



POLITECNICO
MILANO 1863

Laboratorio Prove Materiali - NB 1777 CPR

Notified Body 1777 - CPR

CERTIFICATE OF CONSTANCY OF PERFORMANCE
1777 - CPR - 21.03

In compliance with Regulation (EU) No. 305/2011 of the European Parliament and of the Council of 9 March 2011 (the Construction Products Regulation or CPR), this certificate applies to the construction product

Fluid Spring Damper

with trade name

DAHT PSD

velocity dependent device, to use in buildings and civil engineering works where requirements on individual devices are critical,

placed on the market under the name or trade mark of

DAHT SRL

C.da Alezza zona PIP – 74012 Crispiano (TA) – Italy

and produced in the manufacturing plant

DAHT SRL – C.da Alezza zona PIP – 74012 Crispiano (TA) – Italy.

This certificate attests that all provisions concerning the assessment and verification of constancy of performance described in Annex ZA of the standard

EN 15129:2009

under System 1 for the performance set out in this certificate are applied and that the factory production control conducted by the manufacturer is assessed to ensure the

constancy of performance of the construction product.

This certificate was first issued on 30 July 2021 and will remain valid as long as neither the harmonised standard, the construction product, the AVCP methods nor the manufacturing conditions in the plant are modified significantly, unless suspended or withdrawn by the notified product certification body.

The main characteristics of the product are reported in the Annex to this certificate.

Milan, 30 July 2021

Revision n. 0

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Head of Certification Body



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PRD N° 0317

**Annex to Certificate of Constancy of Performance
no. 1777 – CPR – 21.03**

Fluid Spring Dampers

with trade name

DAHT PSD

product families

DAHT PSD product families comprise fluid spring dampers devices that provide an axial force that depends on the imposed velocity and stroke and complies with the constitutive law declared by the manufacturer over a velocity range extending at least two decades down from the maximum design level. The devices are manufactured from ferrous materials and the active surface of the piston rod is hard chromium plated. The devices are classified as Velocity Dependent Devices, type Fluid Spring Dampers, in accordance with Table 1 of hEN 15129:2009.

DAHT PSD devices are presented in the product families described below.

DAHT PSD with viscous fluid A¹

Description of the product

DAHT PSD with viscous fluid A comprise fluid spring damper devices that provide an axial force that depends on the imposed velocity and stroke and complies with the constitutive law declared by the manufacturer over a velocity range extending at least two decades down from the maximum design level. The devices are manufactured from ferrous materials and the active surface of the piston rod is hard chromium plated. The devices are classified as Velocity Dependent Devices, type Fluid Spring Dampers, in accordance with Table 1 of hEN 15129:2009.

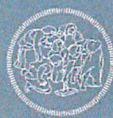
The active surfaces are in accordance with clause 7.2.3 of hEN 15129:2009.¹

The viscous fluid A is in accordance with clause 7.2.4 of hEN 15129:2009.¹

The temperature range is from -25° C to +50° C.

¹ appropriate documents reporting the identification characteristics of the fluid, active surfaces and outsourced manufacturing processes are deposited at the Notified Body involved in the attestation of constancy of performance procedure.

The intended use is in buildings and civil engineering works.



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Performance characteristics

DAHT PSD with viscous fluid A meets the following requirements in accordance to hEN 15129:2009:

- pressure test, clause 7.4.2.2
- low velocity test, clause 7.4.2.4
- constitutive law test, clause 7.4.2.6
- damping efficiency test, clause 7.4.2.7
- stroke verification test, clause 7.4.2.10

The product is not intended to accommodate thermal movements.

The product is not intended to accommodate wind-induced movements.

Type, identification and use

DAHT PSD with viscous fluid A product types are evaluated on the basis of the results reported below

DAHT PSD 127 (preload 70 kN) ±45 mm			
<i>Preload 70 kN - Load capacity ±127 kN - Maximum stroke ±45 mm</i>			
Essential characteristics	Performances		
Axial load transmission capability	Conforming		
Durability aspects	Conforming		
	<i>Parameter</i>	<i>Design value</i>	<i>Unit</i>
Resistance to seismic loads/shock absorption (Survivability against repeated load cycling)	Axial force F_d	127	kN
	Maximum velocity V_d	400	mm/s
	Seismic displacement d_{bd}	±40	mm
	Constitutive law parameter C	13.7	kN(mm/s) ^α
	Constitutive law parameter α	0.1	=
	Preload F_0	70	kN
Lateral flexibility	Stiffness K	0.8	kN/mm
Rotation capability	=	±0.052	Rad



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	Parameter	Design value	Unit
Energy dissipation capability	EDC	1.9	kJ
	Damping efficiency frequency f_0	1.59	Hz
	Damping efficiency amplitude d_0	40	Mm
Stroke	Maximum displacement d_{max}	± 45	mm
==	Minimum service temperature T_l	-25	° C
	Maximum service temperature T_u	+50	° C

According to Test Report no. 2021/1638

DAHT PSD 1180 (preload 500 kN) ± 95 mm			
<i>Preload 500 kN - Load capacity ± 1180 kN - Maximum stroke ± 95 mm</i>			
Essential characteristics	Performances		
Axial load transmission capability	Conforming		
Durability aspects	Conforming		
	Parameter	Design value	Unit
Resistance to seismic loads/shock absorption (Survivability against repeated load cycling)	Axial force F_d	1179	kN
	Maximum velocity V_d	210	mm/s
	Seismic displacement d_{bd}	± 60	mm
	Constitutive law parameter C	161	kN(mm/s) ⁰
	Constitutive law parameter α	0.2	==
	Preload F_0	500	kN
Lateral flexibility	Stiffness K	3.5	kN/mm
Rotation capability	==	± 0.07	Rad

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	Parameter	Design value	Unit
Energy dissipation capability	EDC	43.2	kJ
	Damping efficiency frequency f_0	0.557	Hz
	Damping efficiency amplitude d_0	± 30	Mm
Stroke	Maximum displacement d_{max}	± 95	mm
==	Minimum service temperature T_l	-25	° C
	Maximum service temperature T_u	+50	° C

According to Test Report no. 2022/1930

DAHT PSD 2760 (preload 1750 kN) ± 90 mm			
Preload 1750 kN - Load capacity ± 2760 kN - Maximum stroke ± 90 mm			
Essential characteristics	Performances		
Axial load transmission capability	Conforming		
Durability aspects	Conforming		
	Parameter	Design value	Unit
Resistance to seismic loads/shock absorption (Survivability against repeated load cycling)	Axial force F_d	2760	kN
	Maximum velocity V_d	500	mm/s
	Seismic displacement d_{bd}	± 70	mm
	Constitutive law parameter C	150	kN/(mm/s) °
	Constitutive law parameter α	0.2	==
	Preload F_0	1750	kN
Lateral flexibility	Stiffness K	7	kN/mm
Rotation capability	==	± 0.035	Rad

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	Parameter	Design value	Unit
Energy dissipation capability	EDC	128.8	kJ
	Damping efficiency frequency f_0	0.8526	Hz
	Damping efficiency amplitude d_0	± 70	Mm
Stroke	Maximum displacement d_{\max}	± 90	mm
==	Minimum service temperature T_L	-25	° C
	Maximum service temperature T_U	+50	° C

According to Test Report no. 2023/1405

DAHT PSD 3420 (preload 1220 kN) ± 95 mm			
Preload 1220 kN - Load capacity ± 3420 kN - Maximum stroke ± 95 mm			
Essential characteristics	Performances		
Axial load transmission capability	Conforming		
Durability aspects	Conforming		
	Parameter	Design value	Unit
Resistance to seismic loads/shock absorption (Survivability against repeated load cycling)	Axial force F_d	3420	kN
	Maximum velocity V_d	300	mm/s
	Seismic displacement d_{bd}	± 70	mm
	Constitutive law parameter C	390	kN(mm/s) ^a
	Constitutive law parameter α	0.2	==
	Preload F_0	1220	kN
Lateral flexibility	Stiffness K	14	kN/mm
Rotation capability	==	± 0.052	Rad

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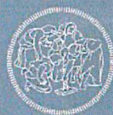


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	Parameter	Design value	Unit
Energy dissipation capability	EDC	128.3	kJ
	Damping efficiency frequency f_0	0.6821	Hz
	Damping efficiency amplitude d_0	± 35	Mm
Stroke	Maximum displacement d_{\max}	± 95	mm
==	Minimum service temperature T_l	-25	° C
	Maximum service temperature T_u	+50	° C

According to Test Report no. 2022/1931

DAHT PSD 8500 (preload 4000 kN) ± 75 mm			
Preload 4000 kN - Load capacity ± 8500 kN - Maximum stroke ± 75 mm			
Essential characteristics	Performances		
Axial load transmission capability	Conforming		
Durability aspects	Conforming		
	Parameter	Design value	Unit
Resistance to seismic loads/shock absorption (Survivability against repeated load cycling)	Axial force F_d	8500	kN
	Maximum velocity V_d	400	mm/s
	Seismic displacement d_{bd}	± 75	mm
	Constitutive law parameter C	1442	kN(mm/s) ^a
	Constitutive law parameter α	0.1	==
	Preload F_0	4000	kN
Lateral flexibility	Stiffness K	25	kN/mm
Rotation capability	==	± 0.052	Rad



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	<i>Parameter</i>	<i>Design value</i>	<i>Unit</i>
Energy dissipation capability	EDC	300	kJ
	Damping efficiency frequency f_0	0.847	Hz
	Damping efficiency amplitude d_0	± 50	Mm
Stroke	Maximum displacement d_{max}	± 75	mm
==	Minimum service temperature T_l	-25	° C
	Maximum service temperature T_u	+50	° C

According to Test Report no. 2021/1639

DAHT PSD with viscous fluid A types and sizes covered by the present Certificate of Constancy of Performance are manufactured in accordance with the same design and with the same parametric technical solutions.

The used materials are the same for all types and sizes.

The dimensions of the products covered by the present Certificate of Constancy of Performance can vary in the dimensional range defined below in accordance with clause 7.4.2.1 of hEN 15129.

<i>Load Capacity</i>	<i>Maximum velocity</i>	<i>Test Report</i>
102 to 152 kN	up to 400 mm/s	2021/1638
943 to 1415 kN	up to 210 mm/s	2022/1930
2208 to 3312 kN	up to 500 mm/s	2023/1405
2736 to 4104 kN	up to 300 mm/s	2022/1931
6800 to 10200 kN	up to 400 mm/s	2021/1639



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DAHT PSD with viscous fluid B²

Description of the product

DAHT PSD with viscous fluid B comprise fluid spring damper devices that provide an axial force that depends on the imposed velocity and stroke and complies with the constitutive law declared by the manufacturer over a velocity range extending at least two decades down from the maximum design level. The devices are manufactured from ferrous materials and the active surface of the piston rod is hard chromium plated. The devices are classified as Velocity Dependent Devices, type Fluid Spring Dampers, in accordance with Table 1 of hEN 15129:2009.

The active surfaces are in accordance with clause 7.2.3 of hEN 15129:2009.²

The viscous fluid B is in accordance with clause 7.2.4 of hEN 15129:2009.²

The temperature range is from -25° C to +50° C.

² appropriate documents reporting the identification characteristics of the fluid, active surfaces and outsourced manufacturing processes are deposited at the Notified Body involved in the attestation of constancy of performance procedure.

The intended use is in buildings and civil engineering works.

Performance characteristics

DAHT PSD with viscous fluid B devices meets the following requirements in accordance to hEN 15129:2009:

- pressure test, clause 7.4.2.2
- low velocity test, clause 7.4.2.4
- constitutive law test, clause 7.4.2.6
- damping efficiency test, clause 7.4.2.7
- stroke verification test, clause 7.4.2.10

The product is not intended to accommodate thermal movements.

The product is not intended to accommodate wind-induced movements.

Type, identification and use

DAHT PSD with viscous fluid B product types are evaluated on the basis of the results reported below.



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DAHT PSD 11 (preload 1 kN) ±25 mm			
<i>Preload 1 kN - Load capacity ±11 kN - Maximum stroke ±25 mm</i>			
Essential characteristics	Performances		
Axial load transmission capability	Conforming		
Durability aspects	Conforming		
	<i>Parameter</i>	<i>Design value</i>	<i>Unit</i>
Resistance to seismic loads/shock absorption (Survivability against repeated load cycling)	Axial force F_d	11	kN
	Maximum velocity V_d	100	mm/s
	Seismic displacement* d_{bd}	±20	mm
	Constitutive law parameter C	0.052	kN(mm/s) ^a
	Constitutive law parameter α	1.0	==
	Preload F_0	1	kN
Lateral flexibility	Stiffness K	0.24	kN/mm
Rotation capability	==	±0.052	Rad
Energy dissipation capability	EDC	150	J
	Damping efficiency frequency f_0	0.796	Hz
	Damping efficiency amplitude d_0	±20	Mm
Stroke	Maximum displacement d_{max}	±25	mm
==	Minimum service temperature T_l	-25	° C
	Maximum service temperature T_u	+50	° C

According to Test Report no. 2021/3124



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DAHT PSD with viscous fluid B types and sizes covered by the present Certificate of Constancy of Performance are manufactured in accordance with the same design and with the same parametric technical solutions.

The used materials are the same for all types and sizes.

The dimensions of the products covered by the by the present Certificate of Constancy of Performance can vary in the dimensional range defined below in accordance with clause 5.3.4.1 of hEN 15129.

<i>Load Capacity</i>	<i>Maximum Velocity</i>	<i>Test Report</i>
8.8 to 13.2 kN	Up to 100 mm/s	2021/3124

Milan, 15 May 2023

Prof. Ing. Carlo Poggi
Head of Certification Body

Firmato digitalmente
da: CARLO POGGI
Organizzazione:
POLITECNICO DI
MILANO/80057930150

**The present Annex is only valid together with the
Certificate of Constancy of Performance no. 1777 – CPR – 21.03
rev.0 dated 30 July 2021.**

**The present Annex cancels and replaces the previous Annex rev. 2
dated 30 November 2022.**