ENVELOPE AND COVERING

Lighweight Construction

TEST REPORT No. CL05-006*01-MOD

(English language translation, the original version is in French language)

This report cancels and replaces the report CL05-006 issued on the 25th of january 2005

It comprises 10 pages of whom 4 pages of appendices.

The original version alone is valid

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SCOPE

Determination of the mechanical strength under loads parallel and perpendicular to the plane of the fixed structural façade glazing.

REFERENCE TEXTES

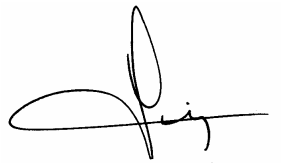
CSTB procedures, described in § 2 of the test procedures, accepted by the requester.

OBJECT SUBMITTED FOR TESTING

Date of receipt	:	December 7, 2004
Test date	:	December 8 and 9, 2004
Origin	:	The samples were delivered to CSTB by the SADEV Company
Identification	:	The samples were registered under number CL1659

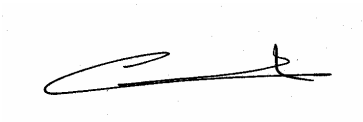
Made at Marne-la-Vallée, January 24, 2005

The Technician in charge with the tests,



L. GASNIER

The Engineer in charge with the tests,



M. COSSAVELLA

1. DESCRIPTION OF THE OBJECT TO BE TESTED

Spiders for fixed structural façade glazing containing 2 branches;

References of spiders:

- S3001 -150-28-180, on-centre of fixing pieces 150 mm, of cast stainless steel: X2 Cr Ni Mo 17-12-2, 3 test specimens.

The drawings of the spiders appear in Appendix A.

2. PROCEDURES FOR TESTS OF THE STRENGTH OF THE SPIDERS

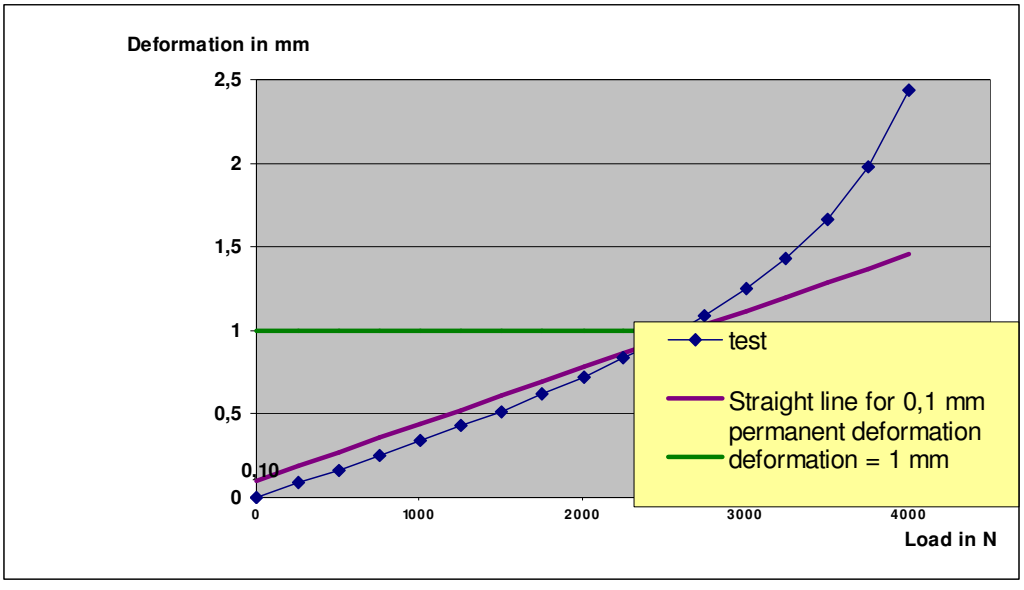
The tests were carried out on an MTS test stand, 10M type, equipped with a 50 kN tester with a test speed of 1mm/min.

The metal spider was positioned on a support, assumed to be non-deformable:

- Vertically to determine the permissible strength under loads parallel to the plane of the glazing (static load type on façade).
- Horizontally to determine the permissible strength under loads perpendicular to the glazing plane (wind type on façade).

The tests make it possible to determine:

- The force in a spider arm, corresponding to a permanent deformation (sres) of 0.1 mm.
- The force in a spider arm, corresponding to a deformation of 1 mm.



A displacement transducer, connected to a computerised acquisition device, is positioned in the perpendicular axis of the two branches tested so as to accurately measure the deformation (see figures 1a, 1b and appendix B).

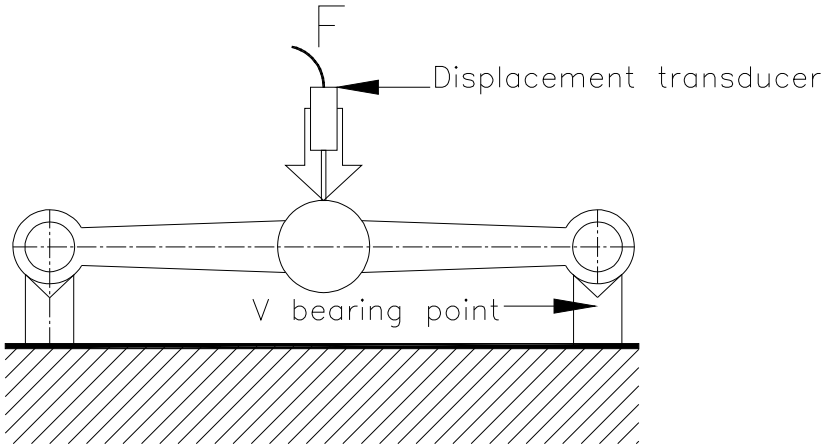


Figure 1a : Load F(1) on sample positioned vertically

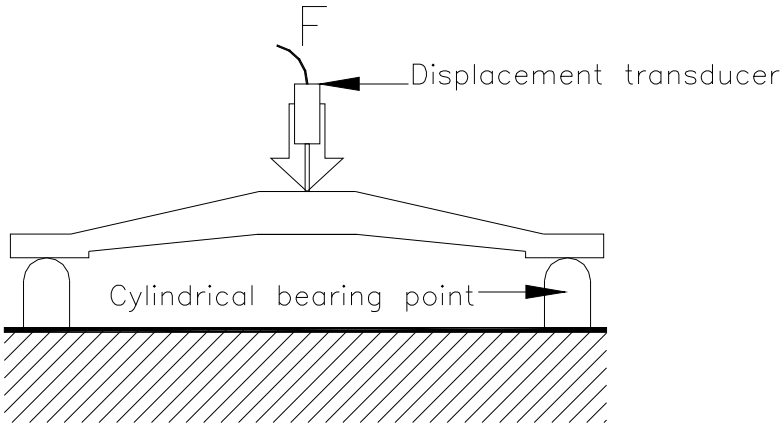
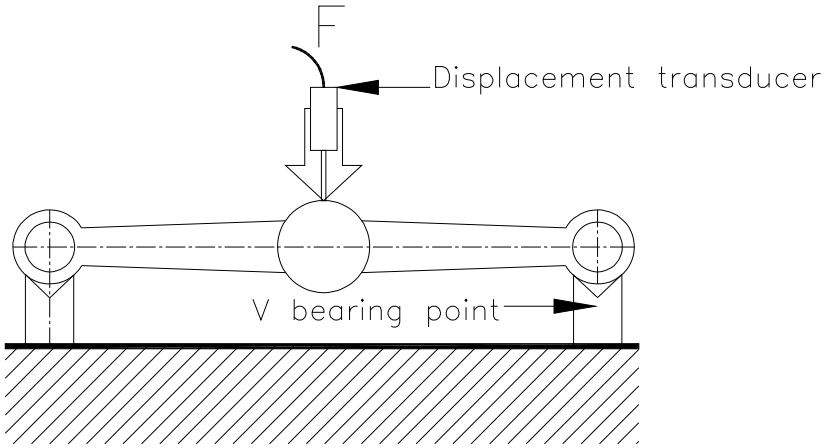


Figure 1b: Load F(1) on sample positioned horizontally

(1) With force F exerted against the two branches of the spider, the permissible force against one branch is therefore F/2.

3. TEST RESULTS

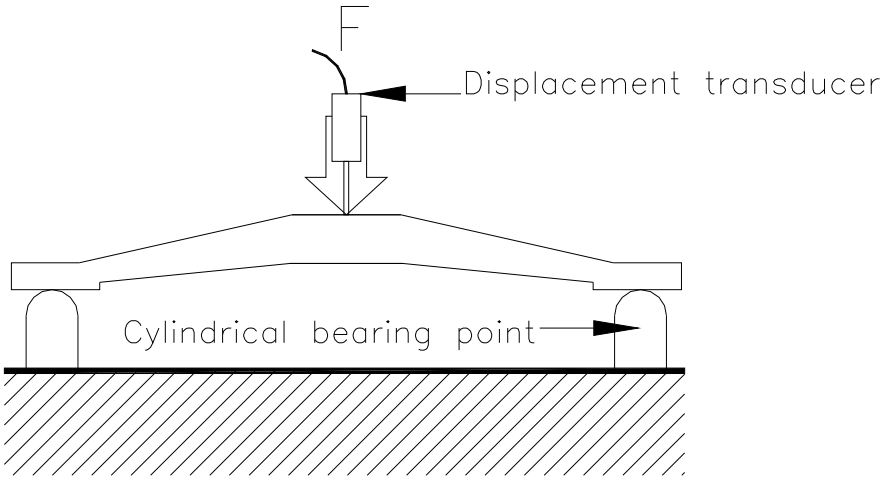
3.1 The strength under loads parallel to the glazing plane is given in the tables below. The details of the test results are in Appendix C.



S3001 – Parallel load on 2 branch

Test	F at 1mm in N	F at sres=0.1mm in N
1	11485	11443
2	11390	10341
3	10202	11112
Average: m	11026	10965
Widened uncertainty: e	860	740
m-e	10166	10225
Weighting coefficient c	1	1.35
Result on 1 branch (m-e) / 2c	5083	3787

3.2 The strength under loads perpendicular to the glazing is given in the following tables. The details of the test results are in Appendix C.



S3001 – Perpendicular load on 2 branch

Test	F at 1mm in N	F at sres=0.1mm in N
4	8771	7777
5	9114	7580
6	9139	7836
Average: m	9008	7731
Widened uncertainty: e	253	178
m-e	8755	7553
Weighting coefficient c	1	1.8
Result on 1 branch (m-e) / 2c	4377	2098

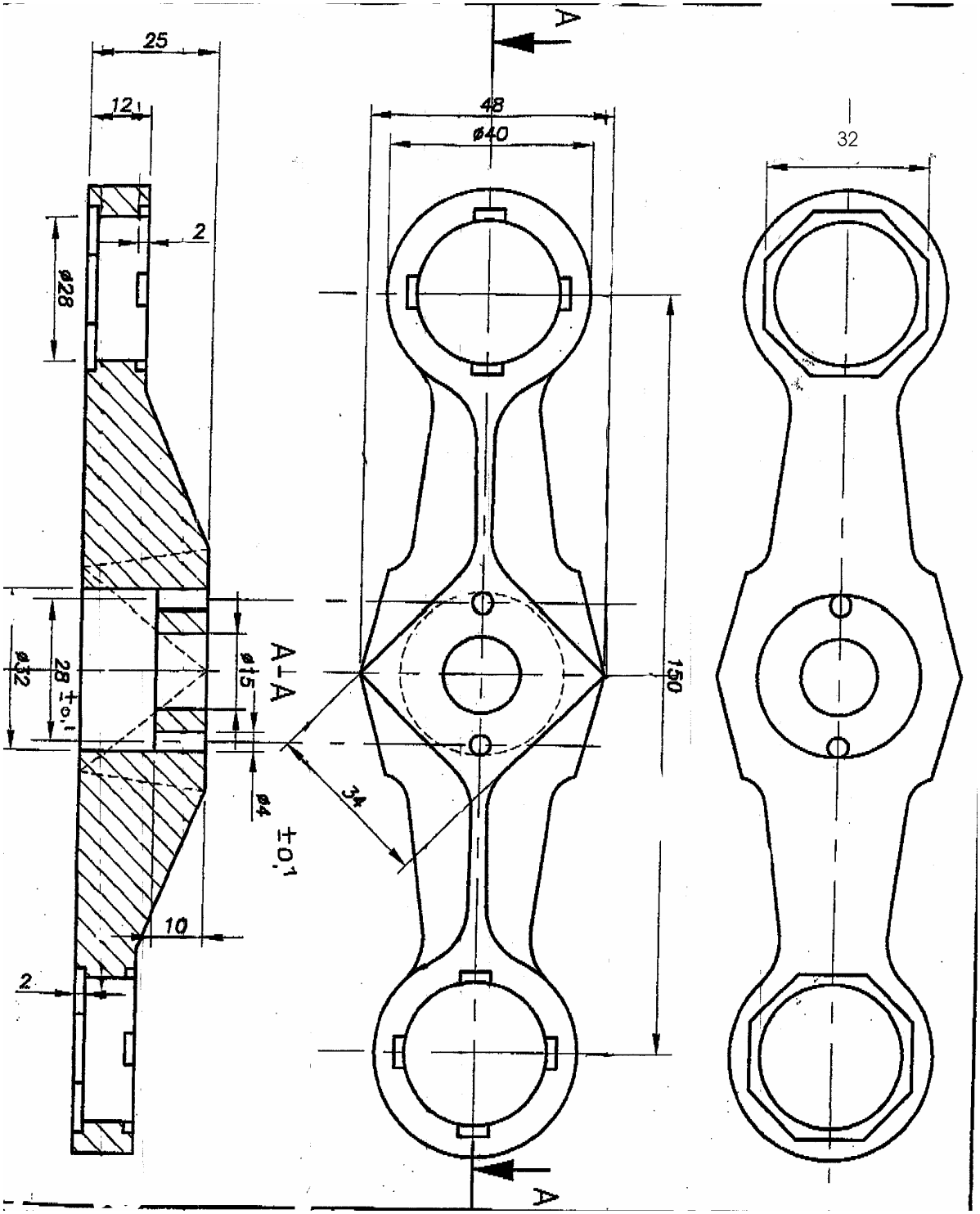
APPENDICES

A – Drawings of spiders

B – Photo of the test stands

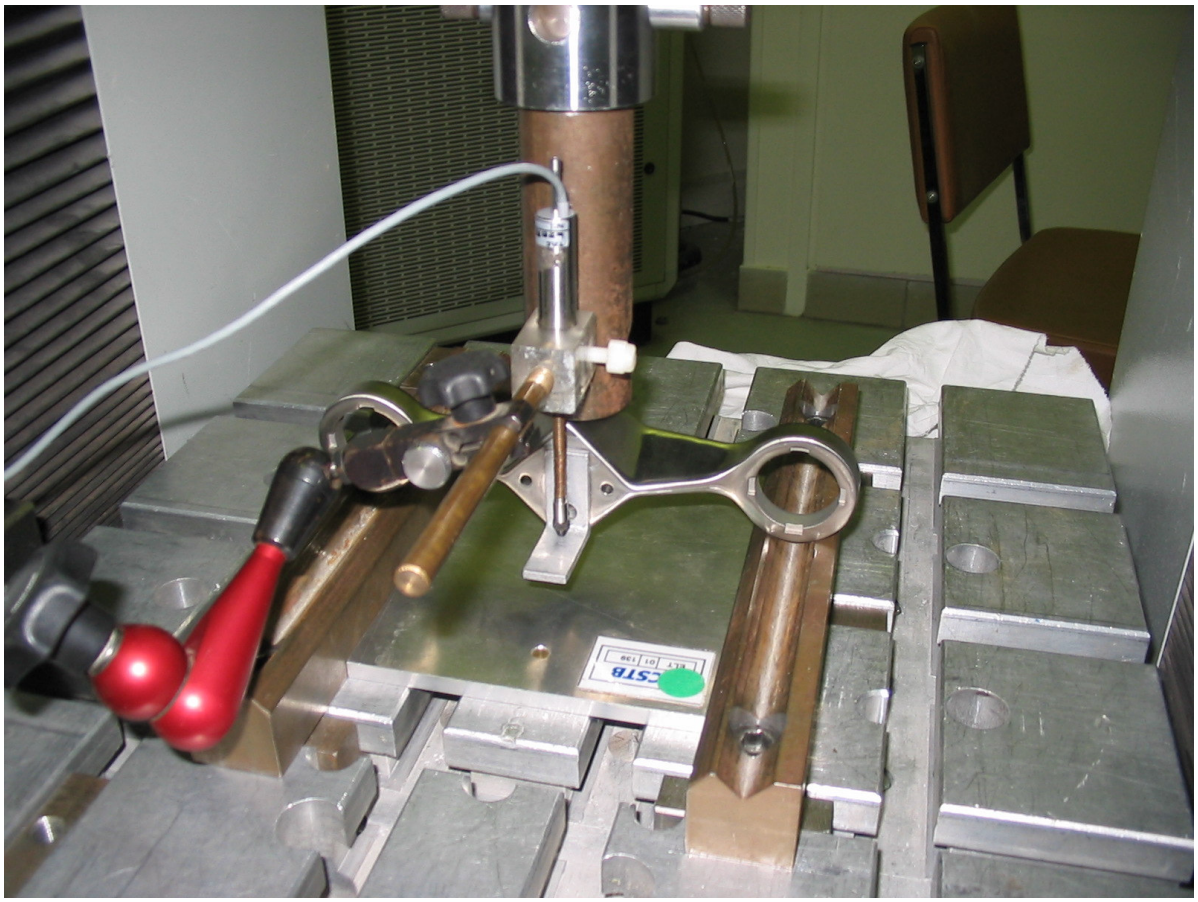
C – Detail of the data

APPENDIX A



S3001

APPENDIX B



Vertical loading apparatus, determination of the permissible strength under permanent vertical loads (static load), on a 2-branch spider

APPENDIX C

Ref. S3001- Test specimens no. 1, 2 and 3, under loads parallel to the glazing

Test n°	Deformation to F=1000N mm	Deformation à F=2000N mm	Deformation to F=3000N mm	Deformation to F=4000N mm	Deformation to F=5000N mm
1	0.007	0.09	0.18	0.28	0.38
2	0.167	0.17	0.23	0.28	0.35
3	0.110	0.18	0.27	0.37	0.46

Test n°	Deformation to F=6000N mm	Deformation to F=7000N mm	Deformation to F=1000N mm	Deformation to F=9000N mm	Deformation to F=10000N mm
1	0.47	0.54	0.62	0.70	0.80
2	0.43	0.50	0.60	0.69	0.80
3	0.55	0.65	0.75	0.86	0.97

Test n°	Maximum load N	Deformation to maximum load mm
1	13412	1.52
2	14572	2.17
3	14573	2.13

Ref. S3001 - Test specimens no. 4, 5 and 6 under perpendicular to the glazing

Test °	Deformation to F=1000N mm	Deformation to F=2000N mm	Deformation to F=3000N mm	Deformation to F=4000N mm	Deformation to F=5000N mm
4	0.17	0.37	0.56	0.76	0.96
5	0.19	0.38	0.57	0.77	0.98
6	0.19	0.40	0.62	0.83	1.05

Test n°	Deformation to F=6000N mm	Deformation to F=7000N mm	Deformation to F=1000N mm	Deformation to F=9000N mm	Deformation to F=10000N mm
4	1.19	1.44	1.74	2.09	2.56
5	1.20	1.45	1.73	2.06	2.51
6	1.30	1.60	1.98	2.45	3.06

Test n°	Maximum load N	Deformation to maximum load mm
4	10194	2.67
5	10639	2.90
6	10031	3.08

END OF REPORT