CSTB
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ENVELOPE AND COVERING

Lighweight Construction

TEST REPORT No. CL05-007*01-MOD

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

This report cancels et replaces the report CL05-007 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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REQUESTED BY: **SADEV**
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Z.I. de Vovray
74603 SEYNOD

SCOPE

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

REFERENCE TEXTES

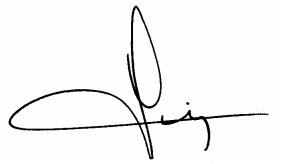
CSTB procedures, described in § 2 of the test procedures, accepted by the requester.

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 CL 1658

Made at Marne-la-Vallée, January 25, 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 4 branches

References of spider:

S3000 on-centre of fixing pieces 204 mm, of cast stainless steel: X2 Cr Ni Mo 17-12-2, 3 test specimens.

The drawings of the spider appear in Appendix A.

2. PROCEDURES FOR TESTS OF THE STRENGTH OF THE SPIDERS

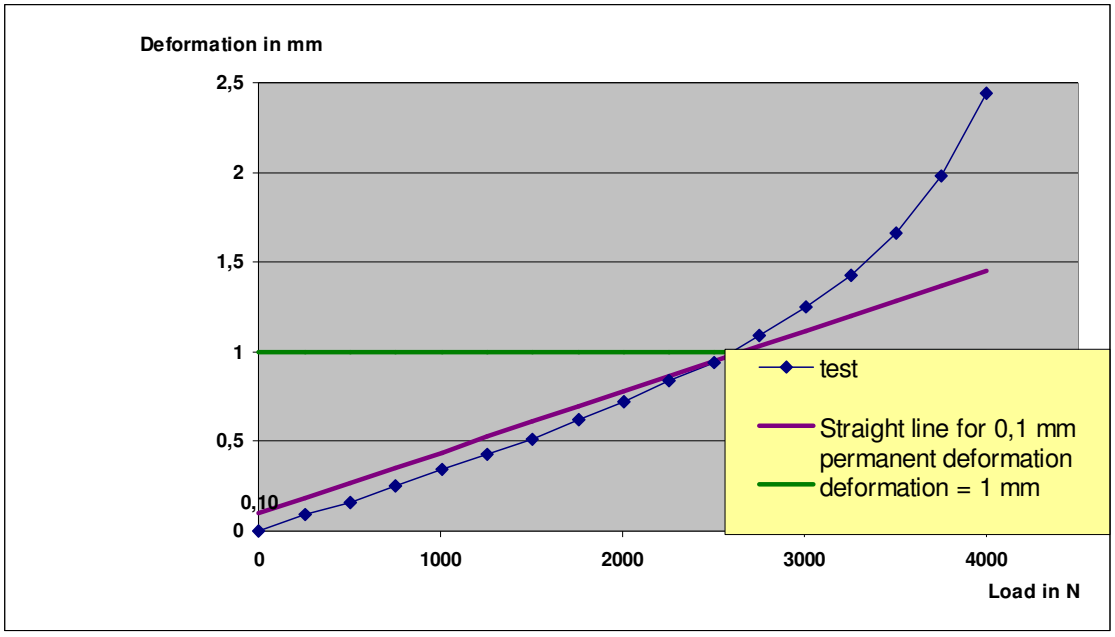
The tests were carried out on an MTS test stand, 10M type, equipped with a 50 kN tester with a test speed of 1mm/min.

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 next to the branch tested (case of loading parallel with the glazing plane) or in the perpendicular axis of the two branches tested (case of loading perpendicular to the glazing plane) so as to accurately measure the deformation (see Figure 1 and Appendix B).

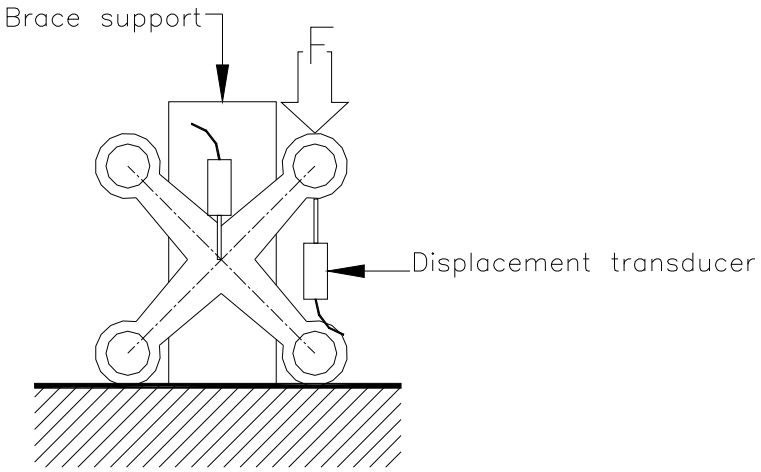


Figure 1a: Loading parallel(1) with the glazing plane on the sample positioned vertically

(1) A second displacement transducer is positioned at the axis of the spider in order to deduct the displacements of the axis from those of the branch tested.

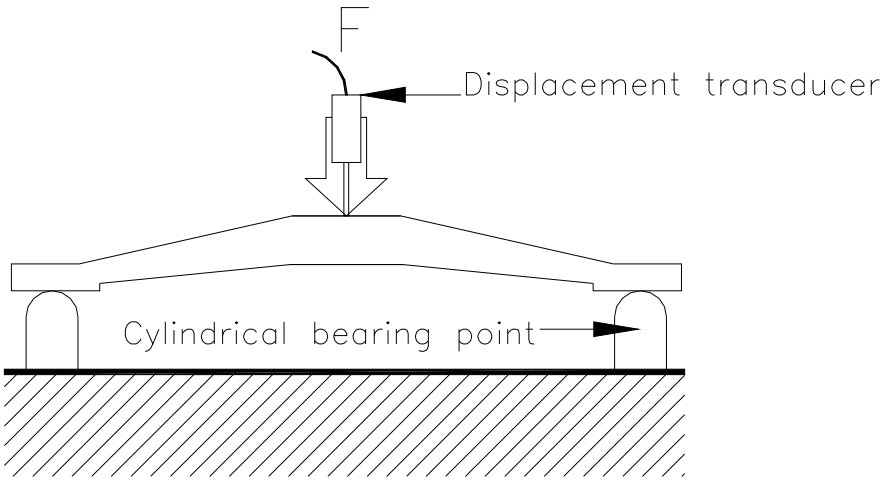
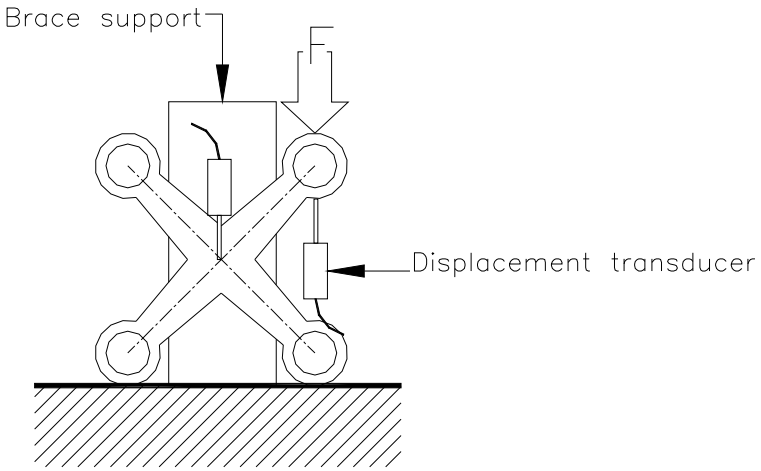


Figure 1 b: Load perpendicular(2) to the glazing plane on sample positioned horizontally

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

3. TEST RESULTS

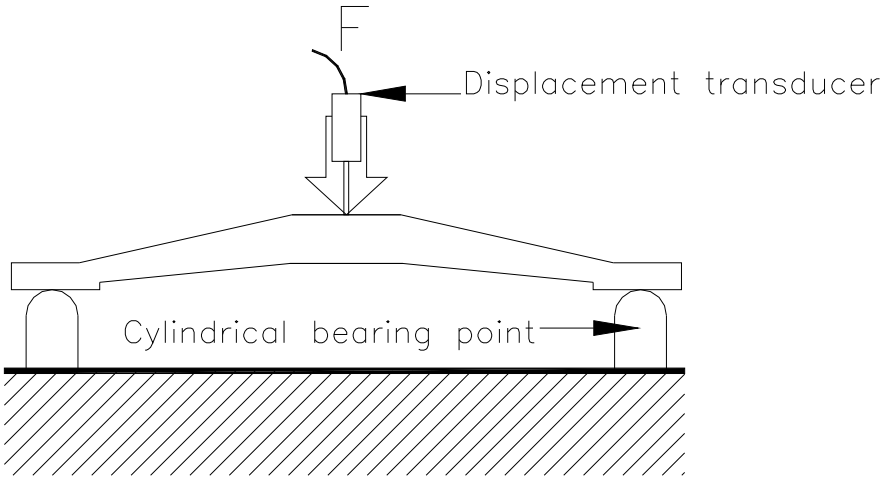
3.1 The strength under loads parallel to the glazing plane is given in the tables below. The details of the test results are in Appendix C.



S3000 – Parallel load on 1 branch

Test	F at 1mm in N	F at sres=0.1mm in N
1	4419	4424
2	4399	4553
3	4569	4030
Average: m	4462	4336
Widened uncertainty: e	117	351
m-e	4345	3985
Weighting coefficient c	1	1.35
(m-e) / c	4345	2952

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.



S3000 – Perpendicular load on 2 branch

Test	F at 1mm in N	F at sres=0.1mm in N
4	5169	6631
5	5084	6560
6	4803	6035
Average: m	5019	6409
Widened uncertainty: e	247	400
m-e	4772	6009
Weighting coefficient c	1	1.8
Result on 1 branch (m-e) / 2c	2386	1669

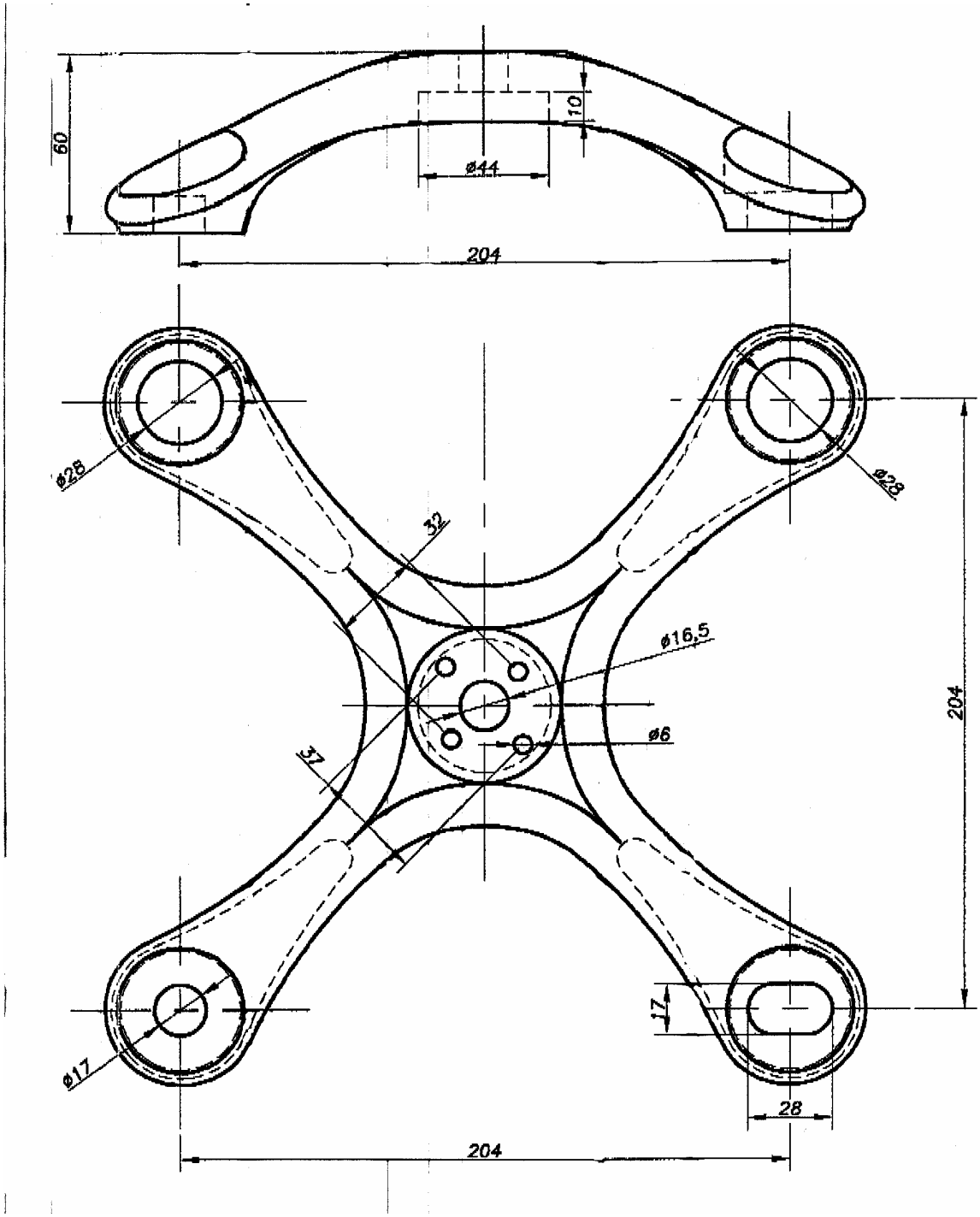
APPENDICES

A – Drawings of spiders

B – Photo of the test stands

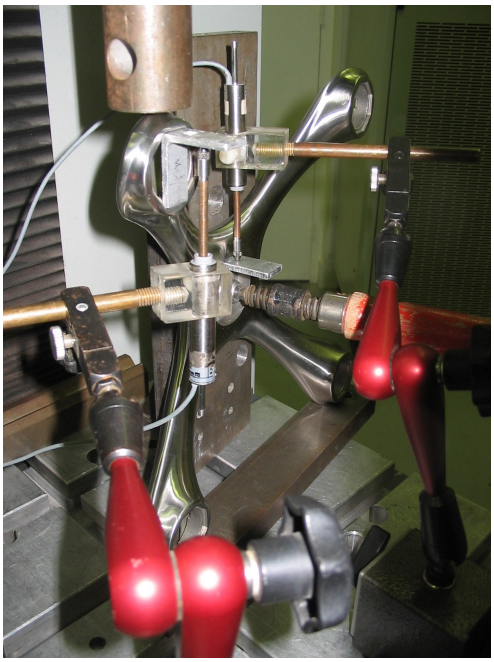
C – Detail of the data

APPENDIX A

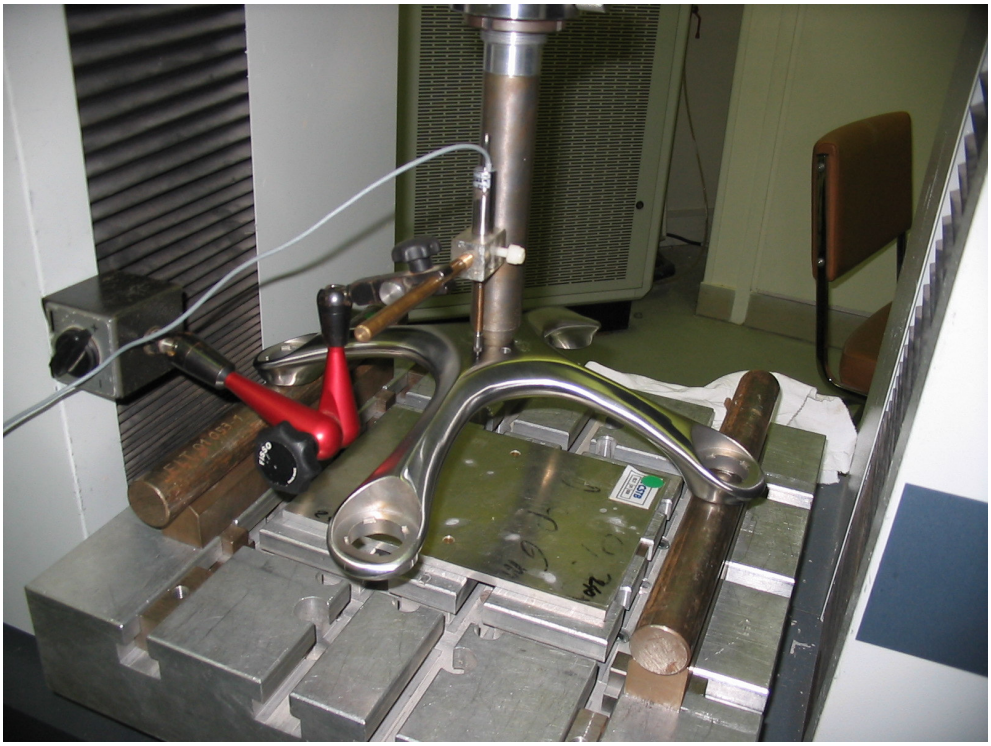


S3000

APPENDIX B



Vertical loading apparatus, determination of the permissible strength under permanent vertical loads (static load), on a 4-branch spider



Horizontal loading apparatus, determination of the permissible strength under instantaneous horizontal loads due to the wind on a 4-branch spider.

APPENDIX C

Ref. S3000- Test specimens no. 1, 2 and 3, under loads parallel to the glazing

Test n°	Deformation to F = 500 N mm	Deformation to F = 1 000 N mm	Deformation to F = 1 500 N mm	Deformation to F = 2 000 N mm	Deformation to F = 2 500 N mm
1	0.,09	0.20	0.30	0.41	0.51
2	0.10	0.20	0.31	0.42	0.53
3	0.,10	0.19	0.28	0.39	0.49

Test n°	Deformation to F = 3 000 N mm	Deformation to F = 3 500N mm	Deformation to F = 4 000 N mm	Deformation to F = 4 500 N mm	Deformation to F = 5 000 N mm
1	0.62	0.75	0.88	1.01	1.19
2	0.64	0.75	0..88	1.02	1.20
3	0.60	0.72	0.85	0.98	1.13

Test n°	Maximum load N	Defomation to maximum load mm
1	6 036	1.62
2	5 105	1.24
3	5 561	1.31

Ref. S3000- Test specimens no. 4, 5 and 6 under perpendicular to the glazing

Test n°	Deformation à F=1000N mm	Deformation to F=2000N mm	Deformation to F=3000N mm	Deformation to F=4000N mm	Deformation to F=5000N mm
4	0.173	0.37	0.56	0.76	0.96
5	0.194	0.38	0.57	0.77	0.98
6	0.187	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