

R-KF2 with Threaded Rods

Economical polyester resin approved for use in non-cracked concrete



Approvals and Reports

• ETA-11/0141



Product information

Features and benefits

- Economical resin for medium duty load applications
- Can be used in damp condition and underwater applications
- Wide range of steel studs with different lengths and diameters
- Small edge and space distances
- Suitable for repetitive use. Partly used product can be reused by fitting a new mixing nozzle

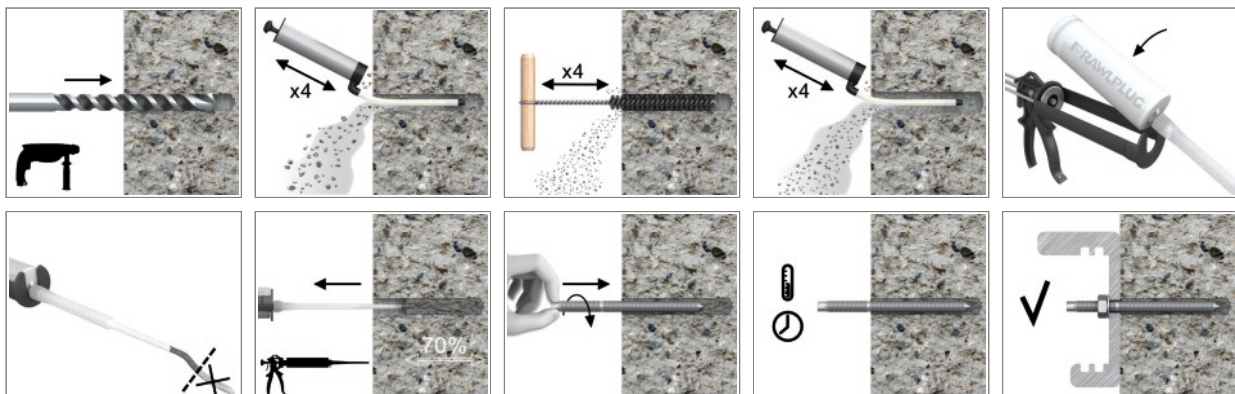
Applications

- Guard rails
- Handrails
- Canopies
- Masonry support
- Balustrading
- Cable trays
- Curtain walling
- Fencing & gates manufacturing and installation

Base materials

- Approved for use in:
- Non-cracked concrete C20/25-C50/60

Installation guide



Product information

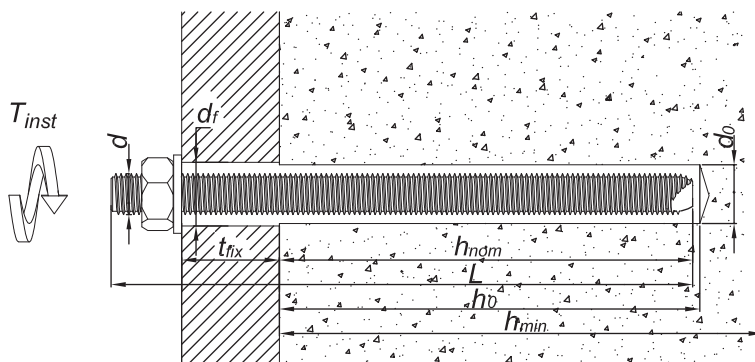
1. Drill hole to the required diameter and depth for stud size being used.
2. Clean the hole thoroughly with brush and hand pump at least four times before installation.
3. Insert cartridge into gun and attach nozzle.
4. Dispense to waste until even colour is obtained.
5. Insert the mixer nozzle to the bottom of the drill hole and inject resin, slowly withdrawing the nozzle as the hole is filled to 70% of its depth.
6. Immediately insert the stud, slowly and with slight twisting motion. Remove any excess resin around the hole before it sets and leave it undisturbed until the curing time elapses.
7. Attach fixture and tighten the nut to the required torque.

Product Code	Resin	Description / Resin Type	Volume
			[ml]
R-KF2-300	R-KF2	Polyester Resin	300
R-KF2-345			345
R-KF2-380			380
R-KF2-400			400

R-STUDS

Size	Product Code			Anchor		Fixture		
	Steel class 5.8	Steel class 8.8	Steel grade A4	Diameter	Length	Hole diameter	Max. thickness t_{fx} for:	
				d	L		$h_{nom, min}$	$h_{nom, max}$
				[mm]	[mm]	[mm]	[mm]	[mm]
M8	R-STUDS-08110	R-STUDS-08110-88	R-STUDS-08110-A4	8	110	9	40	-
	R-STUDS-08160	-	R-STUDS-08160-A4	8	160	9	90	50
M10	R-STUDS-10130	R-STUDS-10130-88	R-STUDS-10130-A4	10	130	12	48	-
	R-STUDS-10170	-	R-STUDS-10170-A4	10	170	12	88	38
	R-STUDS-10190	-	R-STUDS-10190-A4	10	190	12	108	58
M12	R-STUDS-12160	R-STUDS-12160-88	R-STUDS-12160-A4	12	160	14	65	-
	R-STUDS-12190	-	R-STUDS-12190-A4	12	190	14	95	30
	R-STUDS-12220	-	R-STUDS-12220-A4	12	220	14	125	60
	R-STUDS-12260	-	R-STUDS-12260-A4	12	260	14	165	100
	R-STUDS-12300	-	R-STUDS-12300-A4	12	300	14	205	140
M16	R-STUDS-16190	R-STUDS-16190-88	R-STUDS-16190-A4	16	190	18	71	-
	R-STUDS-16220	R-STUDS-16220-88	R-STUDS-16220-A4	16	220	18	101	11
	R-STUDS-16260	-	R-STUDS-16260-A4	16	260	18	141	51
	R-STUDS-16300	-	R-STUDS-16300-A4	16	300	18	181	91
	R-STUDS-16380	-	R-STUDS-16380-A4	16	380	18	261	171
M20	R-STUDS-20260	R-STUDS-20260-88	R-STUDS-20260-A4	20	260	22	117	-
	R-STUDS-20300	-	R-STUDS-20300-A4	20	300	22	157	37
	R-STUDS-20350	-	R-STUDS-20350-A4	20	350	22	207	87
M24	R-STUDS-24300	R-STUDS-24300-88	R-STUDS-24300-A4	24	300	26	132	-
M30	R-STUDS-30380	R-STUDS-30380-88	R-STUDS-30380-A4	30	380	32	180	-

Installation data



Installation data

R-STUDS

Size			M8	M10	M12	M16	M20	M24	M30
Thread diameter	d	[mm]	8	10	12	16	20	24	30
Hole diameter in substrate	d ₀	[mm]	10	12	14	18	24	28	35
Hole diameter in fixture	d _f	[mm]	9	12	14	18	22	26	32
Min. hole depth in substrate	h ₀	[mm]	h _{nom} + 5	h _{nom} + 5	h _{nom} + 5	h _{nom} + 5	h _{nom} + 5	h _{nom} + 5	h _{nom} + 5
Min. substrate thickness	h _{min}	[mm]	h _{nom} + 30 ≥ 100	h _{nom} + 30 ≥ 100	h _{nom} + 30 ≥ 100	h _{nom} + 30 ≥ 100	h _{nom} + 2d ₀	h _{nom} + 2d ₀	h _{nom} + 2d ₀
Installation torque	T _{inst}	[Nm]	10	20	40	80	120	180	300
Min. spacing	s _{min}	[mm]	0.5 * h _{nom} ≥ 40	0.5 * h _{nom} ≥ 40	0.5 * h _{nom} ≥ 40	0.5 * h _{nom} ≥ 40	0.5 * h _{nom} ≥ 40	0.5 * h _{nom} ≥ 40	0.5 * h _{nom} ≥ 40
Min. edge distance	c _{min}	[mm]	0.5 * h _{nom} ≥ 40	0.5 * h _{nom} ≥ 40	0.5 * h _{nom} ≥ 40	0.5 * h _{nom} ≥ 40	0.5 * h _{nom} ≥ 40	0.5 * h _{nom} ≥ 40	0.5 * h _{nom} ≥ 40
MINIMUM EMBEDMENT DEPTH									
Installation depth	h _{nom,min}	[mm]	60	70	80	100	120	140	165
MAXIMUM EMBEDMENT DEPTH									
Installation depth	h _{nom,max}	[mm]	100	120	145	190	240	290	360

Minimum working and curing time

Resin temperature	Concrete temperature	Curing time*	Working time
[°C]	[°C]	[min]	[min]
5	-5	360	60
5	0	180	40
5	5	120	20
10	10	80	12
15	15	60	8
20	20	45	5
25	30	20	2

Mechanical properties

Size			M8	M10	M12	M16	M20	M24	M30
R-STUDS Metric Threaded Rods - Steel Class 5.8									
Nominal ultimate tensile strength - tension	f _{uk}	[N/mm ²]	520	520	520	520	520	520	520
Nominal yield strength - tension	f _{yk}	[N/mm ²]	420	420	420	420	420	420	420
Cross sectional area - tension	A _s	[mm ²]	36.6	58	84.3	157	245	352.8	559.8
Elastic section modulus	W _{el}	[mm ³]	31.2	62.3	109.2	277.5	541	935	1868
Characteristic bending resistance	M ⁰ _{Rk,s}	[Nm]	20	39	68	173	338	583	1166
Design bending resistance	M	[Nm]	11	22	39	99	193	333	666
R-STUDS Metric Threaded Rods - Steel Class 8.8									
Nominal ultimate tensile strength - tension	f _{uk}	[N/mm ²]	800	800	800	800	800	800	800
Nominal yield strength - tension	f _{yk}	[N/mm ²]	640	640	640	640	640	640	640
Cross sectional area - tension	A _s	[mm ²]	36.6	58	84.3	157	245	352.8	559.8
Elastic section modulus	W _{el}	[mm ³]	31.2	62.3	109.2	277.5	541	935	1868
Characteristic bending resistance	M ⁰ _{Rk,s}	[Nm]	30	60	105	266	519	898	1793
Design bending resistance	M	[Nm]	17	34	60	152	297	513	1025
R-STUDS Metric Threaded Rods - A4									
Nominal ultimate tensile strength - tension	f _{uk}	[N/mm ²]	700	700	700	700	700	700	700
Nominal yield strength - tension	f _{yk}	[N/mm ²]	350	350	350	350	350	350	350
Cross sectional area - tension	A _s	[mm ²]	36.6	58	84.3	157	245	352.8	559.8
Elastic section modulus	W _{el}	[mm ³]	31.2	62.3	109.2	277.5	541	935	1868
Characteristic bending resistance	M ⁰ _{Rk,s}	[Nm]	26	52	92	233	454	785	1569
Design bending resistance	M	[Nm]	12	24	42	107	208	360	719

Basic performance data

R-STUDS

Performance data for single anchor without influence of edge distance and spacing - ETAG 001

Size		M8	M10	M12	M16	M20	M24	M30
Substrate		Non-cracked concrete						
MEAN ULTIMATE LOAD								
TENSION LOAD N_{Rm}								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8								
Minimum embedment depth	[kN]	18.9	30.5	42.2	65.4	88.7	111.8	143.1
Maximum embedment depth	[kN]	18.9	30.5	44.1	81.9	128.1	184.8	294.0
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8								
Minimum embedment depth	[kN]	21.1	31.9	42.2	65.4	88.7	111.8	143.1
Maximum embedment depth	[kN]	30.5	48.3	70.4	124.2	196.0	251.5	339.3
R-STUDS METRIC THREADED RODS - A4								
Minimum embedment depth	[kN]	21.1	31.9	42.2	65.4	88.7	111.8	143.1
Maximum embedment depth	[kN]	27.3	43.1	62.0	115.5	179.6	251.5	339.3
SHEAR LOAD V_{Rm}								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8								
Minimum embedment depth	[kN]	11.3	18.3	26.5	49.1	76.9	110.9	176.4
Maximum embedment depth	[kN]	11.3	18.3	26.5	49.2	76.9	110.9	176.4
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8								
Minimum embedment depth	[kN]	18.3	30.0	42.2	79.4	123.5	177.7	282.9
Maximum embedment depth	[kN]	18.3	30.0	42.2	79.4	123.5	177.7	282.9
R-STUDS METRIC THREADED RODS - A4								
Minimum embedment depth	[kN]	16.4	25.8	37.2	69.3	107.7	155.6	247.6
Maximum embedment depth	[kN]	16.4	25.8	37.2	69.3	107.7	155.6	247.6
CHARACTERISTIC LOAD								
TENSION LOAD N_{Rk}								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8								
Minimum embedment depth	[kN]	14.3	22.0	28.7	45.2	64.1	73.9	77.8
Maximum embedment depth	[kN]	18.0	29.0	42.0	78.0	122.0	153.1	169.7
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8								
Minimum embedment depth	[kN]	14.3	22.0	28.7	45.2	64.1	73.9	77.8
Maximum embedment depth	[kN]	23.9	37.7	51.9	86.0	128.2	153.1	169.7
R-STUDS METRIC THREADED RODS - A4								
Minimum embedment depth	[kN]	14.3	22.0	28.7	45.2	64.1	73.9	77.8
Maximum embedment depth	[kN]	23.9	37.7	51.9	86.0	128.2	153.1	169.7
SHEAR LOAD V_{Rk}								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8								
Minimum embedment depth	[kN]	9.00	14.0	21.0	39.0	61.0	88.0	140.0
Maximum embedment depth	[kN]	9.00	14.0	21.0	39.0	61.0	88.0	140.0
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8								
Minimum embedment depth	[kN]	15.0	23.0	34.0	63.0	98.0	141.0	155.5
Maximum embedment depth	[kN]	15.0	23.0	34.0	63.0	98.0	141.0	224.0
R-STUDS METRIC THREADED RODS - A4								
Minimum embedment depth	[kN]	13.0	20.0	29.0	55.0	86.0	124.0	155.5
Maximum embedment depth	[kN]	13.0	20.0	29.0	55.0	86.0	124.0	196.0

Basic performance data

Size		M8	M10	M12	M16	M20	M24	M30
DESIGN LOAD								
TENSION LOAD N_{Rd}								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8								
Minimum embedment depth	[kN]	7.96	12.2	15.9	25.1	35.6	35.2	37.0
Maximum embedment depth	[kN]	12.0	19.3	28.0	47.8	71.2	72.9	80.8
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8								
Minimum embedment depth	[kN]	7.96	12.2	15.9	25.1	35.6	35.2	37.0
Maximum embedment depth	[kN]	13.3	20.9	28.9	47.8	71.2	72.9	80.8
R-STUDS METRIC THREADED RODS - A4								
Minimum embedment depth	[kN]	7.96	12.2	15.9	25.1	35.6	35.2	37.0
Maximum embedment depth	[kN]	13.3	20.9	28.9	47.8	71.2	72.9	80.8
SHEAR LOAD V_{Rd}								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8								
Minimum embedment depth	[kN]	7.20	11.2	16.8	31.2	48.8	70.4	103.7
Maximum embedment depth	[kN]	7.20	11.2	16.8	31.2	48.8	70.4	112.0
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8								
Minimum embedment depth	[kN]	12.0	18.4	27.2	50.4	78.4	98.5	103.7
Maximum embedment depth	[kN]	12.0	18.4	27.2	50.4	78.4	112.8	179.2
R-STUDS METRIC THREADED RODS - A4								
Minimum embedment depth	[kN]	8.33	12.8	18.6	35.3	55.1	79.5	103.7
Maximum embedment depth	[kN]	8.33	12.8	18.6	35.3	55.1	79.5	125.6
RECOMMENDED LOAD								
TENSION LOAD N_{rec}								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8								
Minimum embedment depth	[kN]	5.68	8.73	11.4	18.0	25.4	25.1	26.5
Maximum embedment depth	[kN]	8.57	13.8	20.0	34.1	50.9	52.1	57.7
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8								
Minimum embedment depth	[kN]	5.68	8.73	11.4	18.0	25.4	25.1	26.5
Maximum embedment depth	[kN]	9.47	15.0	20.6	34.1	50.9	52.1	57.7
R-STUDS METRIC THREADED RODS - A4								
Minimum embedment depth	[kN]	5.68	8.73	11.4	18.0	25.4	25.1	26.5
Maximum embedment depth	[kN]	9.47	15.0	20.6	34.1	50.9	52.1	57.7
SHEAR LOAD V_{rec}								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8								
Minimum embedment depth	[kN]	5.14	8.00	12.0	22.3	34.9	50.3	74.1
Maximum embedment depth	[kN]	5.14	8.00	12.0	22.3	34.9	50.3	80.0
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8								
Minimum embedment depth	[kN]	8.57	13.1	19.4	36.0	56.0	70.4	74.1
Maximum embedment depth	[kN]	8.57	13.1	19.4	36.0	56.0	80.6	128.0
R-STUDS METRIC THREADED RODS - A4								
Minimum embedment depth	[kN]	5.95	9.16	13.3	25.2	39.4	56.8	74.1
Maximum embedment depth	[kN]	5.95	9.16	13.3	25.2	39.4	56.8	89.7

Design performance data

R-STUDS

Size			M8	M10	M12	M16	M20	M24	M30
TENSION LOAD									
STEEL FAILURE; STEEL CLASS 5.8									
Characteristic resistance	$N_{Rk,s}$	[kN]	18.00	29.00	42.00	78.00	122.00	176.00	280.00
Partial safety factor	γ_{Ms}	-	1.50	1.50	1.50	1.50	1.50	1.50	1.50
STEEL FAILURE; STEEL CLASS 8.8									
Characteristic resistance	$N_{Rk,s}$	[kN]	29.00	46.00	67.00	126.00	196.00	282.00	448.00
Partial safety factor	γ_{Ms}	-	1.50	1.50	1.50	1.50	1.50	1.50	1.50
STEEL FAILURE; STEEL GRADE A4-70									
Characteristic resistance	$N_{Rk,s}$	[kN]	26.00	41.00	59.00	110.00	171.00	247.00	392.00
Partial safety factor	γ_{Ms}	-	1.87	1.87	1.87	1.87	1.87	1.87	1.87
COMBINED PULL-OUT AND CONCRETE CONE FAILURE; NON-CRACKED CONCRETE, C20/25 (40°C/24°C)									
Characteristic bond resistance	T_{Rk}	[N/mm ²]	9.50	10.00	9.50	9.00	8.50	7.00	5.00
COMBINED PULL-OUT AND CONCRETE CONE FAILURE; NON-CRACKED CONCRETE, C20/25 (80°C/50°C)									
Characteristic bond resistance	T_{Rk}	[N/mm ²]	8.50	9.00	8.50	8.00	7.50	6.00	4.50
COMBINED PULL-OUT AND CONCRETE CONE FAILURE									
Installation safety factor	γ_z	-	1.20	1.20	1.20	1.20	1.20	1.40	1.40
Increasing Factors for $N_{Rd,p}$ - C30/37	ψ_c	-	1.11	1.08	1.08	1.08	1.08	1.00	1.00
Increasing Factors for $N_{Rd,p}$ - C40/50	ψ_c	-	1.15	1.15	1.15	1.15	1.15	1.00	1.00
Increasing Factors for $N_{Rd,p}$ - C50/60	ψ_c	-	1.19	1.19	1.19	1.19	1.19	1.00	1.00
CONCRETE CONE FAILURE									
Installation safety factor	γ_z	-	1.20	1.20	1.20	1.20	1.20	1.40	1.40
Factor for non-cracked concrete	k	-	10.10	10.10	10.10	10.10	10.10	10.10	10.10
Factor for non-cracked concrete	$k_{ucr,N}$	-	11.00	11.00	11.00	11.00	11.00	11.00	11.00
Edge distance	$c_{cr,N}$	[mm]	1.5*h _{ef}	1.5*h _{ef}	1.5*h _{ef}	1.5*h _{ef}	1.5*h _{ef}	1.5*h _{ef}	1.5*h _{ef}
Spacing	$s_{cr,N}$	[mm]	3.0*h _{ef}	3.0*h _{ef}	3.0*h _{ef}	3.0*h _{ef}	3.0*h _{ef}	3.0*h _{ef}	3.0*h _{ef}
CONCRETE SPLITTING FAILURE									
Installation safety factor	γ_z	-	1.20	1.20	1.20	1.20	1.20	1.40	1.40
 SHEAR LOAD									
STEEL FAILURE; STEEL CLASS 5.8									
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	9.00	14.00	21.00	39.00	61.00	88.00	140.00
Ductility factor	k_γ	-	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	19.00	37.00	65.00	166.00	324.00	561.00	1124.00
Partial safety factor	γ_{Ms}	-	1.25	1.25	1.25	1.25	1.25	1.25	1.25
STEEL FAILURE; STEEL CLASS 8.8									
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	15.00	23.00	34.00	63.00	98.00	141.00	224.00
Ductility factor	k_γ	-	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	30.00	60.00	105.00	266.00	519.00	898.00	1799.00
Partial safety factor	γ_{Ms}	-	1.25	1.25	1.25	1.25	1.25	1.25	1.25
STEEL FAILURE; STEEL GRADE A4-70									
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	13.00	20.00	29.00	55.00	86.00	124.00	196.00
Ductility factor	k_γ	-	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	26.00	52.00	92.00	233.00	454.00	786.00	1574.00
Partial safety factor	γ_{Ms}	-	1.56	1.56	1.56	1.56	1.56	1.56	1.56
CONCRETE PRY-OUT FAILURE									
Factor	k	-	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Installation safety factor	γ_z	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00
CONCRETE EDGE FAILURE									
Anchor diameter	d_{nom}	[mm]	8.00	10.00	12.00	16.00	20.00	24.00	30.00
Effective length of anchor	l_f	[mm]	min (h _{ef} ; 8d _{nom})	min (h _{ef} ; 8d _{nom})	min (h _{ef} ; 8d _{nom})	min (h _{ef} ; 8d _{nom})	min (h _{ef} ; 8d _{nom})	min (h _{ef} ; 8d _{nom})	min (h _{ef} ; 8d _{nom})
Installation safety factor	γ_z	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Combined pull-out and concrete cone failure (TR 029, p.5.2.2.3. acc. to formula 5.2a - $N_{Rk,p}^0 = n \cdot d \cdot h_{ef} \cdot \tau_{Rk}$).

Concrete cone failure (TR 029, p.5.2.2.4. acc. to formula 5.3a - $N_{Rk,c}^0 = k_1 \cdot f_{ck,cube}^{0.5} \cdot h_{ef}^{1.5}$).

$h_{ef} = h_{nom}$

Product commercial data

Size	Product Code	Volume [ml]	Quantity [pcs]			Weight [kg]			Bar Codes
			Box	Outer	Pallet	Box	Outer	Pallet	
M30	R-KF2-300 ¹⁾	300	10	10	840	5.9	5.9	529.0	5906675431017
	R-KF2-345 ¹⁾	345	10	10	840	7.0	7.0	618.0	5906675343396
	R-KF2-380 ¹⁾	380	10	10	560	8.2	8.2	486.1	
	R-KF2-400 ¹⁾	400	10	10	560	8.2	8.2	489.2	5906675392080

1) ETA-11/0141