



**POLITECNICO**  
MILANO 1863

Laboratorio Prove Materiali - NB 1777 CPR

**Notified Body 1777 - CPR**

**CERTIFICATE OF CONSTANCY OF PERFORMANCE**  
**1777 - CPR - 21.02**

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 Viscous Damper**

with trade name

**DAHT FVD**

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 8 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product, the AVCP methods nor the manufacturing conditions in the plant are modified significantly, unless suspended or withdrawn by the notified product certification body.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, 8 July 2021

Revision n. 0

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Prof. Ing. Carlo Poggi  
Head of Certification Body



**POLITECNICO**  
MILANO 1863

Laboratorio Prove Materiali - NB 1777 CPR



PRD N° 0317

**Annex to Certificate of Constancy of Performance  
no. 1777 – CPR – 21.02**

**Fluid Viscous Dampers**

with trade name

**DAHT FVD**

**product families**

DAHT FVD product families comprise fluid viscous dampers devices that provide an axial force in either tension or compression that depends on the imposed velocity only 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, type Fluid Viscous Dampers, in accordance with Table 1 of hEN 15129:2009.

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

**DAHT FVD with viscous fluid A<sup>1</sup> and accumulator**

Description of the product

DAHT FVD with viscous fluid A and accumulator devices comprise fluid viscous dampers that provide an axial force in either tension or compression that depends on the imposed velocity only and comply 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, type Fluid Viscous Dampers, in accordance with Table 1 of hEN 15129:2009.

The device is equipped with a hydraulic accumulator.

The active surfaces are in accordance with clause 7.2.3 of hEN 15129:2009.<sup>1</sup>

The viscous fluid A is in accordance with clause 7.2.4 of hEN 15129:2009.<sup>1</sup>

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

The intended use is in buildings and civil engineering works.

<sup>1</sup> 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.





**POLITECNICO**  
MILANO 1863

Laboratorio Prove Materiali - NB 1777 CPR



PRD N° 0317

#### Performance characteristics

DAHT FVD with viscous fluid A and accumulator devices meet the following requirements in accordance with hEN 15129:2009:

- pressure test, clause 7.4.2.2
- low velocity test, clause 7.4.2.3
- constitutive law test, clause 7.4.2.5
- damping efficiency test, clause 7.4.2.7
- wind load cycle test, clause 7.4.2.8
- seal wear test, clause 7.4.2.9
- stroke verification test, clause 7.4.2.10

#### Type, identification and use

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

DAHT FVD 250±50			
Load capacity ±250 kN		Maximum stroke ±50 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 $F_d$	250	kN
	Maximum velocity $V_d$	400	mm/s
	Seismic displacement* $d_{bd}$	±45	mm
	Constitutive law parameter C	101.8	kN (m/s) <sup>-α</sup>
	Constitutive law parameter α	0.15	==
	Wind load frequency $f_w$	1.59	Hz
	Wind load amplitude $d_w$	±5	mm
Rotation capability	==	±0.052	rad
Energy dissipation capability	EDC	43.14	kJ
	Damping efficiency frequency $f_0$	1.414	Hz
	Damping efficiency amplitude $d_0$	±45	mm
Stroke	Thermal displacement $d_{th}$	±10	mm
	Maximum displacement $d_{max}$	±50	mm
==	Minimum service temperature $T_L$	-25	° C
	Maximum service temperature $T_U$	+50	° C

According to Test Report no. 2021/1405.



**POLITECNICO**  
MILANO 1863

Laboratorio Prove Materiali - NB 1777 CPR



PRD N° 0317

DAHT FVD 3000±385			
Load capacity ±3000 kN		Maximum stroke ±385 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 <sub>d</sub>	3000	kN
	Maximum velocity V <sub>d</sub>	400	mm/s
	Seismic displacement d <sub>bd</sub>	±125	mm
	Constitutive law parameter C	1648	kN (m/s) <sup>-α</sup>
	Constitutive law parameter α	0.1	==
	Wind load frequency f <sub>w</sub>	1.59	Hz
	Wind load amplitude d <sub>w</sub>	±5	mm
Rotation capability	==	±0.052	rad
Energy dissipation capability	EDC	1435	kJ
	Damping efficiency frequency f <sub>0</sub>	0.509	Hz
	Damping efficiency amplitude d <sub>0</sub>	±125	mm
Stroke	Thermal displacement d <sub>th</sub>	±50	mm
	Maximum displacement d <sub>max</sub>	±385	mm
==	Minimum service temperature T <sub>L</sub>	-25	° C
	Maximum service temperature T <sub>U</sub>	+50	° C

According to Test Report no. 2021/1406 .





**POLITECNICO**  
MILANO 1863

Laboratorio Prove Materiali - NB 1777 CPR



PRD N° 0317

DAHT FVD with viscous fluid A and accumulator 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 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 7.2.4.1 of hEN 15129.

<i>Load Capacity</i>	<i>Maximum velocity</i>	<i>Test Report</i>
200 to 300 kN	up to 400 mm/s	2021/1405
2400 to 3600 kN	up to 400 mm/s	2021/1406

### **DAHT FVD with viscous fluid B<sup>1</sup> without accumulator**

#### Description of the product

DAHT FVD with viscous fluid B without accumulator devices comprise fluid viscous dampers that provide an axial force in either tension or compression that depends on the imposed velocity only and comply 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, type Fluid Viscous 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.<sup>1</sup>

The viscous fluid B is in accordance with clause 7.2.4 of hEN 15129:2009.<sup>1</sup>

The temperature range is from -20° C to +40° C.

The intended use is in buildings and civil engineering works.

<sup>1</sup> 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.

#### Performance characteristics

DAHT FVD with viscous fluid B without accumulator devices meet the following requirements in accordance with hEN 15129:2009:

- pressure test, clause 7.4.2.2
- low velocity test, clause 7.4.2.3
- constitutive law test, clause 7.4.2.5
- damping efficiency test, clause 7.4.2.7
- wind load cycle test, clause 7.4.2.8
- seal wear test, clause 7.4.2.9
- stroke verification test, clause 7.4.2.10



**POLITECNICO**  
MILANO 1863

Laboratorio Prove Materiali - NB 1777 CPR



PRD N° 0317

#### Type, identification and use

DAHT FVD with viscous fluid B without accumulator product types are evaluated on the basis of the results reported below

DAHT FVD 1260±250			
Load capacity ±1260 kN		Maximum stroke ±250 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 <sub>d</sub>	1260	kN
	Maximum velocity V <sub>d</sub>	900	mm/s
	Seismic displacement d <sub>bd</sub>	±150	mm
	Constitutive law parameter C	323	kN (m/s) <sup>-α</sup>
	Constitutive law parameter α	0.2	==
	Wind load frequency f <sub>w</sub>	0.25	Hz
	Wind load amplitude d <sub>w</sub>	±10	mm
Rotation capability	==	±0.035	rad
Energy dissipation capability	EDC	673.34	kJ
	Damping efficiency frequency f <sub>0</sub>	0.7162	Hz
	Damping efficiency amplitude d <sub>0</sub>	±150	mm
Stroke	Thermal displacement d <sub>th</sub>	±25	mm
	Maximum displacement d <sub>max</sub>	±250	mm
==	Minimum service temperature T <sub>L</sub>	-20	° C
	Maximum service temperature T <sub>U</sub>	+40	° C

According to Test Report no. 2023/0234 .





**POLITECNICO**  
MILANO 1863

Laboratorio Prove Materiali - NB 1777 CPR



PRD N° 0317

DAHT FVD 180±85			
Load capacity ±180 kN		Maximum stroke ±85 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 <sub>d</sub>	180	kN
	Maximum velocity V <sub>d</sub>	750	mm/s
	Seismic displacement d <sub>bd</sub>	±60	mm
	Constitutive law parameter C	48	kN (m/s) <sup>-α</sup>
	Constitutive law parameter α	0.2	==
	Wind load frequency f <sub>w</sub>	0.25	Hz
	Wind load amplitude d <sub>w</sub>	±10	mm
Rotation capability	==	±0.035	rad
Energy dissipation capability	EDC	38.48	kJ
	Damping efficiency frequency f <sub>0</sub>	1.492	Hz
	Damping efficiency amplitude d <sub>0</sub>	±60	mm
Stroke	Thermal displacement d <sub>th</sub>	±25	mm
	Maximum displacement d <sub>max</sub>	±85	mm
==	Minimum service temperature T <sub>L</sub>	-20	° C
	Maximum service temperature T <sub>U</sub>	+40	° C

According to Test Report no. 2023/0235 .

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**POLITECNICO**  
MILANO 1863

Laboratorio Prove Materiali - NB 1777 CPR



PRD N° 0317

DAHT FVD 670±76			
Load capacity ±670 kN		Maximum stroke ±76 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 Fd	670	kN
	Maximum velocity Vd	500	mm/s
	Seismic displacement dbd	±50	mm
	Constitutive law parameter C	360	kN (m/s) <sup>-α</sup>
	Constitutive law parameter α	0.10	==
	Wind load frequency fw	0.25	Hz
	Wind load amplitude dw	±2	mm
Rotation capability	==	±0.035	rad
Energy dissipation capability	EDC	130.0	kJ
	Damping efficiency frequency f0	1.59	Hz
	Damping efficiency amplitude d0	±50	mm
Stroke	Thermal displacement dth	±25	mm
	Maximum displacement dmax	±76	mm
==	Minimum service temperature TL	-20	° C
	Maximum service temperature TU	+40	° C

According to Test Report no. 2023/2928 .

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Certificate of Constancy of Performance no. 1777 – CPR – 21.02 rev. 0

Annex rev. 4 of 19 January 2024

Page 7 of 12





**POLITECNICO**  
MILANO 1863

Laboratorio Prove Materiali - NB 1777 CPR



PRD N° 0317

DAHT FVD 280±120			
Load capacity ±280 kN		Maximum stroke ±120 mm	
Essential characteristics	Performances		
Axial load transmission capability	Conforming		
Durability aspects	Conforming		
	Parameter	Design value	Unit
Resisance to seismic loads/shock absorption (Survivability against repeated load cycling)	Axial force Fd	±280	kN
	Maximum velocity Vd	500	mm/s
	Seismic displacement dbd	±30	mm
	Constitutive law parameter C	110	kN (m/s) <sup>-α</sup>
	Constitutive law parameter α	0.15	==
	Wind load frequency fw	0.25	Hz
	Wind load amplitude dw	±3	mm
Rotation capability	==	0.035	rad
Energy dissipation capability	EDC	32	kJ
	Damping efficiency frequency f0	2.65	Hz
	Damping efficiency amplitude d0	±30	mm
Stroke	Thermal displacement dth	±25	mm
	Maximum displacement dmax	±120	mm
==	Minimum service temperature TL	-20	° C
	Maximum service temperature TU	40	° C

According to Test Report no. 2023/3477 .

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Certificate of Constancy of Performance no. 1777 – CPR – 21.02 rev. 0

Annex rev. 4 of 19 January 2024

Page 8 of 12



**POLITECNICO**  
MILANO 1863

Laboratorio Prove Materiali - NB 1777 CPR



PRD N° 0317

DAHT FVD with viscous fluid B without accumulator 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 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 7.2.4.1 of hEN 15129.

<i>Load Capacity</i>	<i>Maximum velocity</i>	<i>Test Report</i>
144 to 216 kN	up to 750 mm/s	2023/0235
1008 to 1512 kN	up to 900 mm/s	2023/0234
536 to 804 kN	up to 500 mm/s	2023/2928
96 to 144 kN	up to 500 mm/s	2023/3477

### **DAHT FVD with viscous fluid C<sup>1</sup> without accumulator**

#### Description of the product

DAHT FVD with viscous fluid C without accumulator devices comprise fluid viscous dampers that provide an axial force in either tension or compression that depends on the imposed velocity only and comply 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, type Fluid Viscous 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.<sup>1</sup>

The viscous fluid C is in accordance with clause 7.2.4 of hEN 15129:2009.<sup>1</sup>

The temperature range is from +18° C to +28° C.

The intended use is in buildings and civil engineering works.

<sup>1</sup> 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.

#### Performance characteristics

DAHT FVD with viscous fluid C without accumulator devices meet the following requirements in accordance with hEN 15129:2009:

- pressure test, clause 7.4.2.2
- low velocity test, clause 7.4.2.3
- constitutive law test, clause 7.4.2.5
- damping efficiency test, clause 7.4.2.7
- wind load cycle test, clause 7.4.2.8
- seal wear test, clause 7.4.2.9
- stroke verification test, clause 7.4.2.10





**POLITECNICO**  
MILANO 1863

Laboratorio Prove Materiali - NB 1777 CPR



PRD N° 0317

#### Type, identification and use

DAHT FVD with viscous fluid C without accumulator product types are evaluated on the basis of the results reported below

DAHT FVD 600±100			
Load capacity ±600 kN		Maximum stroke ±100 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 <sub>d</sub>	600	kN
	Maximum velocity V <sub>d</sub>	200	mm/s
	Seismic displacement d <sub>bd</sub>	±40	mm
	Constitutive law parameter C	460	kN (m/s) <sup>-α</sup>
	Constitutive law parameter α	0.05	==
	Wind load frequency f <sub>w</sub>	0.955	Hz
	Wind load amplitude d <sub>w</sub>	±5	mm
Rotation capability	==	±0.035	rad
Energy dissipation capability	EDC	84.5	kJ
	Damping efficiency frequency f <sub>0</sub>	0.43	Hz
	Damping efficiency amplitude d <sub>0</sub>	±37	mm
Stroke	Thermal displacement d <sub>th</sub>	±50	mm
	Maximum displacement d <sub>max</sub>	±100	mm
==	Minimum service temperature T <sub>L</sub>	18	° C
	Maximum service temperature T <sub>U</sub>	28	° C

According to Test Report no. 2023/2706.



**POLITECNICO**  
MILANO 1863

Laboratorio Prove Materiali - NB 1777 CPR



PRD N° 0317

DAHT FVD 483±58			
Load capacity ±483 kN		Maximum stroke ±58mm	
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 $F_d$	483	kN
	Maximum velocity $V_d$	200	mm/s
	Seismic displacement $d_{bd}$	±30	mm
	Constitutive law parameter C	68	kN (m/s) <sup>-α</sup>
	Constitutive law parameter α	0.37	==
	Wind load frequency $f_w$	1.592	Hz
	Wind load amplitude $d_w$	±3	mm
Rotation capability	==	0.035	rad
Energy dissipation capability	EDC	39.1	kJ
	Damping efficiency frequency $f_0$	0.531	Hz
	Damping efficiency amplitude $d_0$	±29	mm
Stroke	Thermal displacement $d_{th}$	±25	mm
	Maximum displacement $d_{max}$	±58	mm
==	Minimum service temperature $T_L$	-25°C	° C
	Maximum service temperature $T_U$	+40°C	° C

According to Test Report no. 2023/3379.





**POLITECNICO**  
MILANO 1863

Laboratorio Prove Materiali - NB 1777 CPR



PRD N° 0317

DAHT FVD with viscous fluid C without accumulator 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 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 7.2.4.1 of hEN 15129.

<i>Load Capacity</i>	<i>Maximum velocity</i>	<i>Test Report</i>
480 to 720 kN	up to 200 mm/s	2023/2706
386.4 to 579.6 kN	up to 200 mm/s	2023/3379

Milan, 19 January 2024

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 – 21.02  
rev.0 dated 8 July 2021**

**The present Annex cancels and replaces the previous Annex rev. 3  
dated 18 December 2023**

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Certificate of Constancy of Performance no. 1777 – CPR – 21.02 rev. 0  
Annex rev. 4 of 19 January 2024  
Page 12 of 12