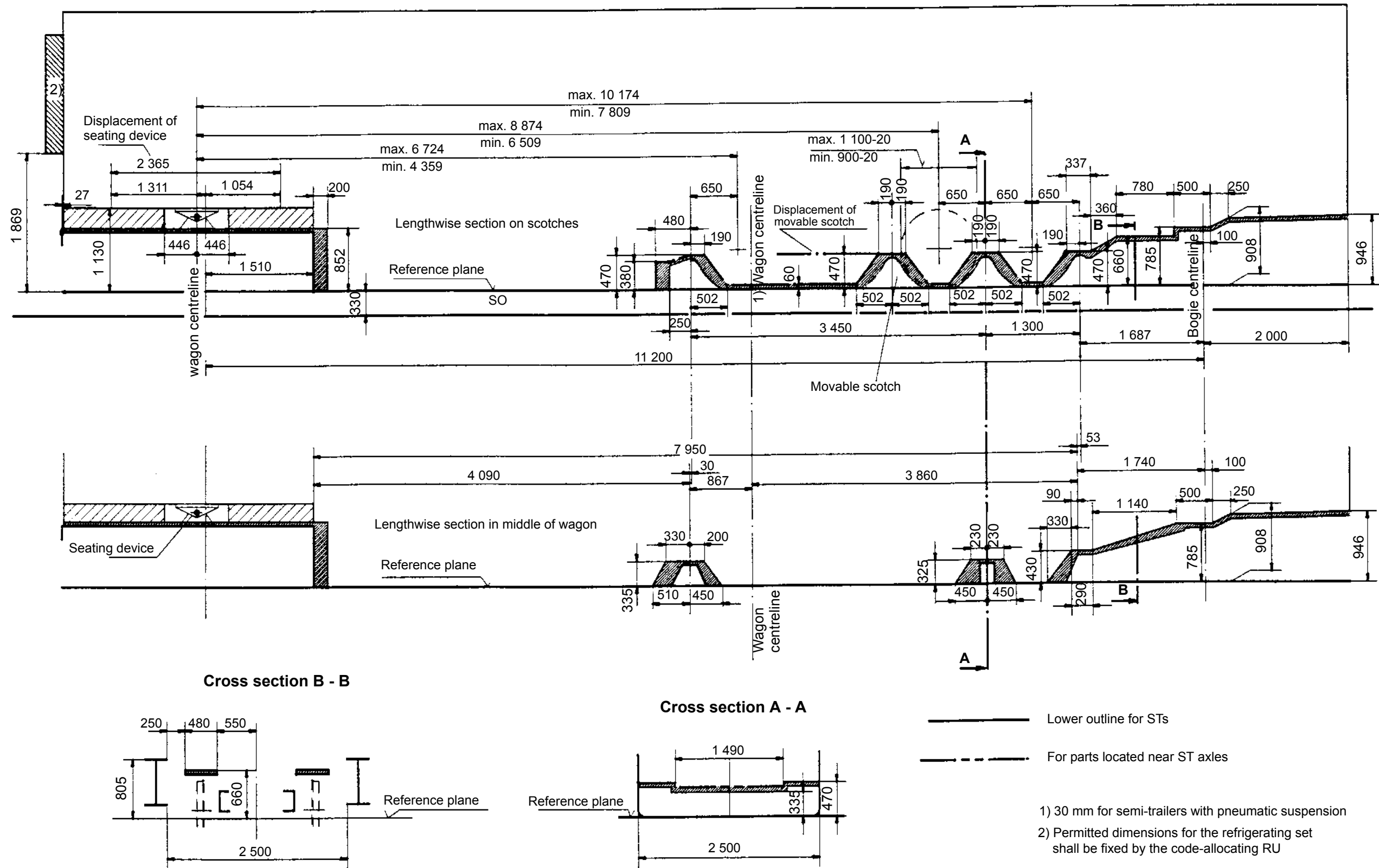


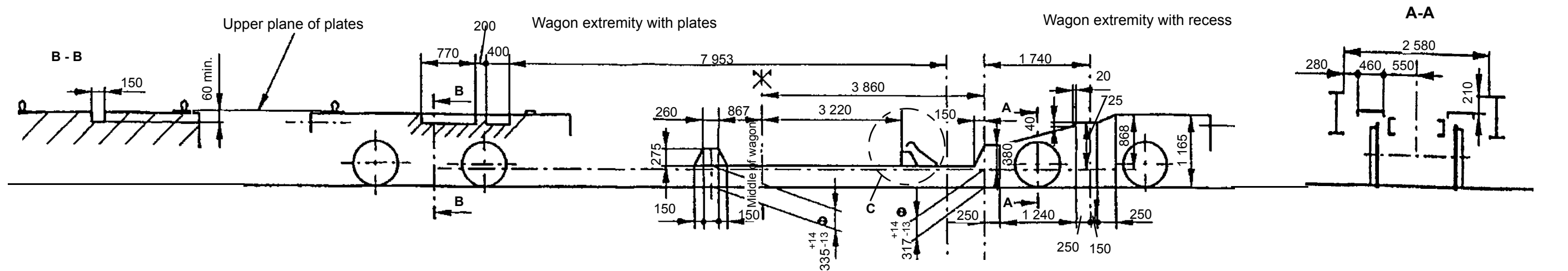
Fig. 12 - Standard cartouche and markings for roller-unit carrier wagons with characteristics more favourable than the conditions of point 3.3.2

Appendix O - Overall dimension and bearing surfaces of semi-trailers on type 1a recess wagons

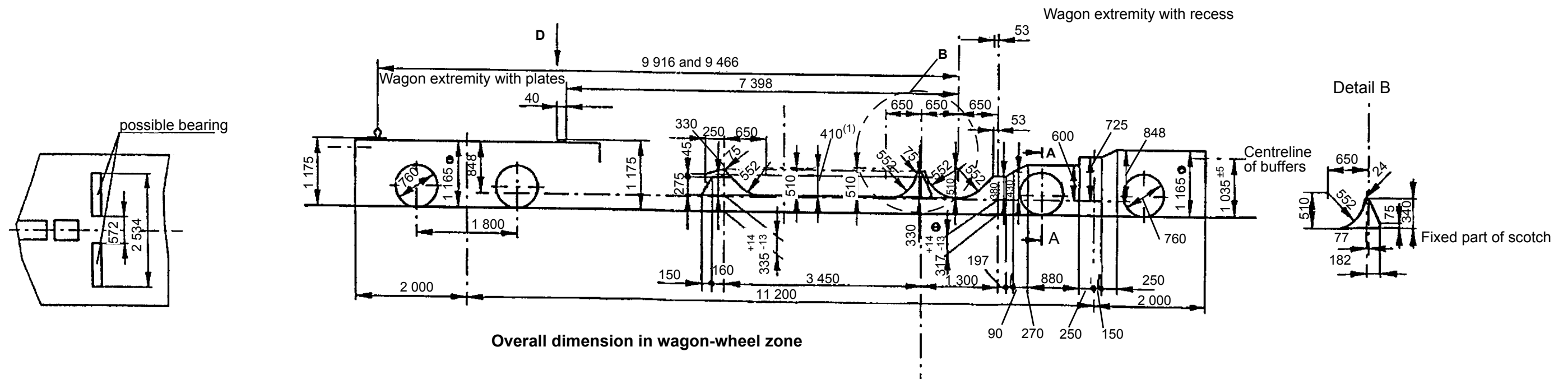


Appendix P - Bearing surface of semi-trailers on type 1a recess wagon

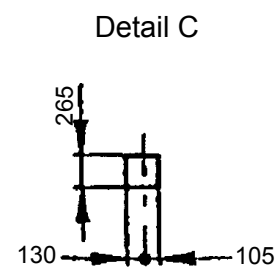
(as per UIC Leaflet 571-4, point 3.1)



Outer dimension in the area of the wagon's longitudinal axis

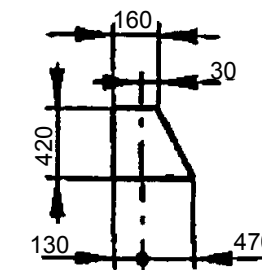


	Wagon in empty condition
	Height of loading plane
(1)	Height of movable scotch in longitudinal axis of wagon



For conveyance of:

- 2-axle semi-trailers,
- 3-axle semi-trailers with standard wheelbase (movable scotch positioned crosswise ready for use).



For conveyance of:

- 3-axle semi-trailers with short wheelbase (1 150 mm maxi.) (movable scotch positioned crosswise in longitudinal axis of wagon).

List of abbreviations

C	Horizontally-transferred containers
CT	Combined transport
CTC	Combined transport company
CTC-NN	Combined transport company nationality number
CTL	Combined transport line
CT-LU-FN	Combined transport load-unit fleet number
CTP	Combined transport profile
CTPN	Combined transport profile number
CTT	Combined transport traffic
UIRR	International Union of combined Road-Rail transport companies
LU	Load unit
NN	Nationality number
PN	Profile number
RN	Registration number
RP	Reference plane
RU	Railway undertaking
SB	Swap body
ST	Semi-trailer
T	Trailer
TN	Technical number
WCC	Wagon compatibility code

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International Union of Railways (UIC)

UIC Leaflet 571-4: Standard wagons - Wagons for combined transport - Characteristics, 4th edition October 2004.

UIC Leaflet 591: Roller units for horizontal transshipment - Technical conditions governing their use in international traffic, 2nd edition of 1.1.98.

UIC Leaflet 592-4: Swap bodies which can be handled by grabs - Technical conditions, 2nd edition, September 2004.

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UIC Leaflet 597: Piggyback system - Semi-trailers on bogies - Characteristics, 1st edition of 1.1.91 - Reprint dated 1.7.93 incorporating 7 Amendments.

2. Minutes of meetings

International Union of Railways (UIC)

Sub-Committee for Combined Transport Techniques (Question 45/C/FIC - Revision of Leaflet 596-6: item 4.2), January 1996.

Sub-Committee for Combined Transport Techniques (Question 45/C/FIC - Point 4 - Updating of Leaflets), June 1996

Sub-Committee for Combined Transport Techniques (Question 45/C/FIC - Amendment to Appendix 8 - Allocation of nationality number), June 1998

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