PAVUS, a.s.
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EGOLF MEMBER

L 1026

Order No: 1 08 236
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(En translation Z210230176)

FIRE TESTING LABORATORY VESELÍ NAD LUŽNICÍ

Testing laboratory accredited by Český institut pro akreditaci, o. p. s.
registration number 1026

FIRE RESISTANCE TEST REPORT

No. Pr-08-2.114-En

issued on 2008-11-10

for product

Suspension system KOŇAŘÍK for suspension of pipes, air conditioning system and cable trays

Test sponsor: **KOŇAŘÍK, závěsová technika**
CTPark Ostrava
Podnikatelská 877
720 00 Ostrava - Hrabová
Czech republic

Test method:

ČSN EN 1363-1
» Fire resistance tests for loadbearing elements -
- Part 1: General requirements «

Test Report includes: 36 pages
(6 pages of text + 4 Annexes)

Number of copies: 2
Copy No.: **1**

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7. assembly 20080126 f – bracket 41/62 x 1,000, test load of 30 kg divided into 6 loads
8. assembly 20080126 h – bracket 41/41 x 600 with strut, test load of 30 kg divided into 2 loads in 1/3 + 2/3 of the bracket length
9. assembly 20080126 f – bracket 41/41 x 300, test load of 20 kg divided into 4 loads
10. assembly 20080126 e – bracket made of bent metal sheets 200 x 200, test load of 20 kg divided into 2 loads in 1/3 + 2/3 of the bracket length
11. assembly 20080126 f – bracket 41/41 x 600, test load of 10 kg divided into 2 loads in 1/3 + 2/3 of the bracket length
12. assembly 20080126 f – bracket 38/40 x 700, test load of 10 kg divided into 2 loads in 1/3 + 2/3 of the bracket length
13. assembly 20080126 j – bracket 38/40 x 2,000 suspended on a pair of M10 rods, test load of 25 kg divided into 5 loads
14. assembly 20080127 s – pipe sleeve on M12 suspension, test load 20 kg
15. assembly 20080126 c – beam ST P 41/62 x 1,000 suspended on a pair of M12 rods, test load of 50 kg divided into 10 loads
16. assembly 20080126 a – beam ST P 41/41 x 500 suspended on a pair of ST P 41/41 profiles, test load of 20 kg divided into 4 loads
17. assembly 20080126 b – beam 28/30 x 500 suspended on a pair of 28/30 profiles, test load of 12 kg divided into 2 loads
18. assembly 20080127 o – bracket 28/30 x 1,000 suspended using a pair of clamps on the IPE profile, test load of 20 kg divided into 4 loads
19. assembly 20080126 k – bracket 27/18 x 1,000 suspended on a pair of M8 rods, test load of 5 kg divided into 2 loads
20. assembly 20080126 d – beam ST P 41/21 x 1,000 suspended on a pair of M10 rods, test load of 10 kg divided into 2 loads
21. assembly 20080127 l – bracket 28/30 x 1,000 suspended on a pair of M8 rods and a trapezoidal suspension, test load of 5 kg divided into 2 loads
22. assembly 20080127 n – bracket 41/41 x 1,000 suspended using clamshell suspensions on the central IPE profile, test load of 2x 10 kg divided into 4 loads
23. assembly 20080127 m – bracket 38/40 x 1,000 suspended using clamshell suspensions on a pair of IPE profiles, test load of 50 kg divided into 6 loads
24. assembly 20080127 r – IPE profile fitted with clamps 4H24 3-8, 4H58 8-14, 812SC1924 S 1/100 and 812SC2530 S 1/100, each clamp loaded with 0,2 kg

The detailed description of specimens incl. used components and anchorages is listed in the documentation in Annex 3.

The specimens were delivered to the Testing Laboratory on June 19, 2008 (Test No. 1) and on July 31, 2008 (Test No. 2).

The manufacturer of the tested specimens was the test sponsor.

3 TEST PERFORMANCE

3.1 General

The fire resistance tests were performed on a modified and expanded horizontal test furnace according to [1].

The specimens were anchored to reinforced concrete ceiling panels and Ytong wall panels using steel dowels and threaded rods. The test load was applied using particular load pieces made of steel blocks fixed in selected positions. The specimens were placed inside the test chamber and they were exposed to fire from all sides.

The test No. 1 was performed on June 24, 2008, the test No. 2 was performed on July 5, 2008.

Sponsor representatives were not present at the test.

45	specimens No. **2** and **7** have sagged, deflections: No. **1** approx. 100 mm, No. **12** approx. 130 mm, No. **13** approx. 100 mm, No. **18** approx. 100 mm, No. **19** approx. 30 mm, No. **20** approx. 20 mm, No. **22** approx. 50 mm, No. **23** approx. 50 mm, the sheet metal of bracket No. **10** is distorting
60	deflections: No. **1** approx. 100 mm, No. **10** approx. 60 mm, No. **11** approx. 50 mm, No. **12** approx. 250 mm, No. **18** approx. 150 mm, No. **19** approx. 30 mm, No. **20** approx. 20 mm, No. **22** approx. 65 mm, No. **23** approx. 65 mm
80	specimens No. **12** and **18** have sagged
91	end of the test

The in-furnace temperatures met the requirements of [1] during the test. Time relations to the measured temperatures are specified in Annex 2.

During cooling, there was a further increase in the specimen deflection. The value measured the next day after cooling may not correspond to the size of the deformation at the end of the test.

5 TEST RESULTS ACCORDING TO THE SPONSOR'S CRITERIA

5.1 Parameters defined by the test sponsor

Due to the type of elements tested not having any separating and insulating function, the only observed criterion was the loadbearing capacity. For the evaluation, it was not possible to use the standard criteria definition according to [1] cl. 11; for the tests, the definition was modified in cooperation with the test sponsor according to the application possibilities for testing the given specimen type:

- **Loadbearing capacity** – the criterion is the time for which the test specimen continues to maintain its ability to support the test load during the test. For the purpose of this test, the failure of the loadbearing criterion means the collapse of the specimen or the complete sagging of the wall bracket.

5.2 Listing of test results

Test No. 1

Assembly 20080203 p – **90 minutes**

There was no failure for the specimens during the test, the individual sockets were not loaded

Test No. 2

Specimen designation	**Loadbearing capacity**	Note
Elements anchored in the wall		
1. assembly 20080126 g	– **90 minutes**	
2. assembly 20080126 g	– **30 minutes**	the brackets have sagged between 35th and 45th test minute
3. assembly 20080126 g	– **90 minutes**	
4. assembly 20080126 g	– **90 minutes**	
5. assembly 20080126 e	– **90 minutes**	
6. assembly 20080126 i	– **90 minutes**	
7. assembly 20080126 f	– **30 minutes**	the brackets have sagged between 35th and 45th test minute
8. assembly 20080126 h	– **90 minutes**	
9. assembly 20080126 f	– **90 minutes**	
10. assembly 20080126 e	– **90 minutes**	
11. assembly 20080126 f	– **90 minutes**	
12. assembly 20080126 f	– **60 minutes**	the brackets have sagged between 60th and 80th test minute

ANNEX 1: TESTING AND MEASURING EQUIPMENT, MEASUREMENT UNCERTAINTY

Test device:	Registration number:
horizontal furnace (+ equipment for furnace temperature and pressure control) thermocouples in furnace	2.001 2.006

Gauging device:	Metrological registration No.:
differential pressure gauge AMR DPS	3 09 10
datalogger ALMEMO 5990-2	3 10 35
PTM - temperature in furnace (TM K ∅ 1 mm)	3 10 08
TM K ∅ 3 mm – ambient temperature	3 10 15
winding tape measure	3 01 05
stop-watch	3 05 01
thermo-hygro-graph THZ1int	3 13 05

Metrological relationships of the device are specified in the metrological registration card of the device, which is expressly identified by the metrological registration number of the device.

Because of the nature of fire resistance testing and the consequent difficulty in quantifying the uncertainty of measurement of fire resistance, it is not possible to provide a stated degree of accuracy of the result.

Value measured			**Extended measurement uncertainty**
name	symbol	unit	
Time from the test beginning	t	(min)	$3.4\ 10^{-2}$min, for t ≤ 240 min
Temperature: TC or K-type STC + compensation cable (both of 2nd tolerance class) + ALMEMO 5990-2	T	(°C)	$\sqrt{(6.40*10^{-6}*T^2 + 1.57*10^{1}°C^2)}$, for 40°C < T ≤ 375°C $\sqrt{(8.04*10^{-5}*T^2 + 7.84°C^2)}$, for 375°C < T ≤ 1000°C
Ambient-to-in-furnace pressure difference	p	(Pa)	$\sqrt{(5*3*10^{-4}*p^2+1.1*10^{-5}Pa^2)}$

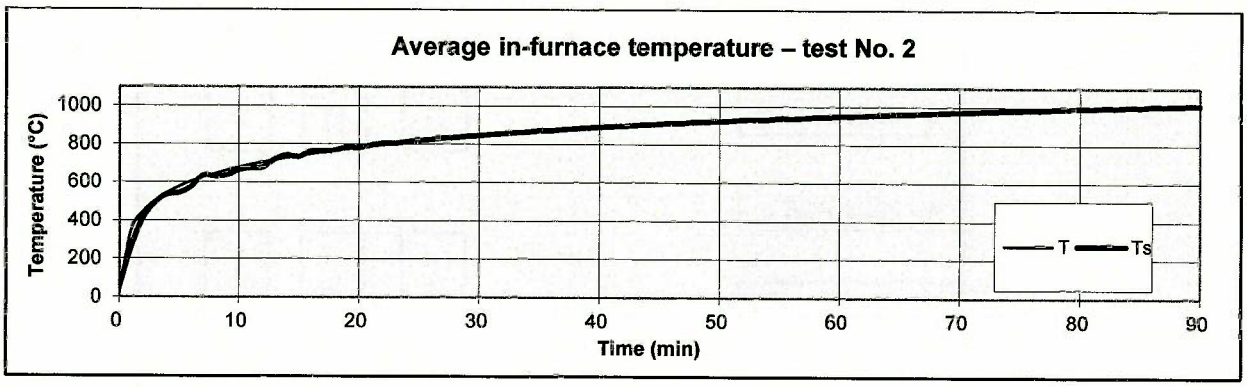
The specified extended measurement uncertainties are a product of standard measurement uncertainty and of the extension coefficient K = 2, which, for normal distribution, corresponds to the coverage probability of 95%.

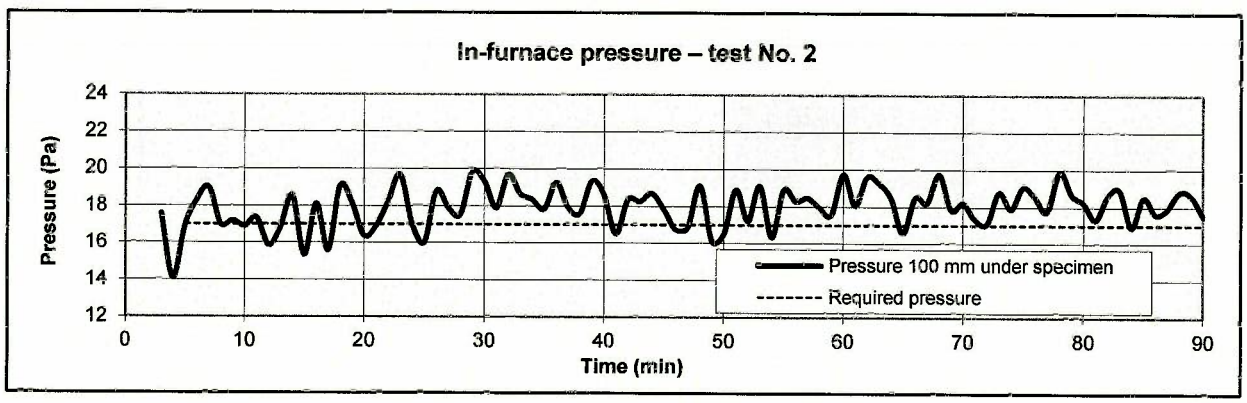
The standard measurement uncertainty has been determined in accordance with the EA-16/02 (EAL R2) and with the GUM documents.

In-furnace temperature and pressure, ambient temperature – test No. 2

Time	Temperature (°C)										Dev. d_e (%)		Amb.	Press.100mm under sp.(Pa)		
t(min)	T	20	21	22	23	30	31	32	33	T_s	Allow.	Actual	Temp.	Required	Actual	Dev.
IC		24	25	25	25	25	25	25	25	25			25			
0	20	45	48	54	58	44	42	52	43	48			24	-		-
10	678	698	697	647	646	668	680	658	632	666	±15	-4,0	24	17,0(±3)	16,9	-0,1
20	781	776	775	762	772	787	786	796	796	781	±10	-1,8	25	17,0(±3)	16,4	-0,6
30	842	843	842	826	837	856	848	859	853	845	±5	-0,9	27	17,0(±3)	19,3	2,3
40	885	886	890	871	884	902	892	903	900	891	±4,2	-0,4	25	17,0(±3)	18,6	1,6
50	918	915	923	904	918	931	922	935	934	923	±3,3	-0,2	25	17,0(±3)	16,5	-0,5
60	945	941	953	934	957	963	953	957	953	951	±2,5	0,0	26	17,0(±3)	19,7	2,7
70	968	966	974	954	974	984	974	979	974	972	±2,5	0,0	25	17,0(±3)	18,2	1,2
80	988	987	995	980	1000	1004	994	1001	998	995	±2,5	0,1	25	17,0(±3)	18,2	1,2
90	1006	1003	1012	992	1013	1020	1010	1016	1013	1010	±2,5	0,2	26	17,0(±3)	17,5	0,5

The temperature was recorded every minute, in the table it figures in 10 minutes interval.

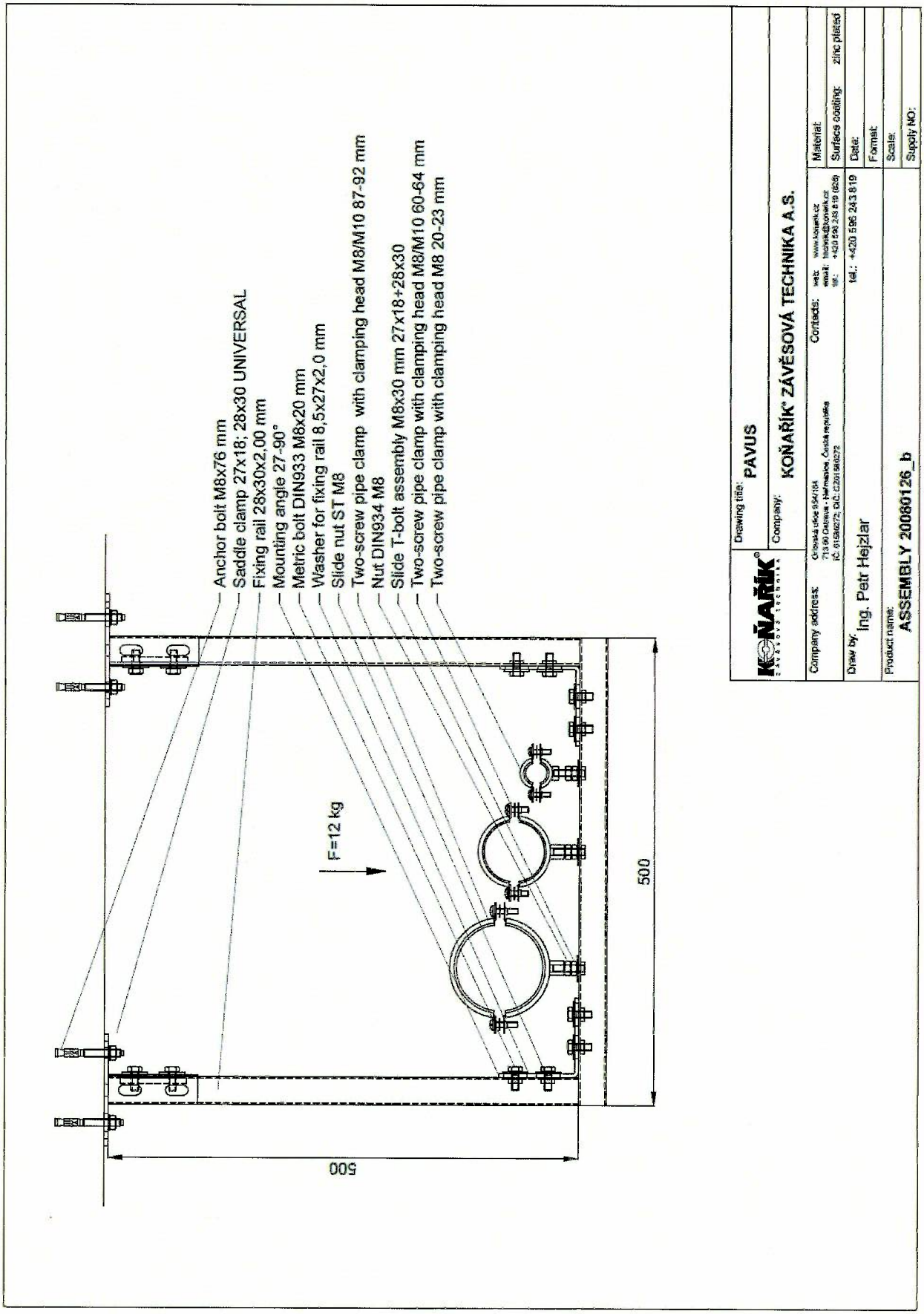


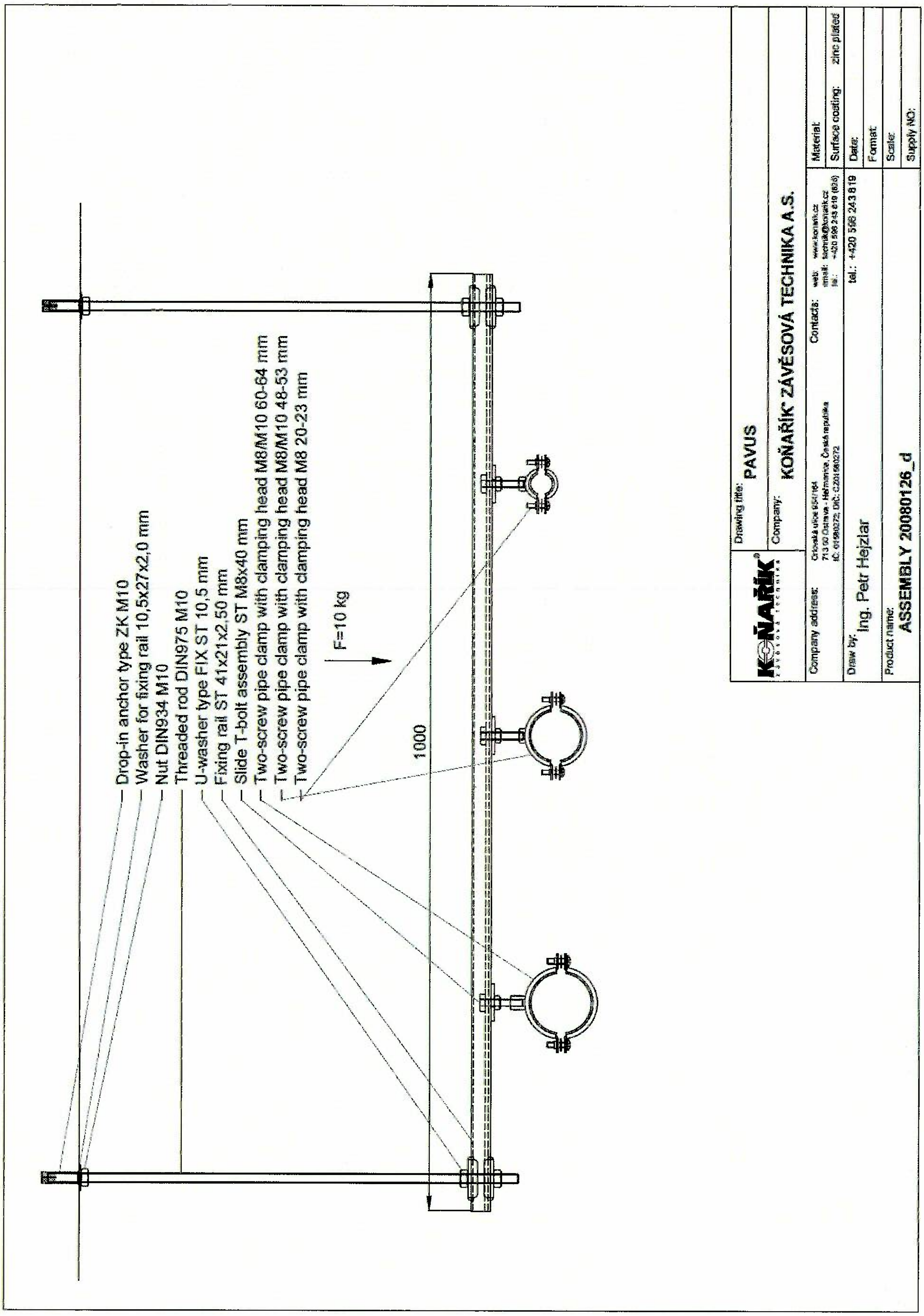


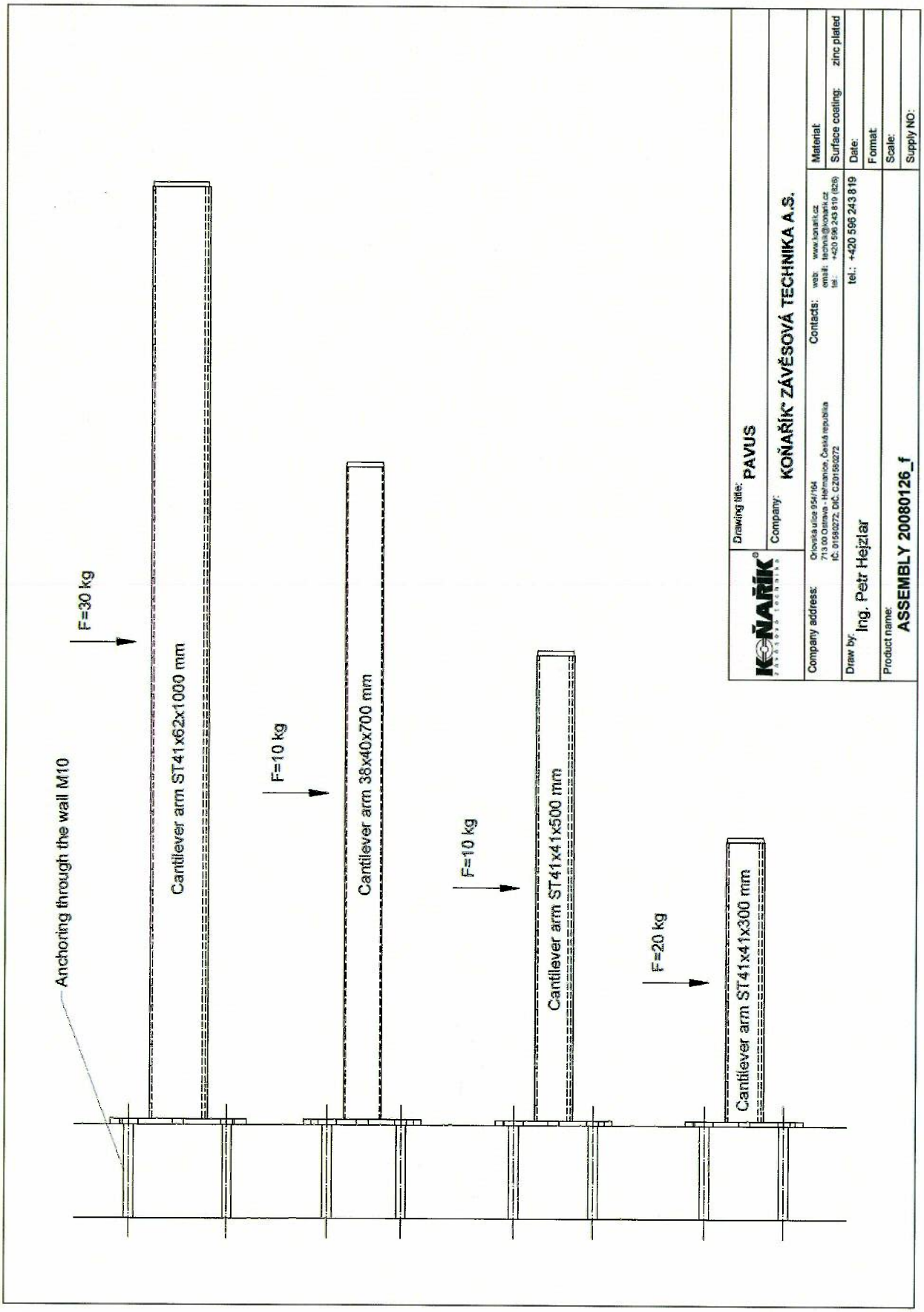
Deflection measurement (mm) after the test

Specimen	Assembly	Point of measurement					
		End of bracket					
Brackets anchored in wall							
1	20080126 g	219					
2	20080126 g	sagging					
3	20080126 g	91					
4	20080126 g	71					
5	20080126 e	30					
6	20080126 i	70					
7	20080126 g	sagging					
8	20080126 f	34					
9	20080126 h	62					
10	20080126 f	121					
11	20080126 e	94					
12	20080126 f	sagging					
		1st suspension	span center	2nd suspension	1st edge	central suspension	2nd edge
Elements suspended under the ceiling							
13	20080126 j	20	161	14			
14	20080127 s	10					
15	20080126 c	1	14	2			
16	20080126 a	5	9	6			
17	20080126 b	11	31	8			
18	20080126 o				sagging	11	sagging
19	20080126 k	13	53	12			
20	20080126 d	8	41	10			
21	20080126 l	6	22	8			
22	20080126 n				92	0	183
23	20080126 m	5	84	22			

The deformations of sockets (test No. 1 – assembly p) and of clamps (test No. 2 – assembly r, specimen 24) were not measured.


Anchor bolt M8x76 mm
Saddle clamp 27x18; 28x30 UNIVERSAL
Fixing rail 28x30x2,00 mm
Mounting angle 27-90°
Metric bolt DIN933 M8x20 mm
Washer for fixing rail 8,5x27x2,0 mm
Slide nut ST M8
Two-screw pipe clamp with clamping head M8/M10 87-92 mm
Nut DIN934 M8
Slide T-bolt assembly M8x30 mm 27x18+28x30
Two-screw pipe clamp with clamping head M8/M10 60-64 mm
Two-screw pipe clamp with clamping head M8 20-23 mm
F=12 kg
500
500
Drawing title: PAVUS
Company: KOŇAŘÍK® ZÁVĚSOVÁ TECHNIKA A.S.
Company address:
Contacts:
web: www.konarik.cz
email: technik@konarik.cz
tel.: +420 596 243 819 (829)
tel.: +420 596 243 819
Draw by: Ing. Petr Hejzlar
Material:
Surface coating: zinc plated
Date:
Format:
Scale:
Supply NO:
Product name: ASSEMBLY 20080126_b


Drop-in anchor type ZK M10
Washer for fixing rail 10,5x27x2,0 mm
Nut DIN934 M10
Threaded rod DIN975 M10
U-washer type FIX ST 10,5 mm
Fixing rail ST 41x21x2,50 mm
Slide T-bolt assembly ST M8x40 mm
Two-screw pipe clamp with clamping head M8/M10 60-64 mm
Two-screw pipe clamp with clamping head M8/M10 48-53 mm
Two-screw pipe clamp with clamping head M8 20-23 mm
F=10 kg
1000
Drawing title:
PAVUS
Company:
KOŇAŘÍK® ZÁVĚSOVÁ TECHNIKA A.S.
Company address:
Contacts:
tel.: +420 596 243 819
Draw by:
Ing. Petr Hejzlar
Product name:
ASSEMBLY 20080126_d
Material:
Surface coating:
zinc plated
Date:
Format:
Scale:
Supply NO:


Anchoring through the wall M10
F=30 kg
Cantilever arm ST41x62x1000 mm
F=10 kg
Cantilever arm 38x40x700 mm
F=10 kg
Cantilever arm ST41x41x500 mm
F=20 kg
Cantilever arm ST41x41x300 mm
KOŇAŘÍK
Drawing title: PAVUS
Company: KOŇAŘÍK ZÁVĚSOVÁ TECHNIKA A.S.
Company address: Orlovská ulice 954/164, 713 00 Ostrava - Heřmanice, Česká republika, IČ: 01580272, DIČ: CZ01580272
Contacts: web: www.konarik.cz, email: technik@konarik.cz, tel.: +420 596 243 819 (826), tel.: +420 596 243 819
Material:
Surface coating: zinc plated
Date:
Format:
Scale:
Supply NO:
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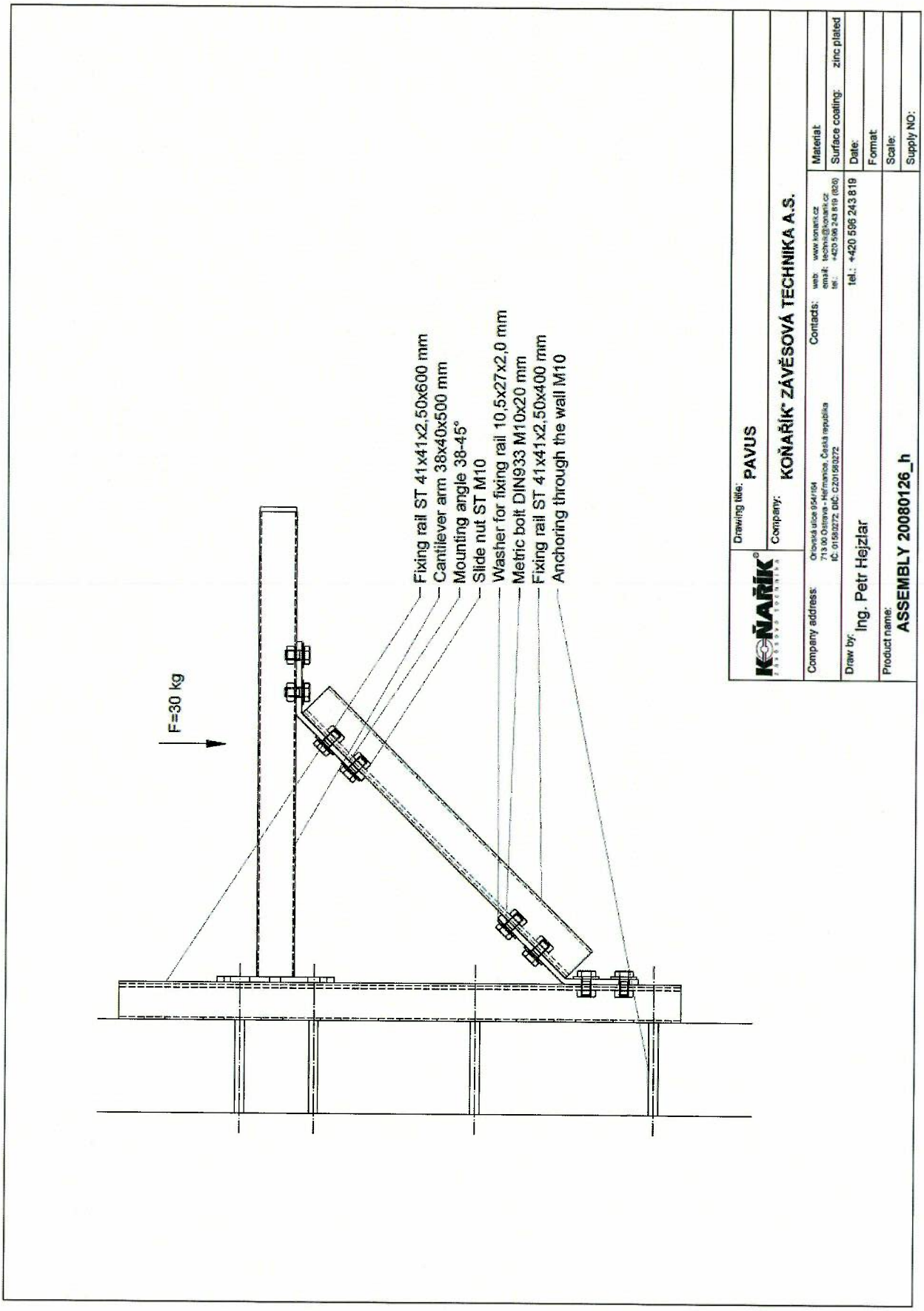
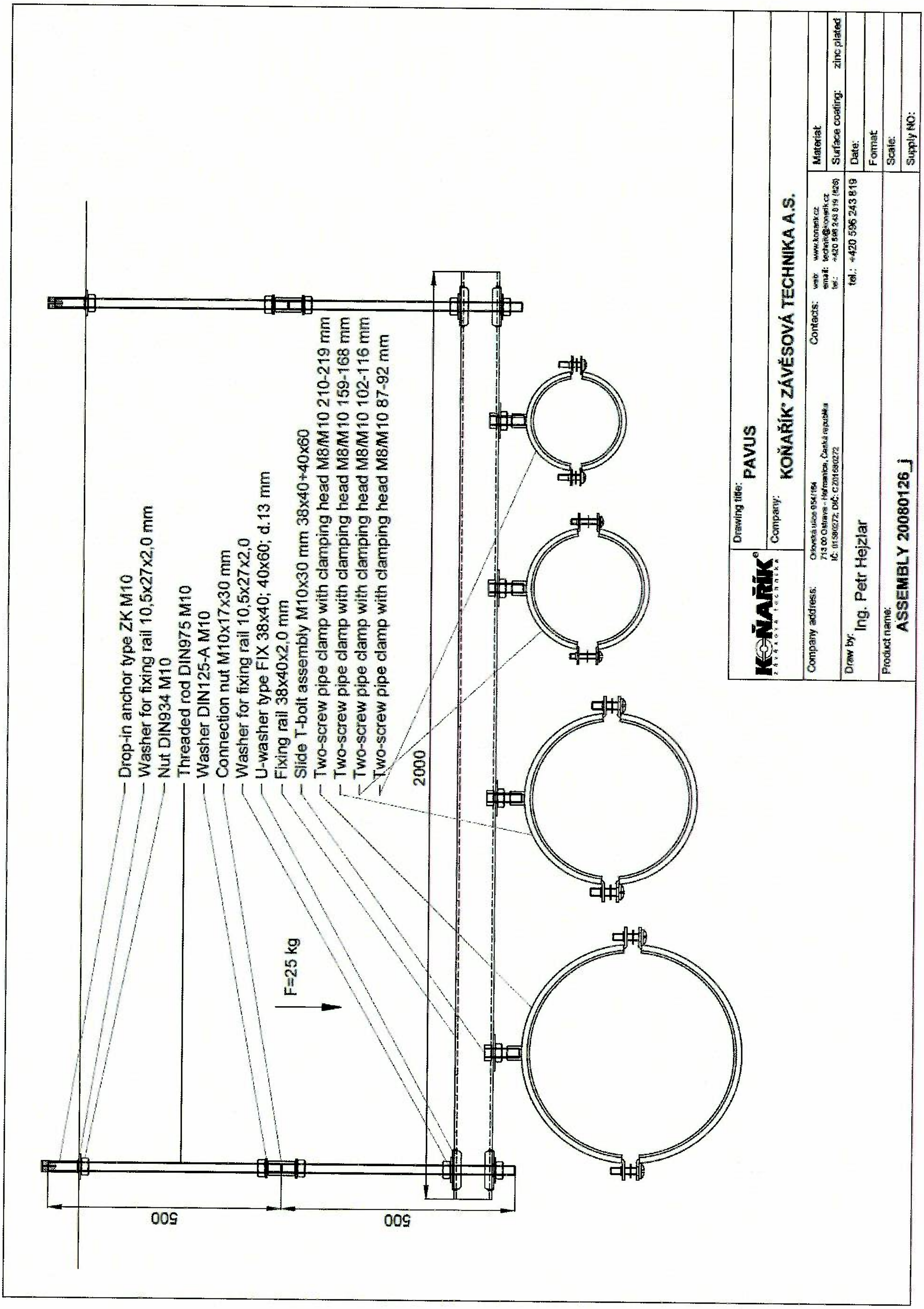
Product name: ASSEMBLY 20080126_f


F=30 kg
Fixing rail ST 41x41x2,50x600 mm
Cantilever arm 38x40x500 mm
Mounting angle 38-45°
Slide nut ST M10
Washer for fixing rail 10,5x27x2,0 mm
Metric bolt DIN933 M10x20 mm
Fixing rail ST 41x41x2,50x400 mm
Anchoring through the wall M10
KOŇAŘÍK
Drawing title: PAVUS
Company: KOŇAŘÍK ZÁVĚSOVÁ TECHNIKA A.S.
Company address: Orlovská ulice 954/164 713 00 Ostrava - Heřmanice, Česká republika IČ: 01582272, DIČ: CZ01582272
Contads: web: www.konarik.cz email: technik@konarik.cz tel.: +420 596 243 819 (820)
Material:
Surface coating: zinc plated
Draw by: Ing. Petr Hejzlar
tel.: +420 596 243 819
Date:
Format:
Product name: ASSEMBLY 20080126_h
Scale:
Supply NO: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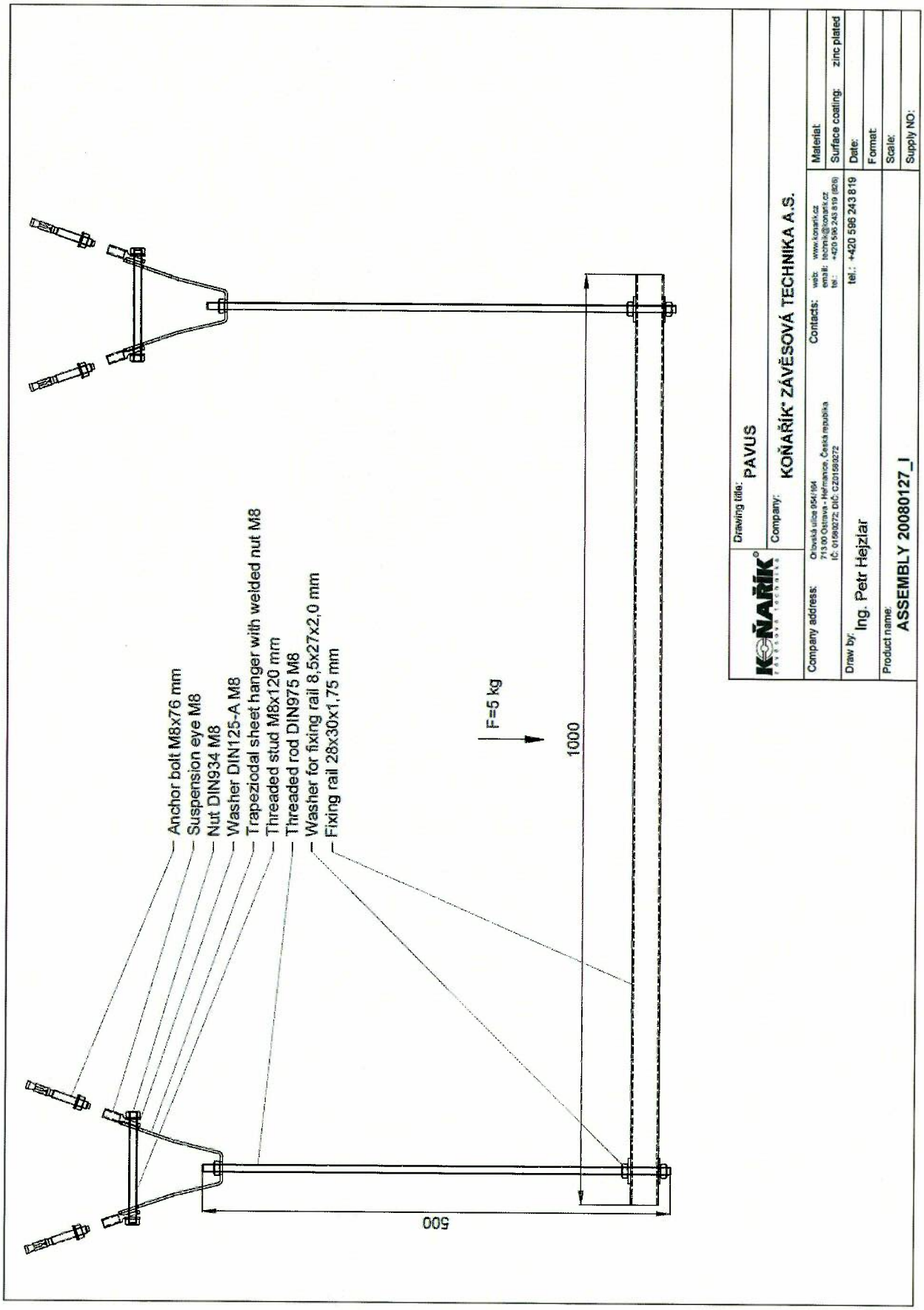
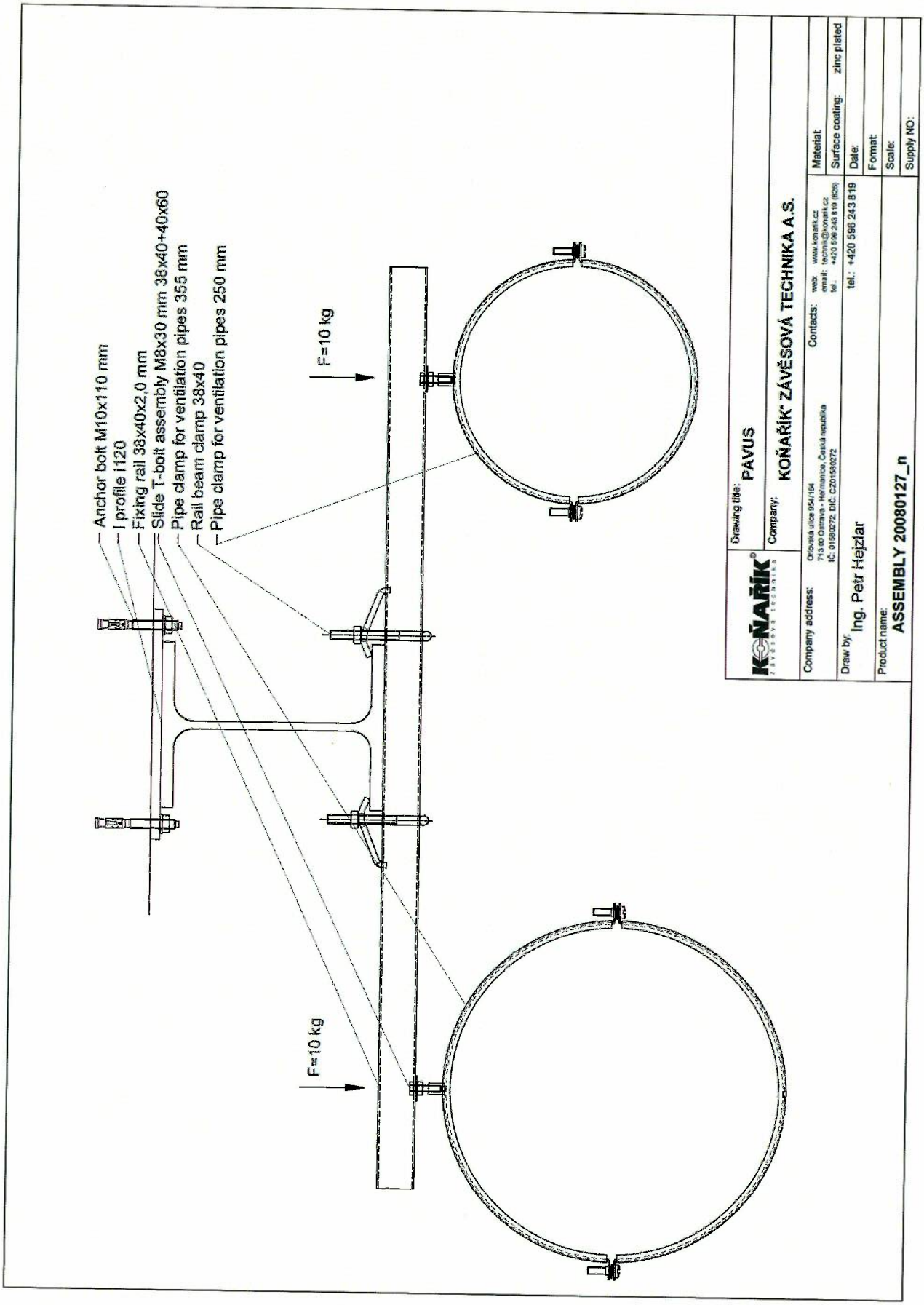
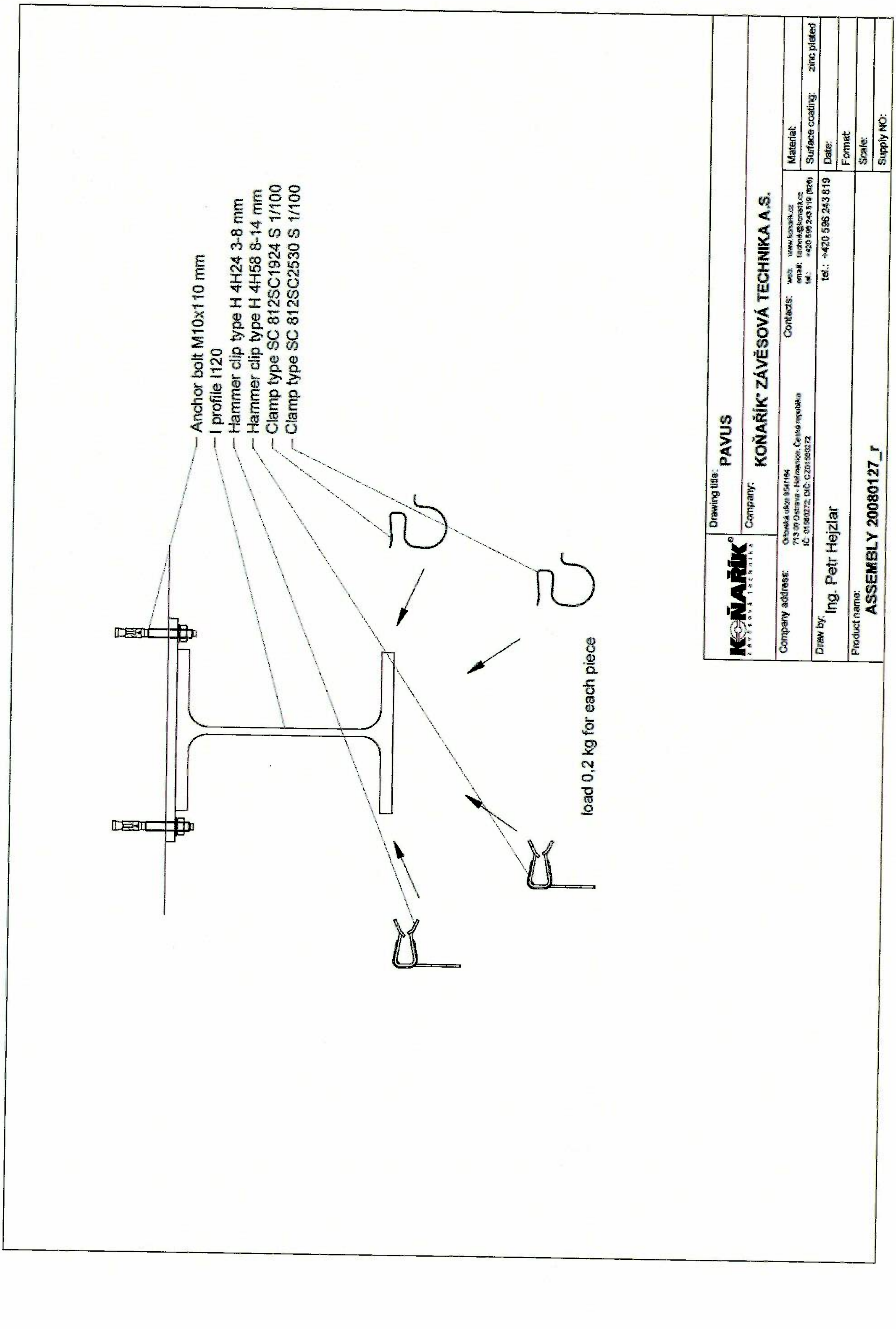
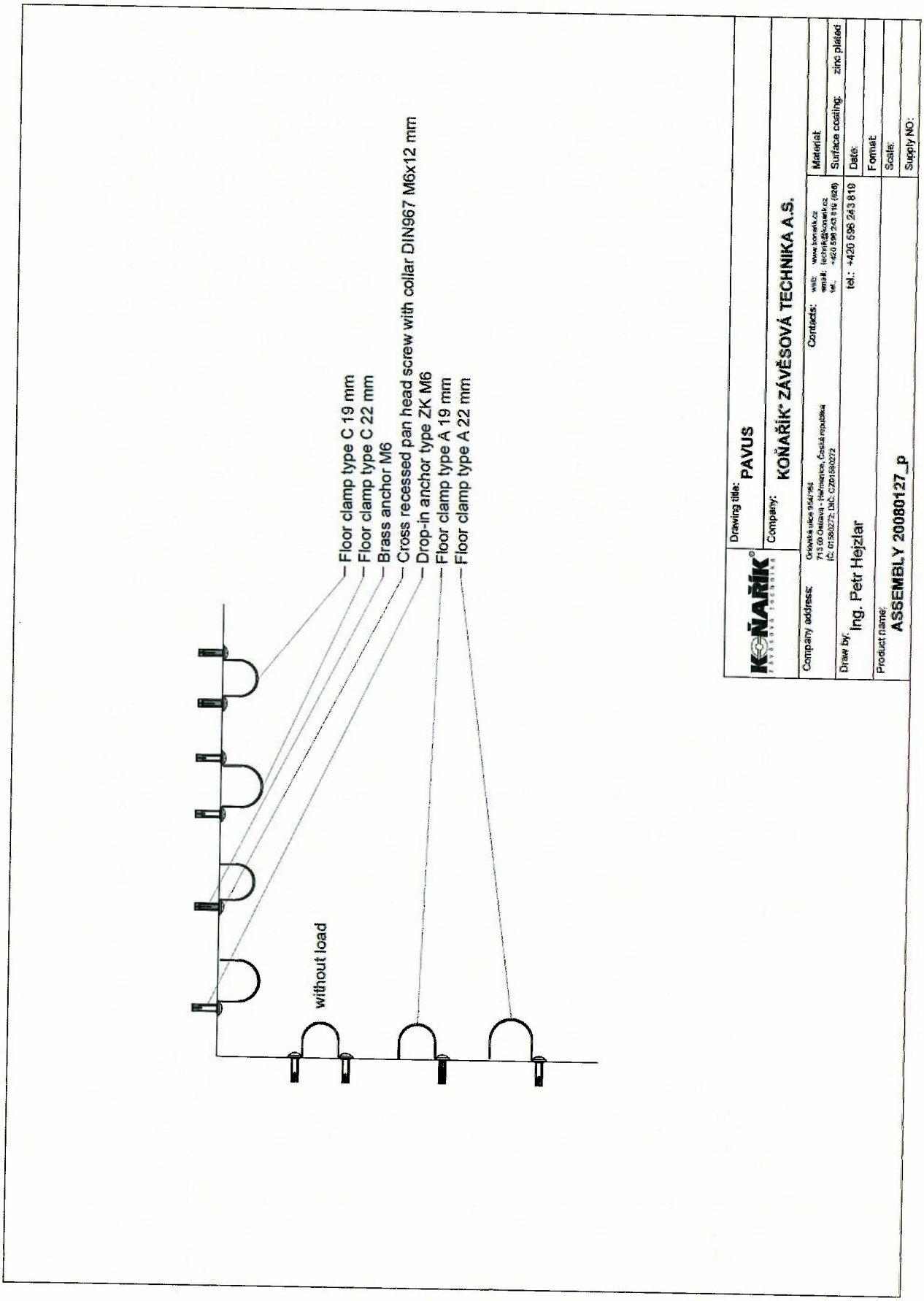
Washer for fixing rail 10,5x27x2,0 mm
Nut DIN934 M10
Threaded rod DIN975 M10
Washer DIN125-A M10
Connection nut M10x17x30 mm
Washer for fixing rail 10,5x27x2,0
U-washer type FIX 38x40; 40x60; d.13 mm
Fixing rail 38x40x2,0 mm
Slide T-bolt assembly M10x30 mm 38x40+40x60
Two-screw pipe clamp with clamping head M8/M10 210-219 mm
Two-screw pipe clamp with clamping head M8/M10 159-168 mm
Two-screw pipe clamp with clamping head M8/M10 102-116 mm
Two-screw pipe clamp with clamping head M8/M10 87-92 mm
F=25 kg
2000
500
500
Drawing title: PAVUS
Company: KOŇAŘÍK ZÁVĚSOVÁ TECHNIKA A.S.
Company address:
Contacts:
tel.: +420 596 243 819
Material:
Surface coating: zinc plated
Draw by: Ing. Petr Hejzlar
Date:
Format:
Scale:
Product name: ASSEMBLY 20080126_j
Supply NO:


Anchor bolt M8x76 mm
Suspension eye M8
Nut DIN934 M8
Washer DIN125-A M8
Trapeziodal sheet hanger with welded nut M8
Threaded stud M8x120 mm
Threaded rod DIN975 M8
Washer for fixing rail 8,5x27x2,0 mm
Fixing rail 28x30x1,75 mm
F=5 kg
1000
500
Drawing title: PAVUS
Company: KOŇAŘÍK ZÁVĚSOVÁ TECHNIKA A.S.
KOŇAŘÍK
Company address: Orlovská ulice 954/164, 713 00 Ostrava - Heřmanice, Česká republika, IČ: 01593272; DIČ: CZ01593272
Contacts: web: www.konarik.cz, email: technik@konarik.cz, tel.: +420 596 243 819 (826), tel.: +420 596 243 819
Draw by: Ing. Petr Hejzlar
Product name: ASSEMBLY 20080127_I
Material:
Surface coating: zinc plated
Date:
Format:
Scale:
Supply NO:

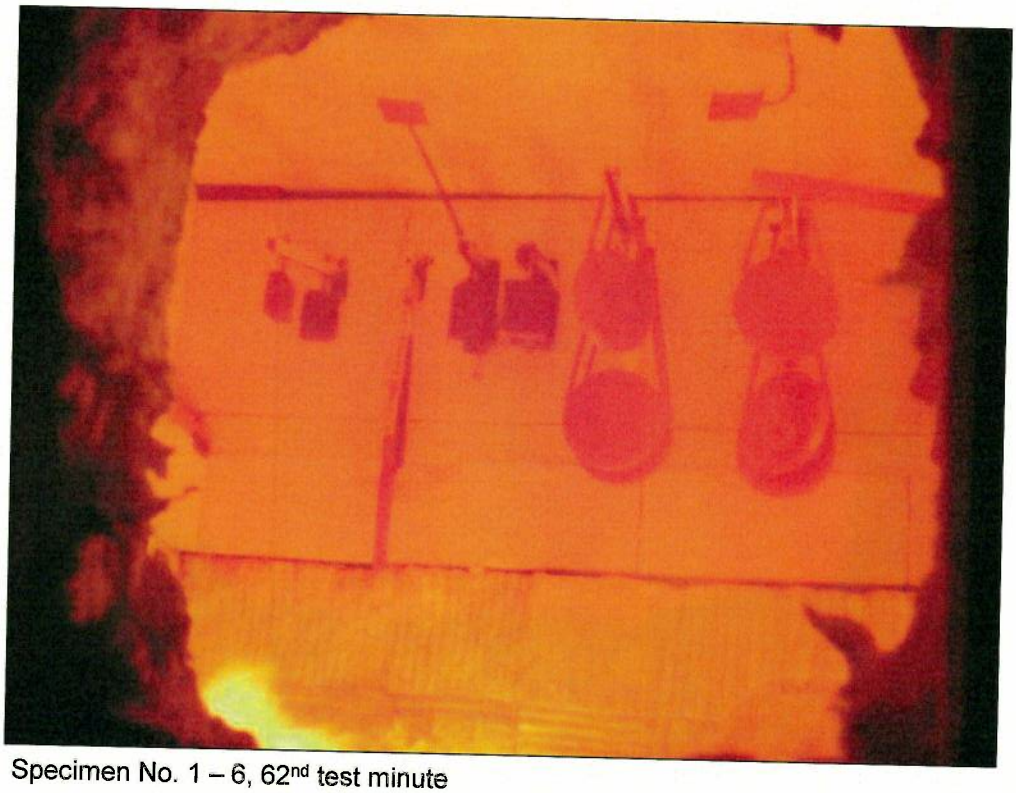

Anchor bolt M10x110 mm
I profile I120
Fixing rail 38x40x2,0 mm
Slide T-bolt assembly M8x30 mm 38x40+40x60
Pipe clamp for ventilation pipes 355 mm
Rail beam clamp 38x40
Pipe clamp for ventilation pipes 250 mm
F=10 kg
F=10 kg
KOŇAŘÍK
Drawing title: PAVUS
Company: KOŇAŘÍK' ZÁVĚSOVÁ TECHNIKA A.S.
Company address: Orlovská ulice 954/104, 713 00 Ostrava - Hrabůvka, Česká republika, IČ: 91580272, DIČ: CZ91580272
Contacts: web: www.konarik.cz, email: technik@konarik.cz, tel.: +420 596 243 819 (826), tel.: +420 596 243 819
Material:
Surface coating: zinc plated
Date:
Format:
Scale:
Supply NO:
Draw by: Ing. Petr Hejzlar
Product name: ASSEMBLY 20080127_n


Anchor bolt M10x110 mm
I profile I120
Hammer clip type H 4H24 3-8 mm
Hammer clip type H 4H58 8-14 mm
Clamp type SC 812SC1924 S 1/100
Clamp type SC 812SC2530 S 1/100
load 0,2 kg for each piece
Drawing title: PAVUS
Company: KOŇAŘÍK ZÁVĚSOVÁ TECHNIKA A.S.
Company address:
Contacts:
tel.: +420 596 243 819
Material:
Surface coating: zinc plated
Date:
Format:
Scale:
Supply NO:
Draw by: Ing. Petr Hejzlar
Product name: ASSEMBLY 20080127_r

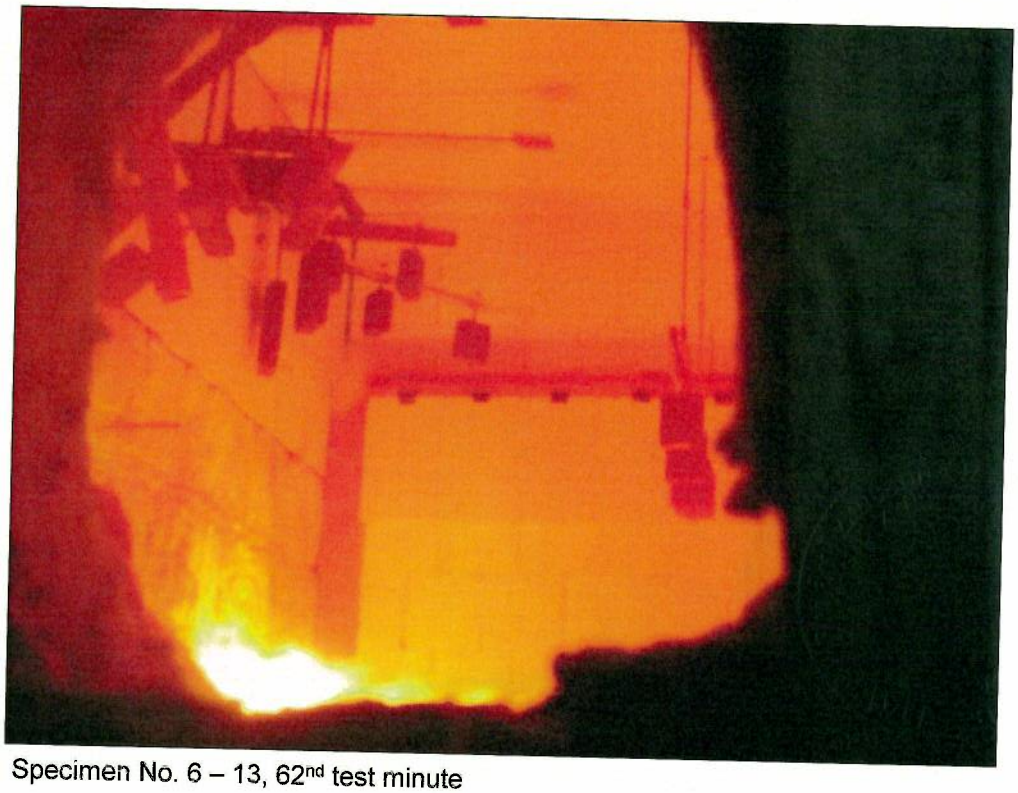

Floor clamp type C 19 mm
Floor clamp type C 22 mm
Brass anchor M6
Cross recessed pan head screw with collar DIN967 M6x12 mm
Drop-in anchor type ZK M6
Floor clamp type A 19 mm
Floor clamp type A 22 mm
without load
Drawing title: PAVUS
Company: KOŇAŘÍK ZÁVĚSOVÁ TECHNIKA A.S.
Company address: Osoblažská 954/164, 713 00 Ostrava - Heřmanice, Česká republika, IČ: 01580272, DIČ: CZ01580272
Contacts: web: www.konarik.cz, email: technik@konarik.cz, tel.: +420 596 243 819 (926), tel.: +420 596 243 819
Material:
Surface coating: zinc plated
Draw by: Ing. Petr Hejzlar
Date:
Format:
Product name: ASSEMBLY 20080127_p
Scale:
Supply NO.:

Specimen No. 9 – 12 prior to the test

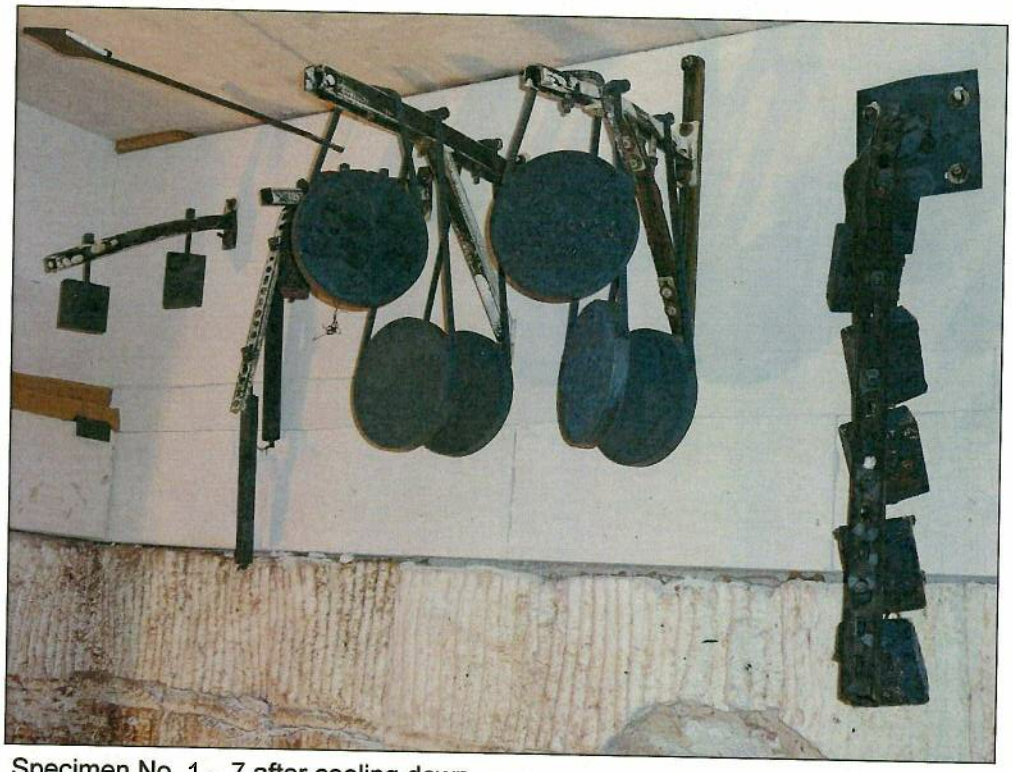
Specimen No. 15 – 18 prior to the test



Specimen No. 1 – 6, 62nd test minute



Specimen No. 6 – 13, 62nd test minute



Specimen No. 1 – 7 after cooling down

Specimen No. 6 – 12 after cooling down