

ISBN 978-0-626-28658-3

**SANS 50286-3:1994**

Edition 1 and nat. amdt 1

**EN 286-3:1994**

Edition 1

Any reference to SABS EN 286-3 is deemed  
to be a reference to this standard  
(Government Notice No. 1373 of 8 November 2002)

## **SOUTH AFRICAN NATIONAL STANDARD**

**Simple unfired pressure vessels designed to  
contain air or nitrogen**

**Part 3: Steel pressure vessels designed for air  
braking equipment and auxiliary pneumatic  
equipment for railway rolling stock**

This national standard is the identical implementation of EN 286-3:1994, and is adopted with the permission of CEN, rue de Stassart 36, B-1050 Brussels.

---

Published by SABS Standards Division  
1 Dr Lategan Road Groenkloof ☒ Private Bag X191 Pretoria 0001  
Tel: +27 12 428 7911 Fax: +27 12 344 1568  
[www.sabs.co.za](http://www.sabs.co.za)  
© SABS

**SABS**

---

**SANS 50286-3:1994**

Edition 1 and nat. amdt 1

**EN 286-3:1994**

Edition 1

**Table of changes**

<b>Change No.</b>	<b>Date</b>	<b>Scope</b>
Nat. amdt 1	2007	Amended to change the designation from SABS to SANS, with no technical changes.

**National foreword**

This South African standard was approved by National Committee SABS TC 58, *Vessels and systems under pressure*, in accordance with procedures of the SABS Standards Division, in compliance with annex 3 of the WTO/TBT agreement.

This part of SANS 50286 was published in March 2007. This SANS edition is technically identical to the first SABS edition (SABS EN 286-3:1994).

**Reaffirmed and reprinted in March 2013.  
This document will be reviewed every five years  
and be reaffirmed, amended, revised or withdrawn.**

EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

September 1994

---

UDC 621.642.02-98 : 629.8 : 620.1

Descriptors: Railway rolling stock, pneumatic equipment, pneumatic brakes, pressure vessels, unalloyed steels, grades : quality, welded joints, computation, design, production control, tests, assembling, certification

English version

## Simple unfired pressure vessels designed to contain air or nitrogen — Part 3 : Steel pressure vessels designed for air braking equipment and auxiliary pneumatic equipment for railway rolling stock

Réipients à pression simple, non soumis à la flamme, destinés à contenir de l'air ou de l'azote — Partie 3: Réipients à pression en acier destinés aux équipements pneumatiques de freinage et aux équipements pneumatiques auxiliaires du matériel roulant ferroviaire

Einfache unbefeuerte Druckbehälter für Luft oder Stickstoff — Teil 3: Druckbehälter aus Stahl für Druckluftbremsanlagen und pneumatische Hilfseinrichtungen in Schienenfahrzeugen

This European Standard was approved by CEN on 1994-09-09. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

### CEN

European Committee for Standardization  
Comité Européen de Normalisation  
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

## Foreword

This European Standard was prepared by CEN/TC 54, Unfired pressure vessels, of which the secretariat is held by BSI.

This European Standard has been prepared under a Mandate given to CEN by the European Commission and the European Commission and the European Free Trade Association, and supports essential requirements of the EC Directive(s).

CEN/TC 54 decided to submit the final draft for formal vote by its resolution. The result was positive.

This Part is one of a series of four. The other Parts are:

Part 1: *Design, manufacture and testing*

Part 2: *Pressure vessels for air braking and auxiliary systems for motor vehicles and their trailers*

Part 4: *Aluminium alloy pressure vessels designed for air braking equipment and auxiliary pneumatic equipment for railway rolling stock*

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 1995, and conflicting national standards shall be withdrawn at the latest by March 1995.

According to the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain and United Kingdom.

## Contents

	Page
Foreword	2
1 Scope	3
2 Normative references	4
3 Symbols	5
4 Materials	6
5 Design	7
6 Inspection and drainage bosses	21
7 Marking	22
8 Corrosion protection	22
9 Qualification of welding procedures	22
10 Qualification of welders and welding operators	22
11 Testing of the vessels	25
12 Certification procedures	30
13 Information to be supplied at the time of invitation to tender and the time of order	31
14 Delivery	31
15 Documentation to accompany the vessel	31
Annex A (normative) Verification	32
Annex B (normative) Declaration of conformity — Surveillance	32
Annex C (normative) Design and manufacturing schedules	34
Annex D (normative) Type examination	34
Annex E (normative) Content of the manufacturing record	35
Annex F (informative) Assembly to the vehicles	36
Annex G (informative) Service surveillance of type A vessels	38
Annex H (informative) Service surveillance of type B and C vessels	41

## 1 Scope

1.1 This Part of this European Standard is applicable to simple unfired steel pressure vessels, referred to as 'vessel' in this standard, designed for air braking equipment and auxiliary pneumatic equipment for railway rolling stock (see 1.6).

It defines three types of vessel A, B and C (see table 1) corresponding to the current practice of European railway networks.

1.2 The vessels to this standard are:

- a) made from a single shell;
- b) made from non-alloy steel;
- c) fabricated by welding;
- d) used at a maximum working pressure of 10 bar;
- e) the product of the maximum working pressure (in bar) and the volume (in litre):  
50 bar litres <  $PV$  ≤ 10 000 bar litres;
- f) made of a cylindrical part of circular cross-section called the shell with two outwardly dished torispherical ends, that is two dished ends with the same axis of rotation. This standard

therefore does not apply to vessels with one or two flat ends or those made up of several compartments;

g) calculated with a design pressure  $P$  (see 5.1.4.1.2);

h) designed for a working temperature of between -40 °C and +100 °C;

i) fastened to the vehicles:

- 1) by straps for types A and B vessels;
- 2) by welded brackets for types B and C vessels.

1.3 In normal service, a momentary overpressure of 1 bar of the maximum working pressure is permitted (10 % of  $P_S$ ).

1.4 This Part of this European Standard applies to the vessel proper, from the inlet connection to the outlet connection and to all other connections and fittings belonging to the vessel.

1.5 This Part of this European Standard gives the requirements to be met for the calculation, design, fabrication, inspection during fabrication and certification of the vessel, and fittings for assembly to the vehicle.

Table 1. Definitions of types of vessel				
Criterion	Type A	Type B	Type C	Reference clause in this standard
Nominal design stress $f$	0,6 $R_{eT}$ or 0,3 $R_m$		0,6 $R_{eT}$ or 0,3 $R_m$	5.1.4.1
		0,3 $R_m/1,4$ with $R_m \leq 360$ N/mm <sup>2</sup>		5.1.4.2
Radii of curvature of the end	$R = D_o$ $r = 0,1D_o$		$R = D_o$ $r = 0,1D_o$	5.1.3.1.1
		$R = D_o$ $r \geq 0,06D_o$		5.1.3.1.2
Shell ring/end assembly	Butt weld or swaged end. Full penetration weld		Butt weld or swaged end. Full penetration weld	5.1.5.2.1
		Inserted end		5.1.5.2.2
Thread of inspection, branch and drainage boss	ISO 228-1 ISO 261	ISO 7-1 ISO 228-1 ISO 261	ISO 7-1 ISO 228-1 ISO 261	5.2.1
Weld of drainage boss	Full penetration weld of the vessel wall for penetrating boss	Full penetration weld of the vessel wall for penetrating boss. Convex weld for surface mounted boss	Full penetration weld of the vessel wall for penetrating boss. Convex weld for surface mounted boss	5.2.4.2
Method of fixing to the vehicle	Fixing by steel straps	Fixing by straps or welded brackets	Fixing by welded brackets	Annex F
Service surveillance	Annex G	Annex H	Annex H	