

**Test report No. 15PG0468-00**

Test object: Patient stretcher with carriage  
Models: 3002, 3003, 3006 with carriage models 4002, 2870  
Manufacturer: Stollenwerk u. Cie. GmbH

---

**Documentation**

on the testing

of

restraint systems and the fastening of equipment

in rescue service ambulances

This test report has been drawn up exclusively for documentation of test results.

TÜV Kraftfahrt GmbH Unternehmensgruppe TÜV Rheinland/Berlin- Brandenburg	Institut für Verkehrssicherheit Typprüfstelle Fahrzeuge/Fahrzeugteile Am Grauen Stein, D-51105 Köln (Poll)	Page 1
---	--	--------

Test object: Patient stretcher with carriage  
 Models: 3002, 3003, 3006 with carriage models 4002, 2870  
 Manufacturer: Stollenwerk u. Cie. GmbH

---

**1. Introduction**

On the request of the ordering party, TÜV Kraftfahrt GmbH tested patient stretchers with carriage produced by the Stollenwerk company. The purpose of testing was to find if the patient stretchers can withstand the load to which they are exposed in a dynamic test on the basis of chapter 3 of this document.

1.1 Name and address of the ordering party:

Stollenwerk und Cie. GmbH  
 Dellbrücker Hauptstrasse 197  
 D – 51069 Köln

**2. Description of the test object**

Type: Patient stretcher with carriage (wheeled stretchers)  
 Manufacturer: Stollenwerk und Cie. GmbH  
 Model(s):  
 - Patient stretchers: 3002 (raising head end)  
 3003 (same as 3002, and with raising foot end)  
 3006 (raising head end and abdominal relief)  
 - Carriages: 2870 (4 steering castors, variable loading height)  
 4002 (same as 2870, with additional head end handles)  
 4003 (same as 4002, with 160 mm steering castors)

Technical description: The wheeled stretcher consists of a patient stretcher (main stretcher) and a carriage. The patient stretcher is mounted on the carriage with quick-action latches. The patient stretcher has a restraint system (6-point belt system with central lock), product of Schroth (type 90127). The above-mentioned restraint system has additional belting in the knee area and chest area (see annex 1). All three above-mentioned patient stretchers can be combined with either carriage. The carriages are fastened to the patient stretcher by means of the fastening system described in annex 2.

TÜV Kraftfahrt GmbH Unternehmensgruppe TÜV Rheinland/Berlin- Brandenburg	Institut für Verkehrssicherheit Typprüfstelle Fahrzeuge/Fahrzeugteile Am Grauen Stein, D-51105 Köln (Poll)	Page 2
---	--	--------

**Test report No. 15PG0468-00**

Test object: Patient stretcher with carriage  
 Models: 3002, 3003, 3006 with carriage models 4002, 2870  
 Manufacturer: Stollenwerk u. Cie. GmbH

---

**3. Test basis and test facility**

3.1 Test basis: DIN EN 1789 (as of 1999), sections 4.5.9 and 5.3 on rescue service ambulances and their equipment - ambulances

3.2 Test facility: Crash facility of TÜV Kraftfahrt GmbH in Cologne

**4. Description of test**

4.1 Test date: April 2000 to February 2001

4.2 Test site: Cologne

4.3 Description of test setup: The behavior of the patient stretchers in the event of crash was tested with a rolling truck which was accelerated by the crash drive and then decelerated by a delay mechanism (dynamic testing). The deceleration of the rolling truck corresponded to the values defined in section 5.3 of the test basis.

The ambulance stretchers were fastened with the appropriate fastening system (see annex 2) to a patient support of Ambulanzmobile Schönebeck type ST2000. The patient support was directly fastened to the rolling truck (see annex 1). Due to rigid fastening, the forces acting on the test objects are higher than those acting on the vehicle body.

The dummies were immobilized on the patient stretcher with the restraint system described in section 2. The belts were applied as prescribed by the manufacturer. The tightening forces of the belts (< 100 N) resembled the force applied in normal belting up. Dummy types "ECE R-16 annex 7" and "Hybrid II" were used for the tests. The latter dummy was chosen in particular because it fits the restraint system better.

The head portion of the patient stretcher was set to 15° from the horizontal.

TÜV Kraftfahrt GmbH Unternehmensgruppe TÜV Rheinland/Berlin-Brandenburg	Institut für Verkehrssicherheit Typprüfstelle Fahrzeuge/Fahrzeugteile Am Grauen Stein, D-51105 Köln (Poll)	Page 3
---	--	--------

Test object: Patient stretcher with carriage  
 Models: 3002, 3003, 3006 with carriage models 4002, 2870  
 Manufacturer: Stollenwerk u. Cie. GmbH

---

#### 4.4. Tests carried out

Tested object	Impact direction in dynamic test	Comments
Carriage 4002 with patient stretcher 3002	forward	
Carriage 2870 with patient stretcher 3002	forward	
Carriage 4002 with patient stretcher 3002	backward	
Carriage 2870 with patient stretcher 3002	90° to the side	
Carriage 4003 with patient stretcher 3002	90° to the side	
Carriage 4003 with patient stretcher 3002	vertically up	

#### 5. Test results

The ambulance stretchers were able to withstand the loads of the dynamic tests. No part of the stretcher cam off the fixation or transformed into a projectile. After the tests, the restraint systems opened by simple actuation of the appropriate release systems.

The top edge of the patient stretcher moved less than 150 mm in the direction of the impact during dynamic testing. In some cases the dummies moved more than the above limit. The test procedure (see chapter 5.3) described in the norm is insufficient for an assessment if the dummy movement can be a danger to humans. The standard committees at present draft an adjustment of the test parameters / test methods in the light of the dummy displacement.

The restraining action of the tested patient restraint system can be deemed sufficient. No assessment of biomechanical parameters is possible with the norm currently in effect.

The tests carried out are considered representative of the versions of patient stretchers and carriages specified in section 2.

The fixation systems of the ambulance stretcher must be attached to a patient support as illustrated in annex 2.

TÜV Kraftfahrt GmbH Unternehmensgruppe TÜV Rheinland/Berlin- Brandenburg	Institut für Verkehrssicherheit Typprüfstelle Fahrzeuge/Fahrzeugteile Am Grauen Stein, D-51105 Köln (Poll)	Page 4
---	--	--------

Test object: Patient stretcher with carriage  
Models: 3002, 3003, 3006 with carriage models 4002, 2870  
Manufacturer: Stollenwerk u. Cie. GmbH

---

**6. Annexes**

1. Representative photos of the test setup
2. Drawing and parts list of the fixation system (2 pages)
3. Content of the manufacturer's specification (2 pages)

The test report, together with annex 1, comprises pages 1 to 10 and must not be copied in whole or part without the approval of the test laboratory.

13 September 2001  
Li

(signature)

Dipl.-Ing. Liebers

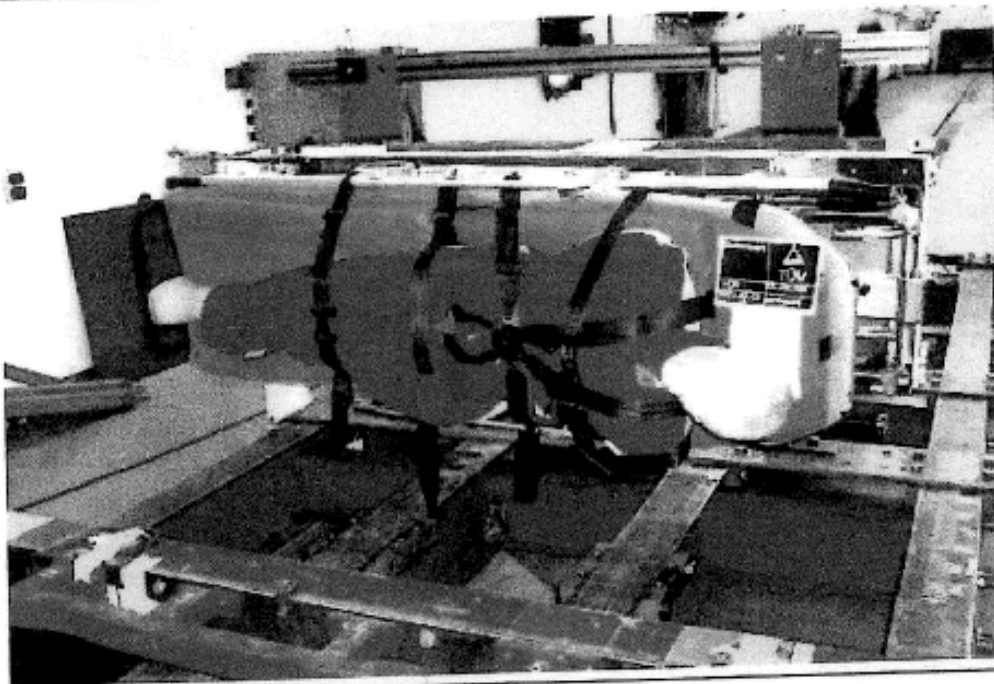
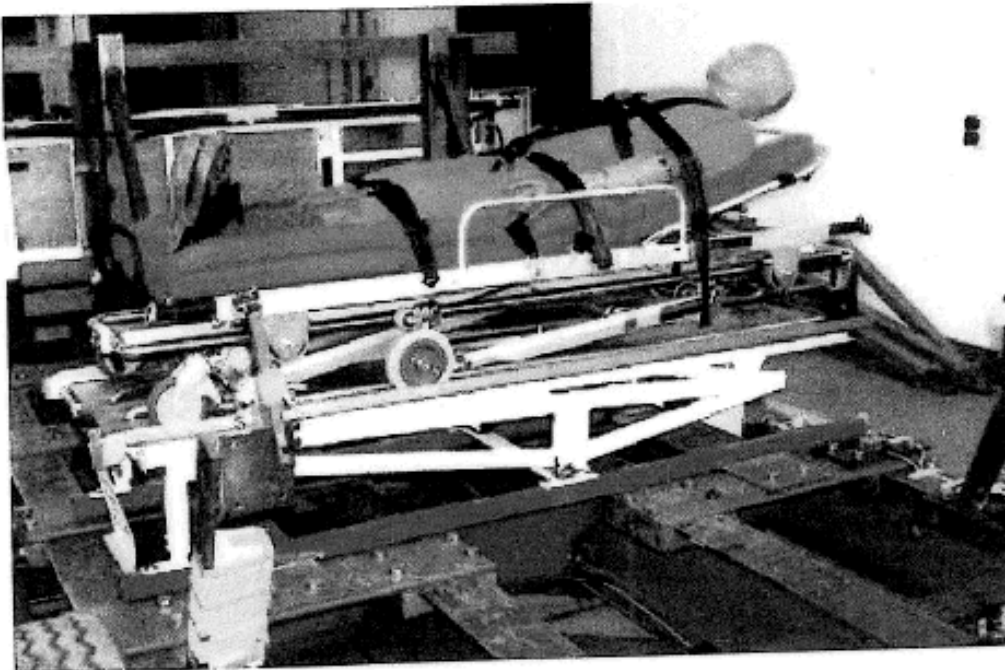
TÜV Kraftfahrt GmbH Unternehmensgruppe TÜV Rheinland/Berlin- Brandenburg	Institut für Verkehrssicherheit Typprüfstelle Fahrzeuge/Fahrzeugteile Am Grauen Stein, D-51105 Köln (Poll)	Page 5
---	--	--------

Test object: Patient stretcher with carriage  
Models: 3002, 3003, 3006 with carriage models 4002, 2870  
Manufacturer: Stollenwerk u. Cie. GmbH

---

Photos showing the test setup

Annex I



54

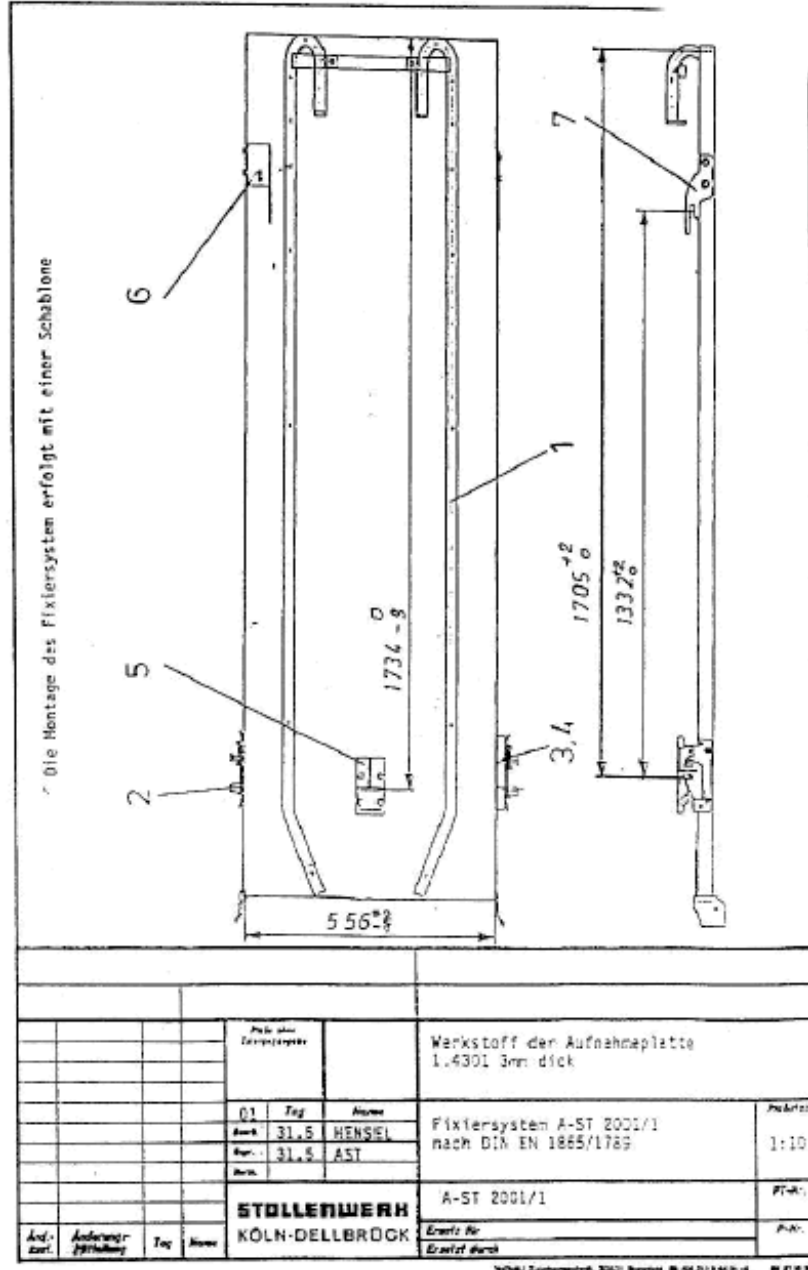
**Test report No. 15PG0468-00**

Test object: Patient stretcher with carriage  
 Models: 3002, 3003, 3006 with carriage models 4002, 2870  
 Manufacturer: Stollenwerk u. Cie. GmbH

Fixation system

Annex 2

The fixation system is installed with a template.



Material of the holding plate: 1.4301 3 mm thick – Fixation system A-ST 2001/1 ,acc. to DIN EN 1865/1789 A-ST 2001/1

TÜV Kraftfahrt GmbH Unternehmensgruppe TÜV Rheinland/Berlin- Brandenburg	Institut für Verkehrssicherheit Typprüfstelle Fahrzeuge/Fahrzeugteile Am Grauen Stein, D-51105 Köln (Poll)	Page 7
---	--	--------

**Test report No. 15PG0468-00**

Test object: Patient stretcher with carriage  
 Models: 3002, 3003, 3006 with carriage models 4002, 2870  
 Manufacturer: Stollenwerk u. Cie. GmbH

---

Fixing system parts list

Annex 2

Part no.	Designation / description	Drawing no.
	Fixing system A-ST 2001/1 acc. to DIN EN 1865/1789 comprising the following assemblies	
1	Catch frame	941-00-050.1
2	Fixing lock, left	941-00-020
3	Fixing lock, right	941-00-020.2
4	Spacer plate	941-00-006.2
5	Rollover and roll-off guard	941-00-022
6	Catch hook, inside left	941-00-025.1
7	Catch hook, outside right	941-00-025.3

TÜV Kraftfahrt GmbH Unternehmensgruppe TÜV Rheinland/Berlin- Brandenburg	Institut für Verkehrssicherheit Typprüfstelle Fahrzeuge/Fahrzeugteile Am Grauen Stein, D-51105 Köln (Poll)	Page 8
---	--	--------

**Test report No. 15PG0468-00**

Test object: Patient stretcher with carriage  
 Models: 3002, 3003, 3006 with carriage models 4002, 2870  
 Manufacturer: Stollenwerk u. Cie. GmbH

Content of the manufacturer's technical specification

Annex 3

The technical specification and documentation of the patient stretcher models 3002, 3003, 3006 and carriages 2870, 4002, 4003

Sl. no.	Designation / description	Drawing no.
0	Instruments	none
1	Patient stretcher model 3002 overall drawing 3002-00.00 parts list 8 pages consisting of the following assemblies	3002-00.00
		3000-10 sheets 2-3-4 3002-10 sheet 1
		3002-20
		3002-30
		3000-45
		3002-55
		3000-60
		3000-70
		3002-85
		3045-00
		3002-110
2	Patient stretcher model 3003 overall drawing 3003-00.00 parts list 9 pages consisting of the following assemblies	3003-00.00
		3000-10 sheet 2 3001-10 shts. 1- 2 3003-10, sheet 1
		3002-20
		3002-30
		3000-45
		3002-55
		3002-60
		3000-70
		3006-85
		3045-00
		3002-110
		3003-130
3	Patient stretcher model 3006 overall drawing 3006-00.00 parts list 10 pages consisting of the following assemblies	3006-00.00
		3000-10 sheet 2 3001-10 sheets 1-2 3006-10 sheet 1
		3002-20
		3002-30

		3000-45
		3002-55
		3002-60
		3000-70
		3006-85
		3045-00
		3002-110
		3006-130

TÜV Kraftfahrt GmbH Unternehmensgruppe TÜV Rheinland/Berlin- Brandenburg	Institut für Verkehrssicherheit Typprüfstelle Fahrzeuge/Fahrzeugteile Am Grauen Stein, D-51105 Köln (Poll)	Page 9
---	--	--------

**Test report No. 15PG0468-00**

Test object: Patient stretcher with carriage  
 Models: 3002, 3003, 3006 with carriage models 4002, 2870  
 Manufacturer: Stollenwerk u. Cie. GmbH

Content of the manufacturer's technical specification

Annex 3

Sl. no.	Designation / description	Drawing no.
4	Side clips model 2935 overall drawing 2935-00.00 parts list 2 pages	2935-000.00
5	Belt set, complete, incl. fastening material, model 3045 overall drawing 3045-00 parts list 1 page consisting of the following assemblies	3045-00
		3045-10
		3045-20
		3045-30
6	Carriage model 2870 overall drawing 2870-000.00 parts list 18 pages consisting of the following assemblies	2870-000.00
		2870-110 EN
		2870-200
		2870-300
		2870-400
7	Carriage model 4002 overall drawing 4002-000.00 parts list 22 pages consisting of the following assemblies	4002-000.00
		4002-110 EN
		4002-200
		4002-300
8	Carriage model 4003 overall drawing 4003-000.00 parts list 22 pages consisting of the following assemblies	4003-000.00
		4002-110 EN
		4002-200
		2870-300

TÜV Kraftfahrt GmbH Unternehmensgruppe TÜV Rheinland/Berlin- Brandenburg	Institut für Verkehrssicherheit Typprüfstelle Fahrzeuge/Fahrzeugteile Am Grauen Stein, D-51105 Köln (Poll)	Page 10
---	--	---------