

PROTECTION FROM GEOLOGICAL HAZARDS

MATERIALS & STRUCTURES

GENERAL CATALOG



RING NET PANELS

- Zn-coated or stainless steel
- wire diameter 2-4 mm
- tensile strength up to 1500 kN/m'
- ring diameter 250, 350 and 420 mm
- clever weaving technology

RHOMBOID STEEL WIRE CHAIN-LINK MESH «2D-GEO»

- tensile strength up to 155 kN
- many types of material with different characteristics
- Zn-coated

EROSION CONTROL MATS

- mats from polypropylene for hydroseeding
- organic geotextile with seed grains
- 3d geoweb

BAR GROUND ANCHOR

- the unique production technology from rail steel 80S
- diameter from 15 to 32 mm
- tensile strength from 150 to 804 kN
- complete package of accessories to anchors

HOLLOW BAR GROUND ANCHOR

- system of more than 100 kinds of accessories and components
- several types of drill bits for different grounds
- tubular screw rod outer diameter from 30 to 105 mm
- with tensile strength from 173 to 6297 kN

EARTH ANCHORS

- The effective area of earth anchors from 110 to 500 cm²
- Working load limit from up to 120 kN
- Rod diameter from 16 to 20 mm
- Full package of accessories

FLEXIBLE CABLE ANCHOR

- flexible head of anchor bending up to 30 degrees in line of force application

STEEL WIRE ROPES

- more than 30 different types for your needs

DOUBLE-TWISTED MESH

- 16 different types of mesh: Zn-coated, Zn+Al, Zn+PVC, Zn+Al+PVC

CUSTOM PRODUCTS FROM STEEL PROFILE

- design, lathework, milling, fitting, thermal treatment, welding, coating.

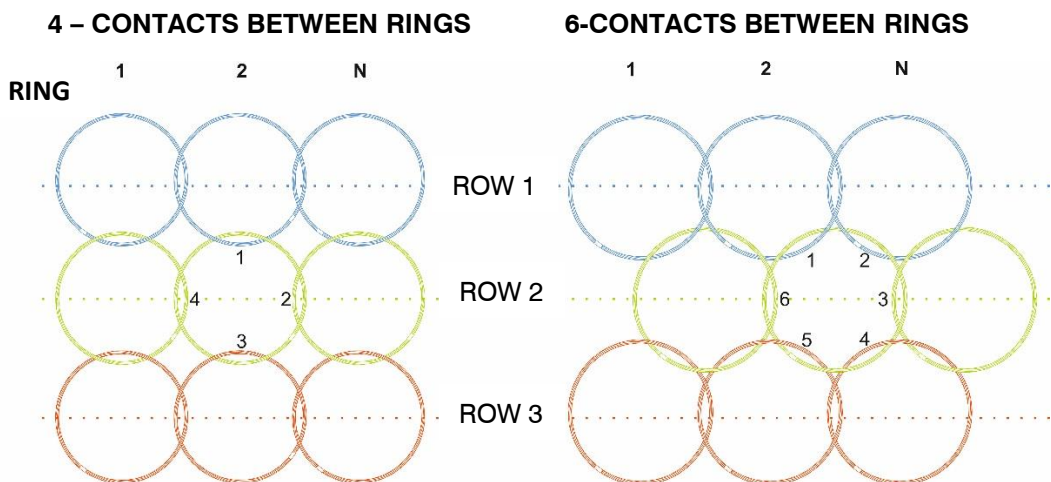
RING NET PANELS

Ring net	Inner ring diameter, [mm]	Type of ring binding, number of wire loops	Type of net binding, number of contacts	Wire diameter, [mm]	Zn coating, [g/m ²]	Tensile strength of wire [N/mm ²]	Height of net, [m]	Standard length of net, [m]	Calculated weight of 1 m ² , [kg]	Tensile strength of one ring, [kN]	Tensile strength of net, [kN/m]
2,5.35.7/4	350	7	4	2,5	230	≥1380	on request	≤ 10 m	2,6	75	150
3.35.7/4	350	7	4	3	245				3,7	100	210
2,5.35.7/6	350	7	6	2,5	230				3,1	75	215
2,5.25.7/4	250	7	4	2,5	230				4,0	75	215
3.42.7/6	420	7	6	3	245				3,6	100	270
3.35.7/6	350	7	6	3	245				4,4	100	300
2,5.25.7/6	250	7	6	2,5	230				4,6	75	300
4.35.7/4	350	7	4	4	275				7,0	190	370
3.25.7/6	250	7	6	3	245				6,7	100	415
4.35.7/6	350	7	6	4	275				8,3	190	525
3.42.19/4	420	19	4	3	245				9,0	340	585
3.42.19/6	420	19	6	3	245				11,0	340	860
4.42.19/4	420	19	4	4	275				16,0	600	1050
4.42.19/6	420	19	6	4	275				19,6	600	1525

By request can be manufactured:

- 1) ring nets with higher tensile strength (increase in 1,5 times) from wires GOST 7372-79 with tensile strength ≥ 1770 N/mm².
- 2) ring nets from stainless steel wires, including austenitic-ferritic duplex stainless steel for use in seawater.
- 3) ring net panels with not standard sizes, for example one-piece trapezoidal panel for mud flow barriers.

TYPES OF RING NETS:



RHOMBOID STEEL WIRE CHAIN-LINK MESH «2D-GEO»

Technical characteristics	W80/3	W56/3	W80/4	W56/4	W40/4
Mesh size W x H, [mm]	80x130	56x90	80x130	56x90	40x70
Incircle diameter, [mm]	62	42	62	42	28
The angle of the cell, α [degrees]	63	63	63	63	60
Thickness of net, t [mm]	15	18	19	20	20
Shape of cell	vertical rhombus				
Tensile strength of a wire, [N/mm ²]	≥ 500				
Corrosion protection	Zn ≥ 155 g/m ²				
Wire diameter [mm]	3	3	4	4	4
Weight of 1 m ² , [kg]	1,95	2,58	3,45	4,60	6,65
Tensile strength of net, [kN/m]	40	60	75	100	155
Roll width [m]	2,5				
Roll length [m]	on request				

Loads at contacts between net and special 2D-GEO anchor plate

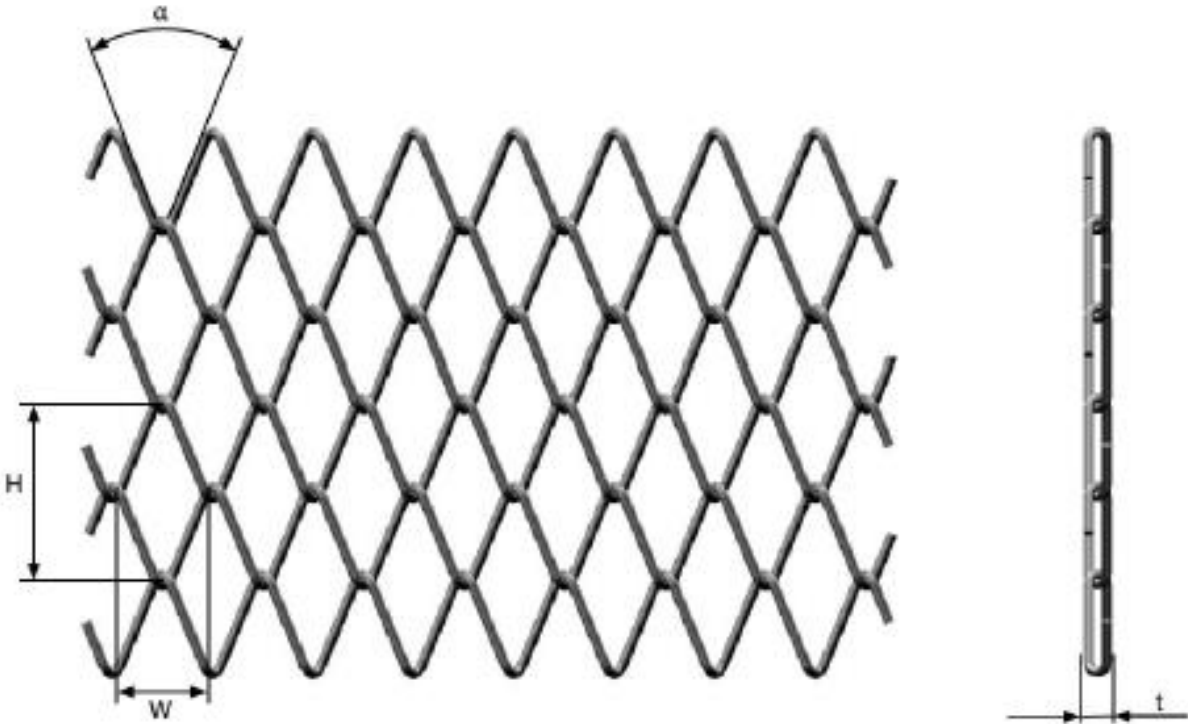
Bearing resistance of net against puncturing with anchor plate, [kN]	56	85	100	150	200
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Technical characteristics	W80/3 PRO	W56/3 PRO	W80/4 PRO	W56/4 PRO ²	W56/4 PRO
Mesh size W x H, [mm]	80x130	56x90	80x130	56x90	56x90
Incircle diameter [mm]	62	42	62	42	42
The angle of the cell, α [degrees]	63	63	63	63	63
Thickness of net, t [mm]	15	18	19	20	20
Shape of cell	vertical rhombus				
Tensile strength of a wire, [N/mm ²]	≥ 800				
Corrosion protection	Zn ≥ 155 g/m ²				≥ 80 g/m ²
Wire diameter [mm]	3	3	4	4	4
Weight of 1 m ² , [kg]	2,0	2,6	3,5	4,9	4,9
Tensile strength of net, [kN/m]	60	96	120	155	155
Roll width [m]	2,5				
Roll length [m]	on request				

Loads at contacts between net and special 2D-GEO anchor plate

Bearing resistance of net against puncturing with anchor plate, [kN]	90	136	160	240	200
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RHOMBOID STEEL WIRE CHAIN-LINK MESH «2D-GEO»



EROSION CONTROL MAT «2D-PP»



Technical characteristics\Product	A	B	C	D
Material	polypropylene			
Mass-area ratio, [g/mm ²]	400	500	550	600
Thickness, [mm]	15	18	20	24
Tensile strength, [kN/m]	Longitudinal	2,0	2,5	3,0
	Transversely	1,5	1,8	2,0
Elongation, [%]	30			
Working temperature, [°C]	-30° ÷ +80°			
Color	black			
UV stability	80 % strength retained			
Roll width, [m]	2 ÷ 4,2			
Roll length, [m]	30 ÷ 60			

ORGANIC GEOTEXTILE «2D-BIO»



Technical characteristics\ Product	A	B	C	D
Density, [g/m ²]	550	580	610	640
Seeds [g/m ²]	60	80	100	120
The content of fertilizers, growth stimulants and soil-forming additives [g/m ²]	40	50	60	70
Material	100% - flax			
Color	light gray			
Production method	needle punched			
Roll width, [m]	1,6 ÷ 2,0			
Roll length, [m]	25			

BAR GROUND ANCHORS «TULA»

Nominal diameter [mm]	Yield strenght [N/mm ²]	Tensile strenght [N/mm ²]	Cross-sectional area [mm ²]	Ultimate load [kN]	Weight [kg/m]	Elongation, %
15,0	500	883	177	150	1,38	6
16	500	883	200	160	1,56	6
18	500	883	254	200	1,98	6
20	500	883	314	250	2,44	6
22	500	883	380	300	2,96	6
25	500	883	491	390	3,8	6
32	500	883	804	640	6,53	6
15,0	800	1000	177	177	1,38	6
18	800	1000	254	254	1,98	6
25	800	1000	491	491	3,8	6
32	800	1000	804	804	6,53	6

CHEMICAL COMPOSITION

C	Mn	Si	V	Ti	S	P
0,71-0,84	0,75-1,25	0,18-0,55	up to 0,025	up to 0,02	≤ 0,045	≤ 0,035

Available accessories for all diameters: spherical nut, coupler



HOLLOW BAR GROUND ANCHOR

CHARACTERISTICS OF USUAL TUBULAR SCREW RODS

Propety	Outer diameter [mm]	Internal diameter [mm]	Linear weight [kg/m]	Cross-section area [mm ²]	Yield strenght [N/mm ²]	Ultimate resistance [N/mm ²]	YForce at the yield strenght boundary [kN]	Failure load [kN]
30/15	30	14,9	2,88	367,3	470	564	173	194
40/21	40	21,9	5,96	759	590	708	448	537
40/18	40	18,2	6,66	849	590	708	501	601
40/14	40	14,2	7,52	958	590	708	565	679
52/31	52	31,9	7,87	1003	590	708	592	710
52/28	52	28,9	9,08	1156	590	708	682	819
52/20	52	20,3	11,58	1475	590	708	870	1045
72/54	72	54,0	11,53	1468	590	708	854	1039
72/49	72	50,0	13,85	1764	590	708	1041	1249
72/40	72	40,0	17,92	2283	560	672	1278	1534
105/52	105	52,0	47,17	6008	500	600	3004	3605
105/78	105	78,0	26,56	3384	530	636	1793	2152
135/83	135	83,0	63,38	8074	500	600	4037	4845

CHARACTERISTICS OF HIGH-TENSILE TUBULAR SCREW RODS

Propety	Outer diameter [mm]	Internal diameter [mm]	Linear weight [kg/m]	Cross-section area [mm ²]	Yield strenght [N/mm ²]	Ultimate resistance [N/mm ²]	YForce at the yield strenght boundary [kN]	Failure load [kN]
30/15	30	14,9	2,88	367,3	650	730	238	268
40/21	40	21,9	5,96	759	820	920	622	698
40/18	40	18,2	6,66	849	820	920	696	781
40/14	40	14,2	7,52	958	820	920	785	881
52/31	52	31,9	7,87	1003	820	920	822	922
52/28	52	28,9	9,08	1156	820	920	682	1063
52/20	52	20,3	11,58	1475	820	920	1209	1357
72/54	72	54,0	11,53	1468	820	920	1203	1350
72/49	72	50,0	13,85	1764	820	920	1446	1622
72/40	72	40,0	17,92	2283	770	870	1757	1986
105/52	105	52,0	47,17	6008	690	780	4145	4686
105/78	105	78,0	26,56	3384	730	830	2470	2808
135/83	135	83,0	63,38	8074	690	780	5571	6297

Available accessories for all diameters: spherical nut, coupler, centralizer, pressure anchor plate

DRILL BITS FOR HOLLOW BAR GROUND ANCHORS

Tubular screw rod diameter, [mm]	Drill bit outer diameter, [mm]	Type	Weight, [kg]
30	75	clay	0,44
30	95	clay	0,55
30	51	hard metal button	0,75
30	51	hard metal cross	0,8
30	76	hardened cross	0,8
30	90	hardened cross	1,17
40	110	clay	1,52
40	150	clay	1,92
40	70	hard metal button	1,75
40	90	hard metal button	2,4
40	70	hard metal cross	0,98
40	90	hard metal cross	2,05
40	90	hardened cross	1,12
40	115	hardened cross	2,17
52	130	clay	2,65
52	175	clay	5,5
52	115	hard metal button	6,4
52	115	hard metal cross	3,7
52	115	hardened cross	2,18
52	130	hardened cross	2,95
72	130	clay	4,9
72	200	clay	5,8
72	230	clay	8,83
72	330	clay	13,1
72	130	hard metal button	6,9
72	130	hard metal cross	4,27
72	130	hardened cross	5,68
72	175	hardened cross	8,4
105	165	clay	7
105	220	clay	13
105	280	clay	14,1
105	175	hard metal button	13,8
105	175	hard metal threeblades	16,4
105	175	hardened cross	9,2



EARTH ANCHORS «ZHD»

ANCHOR HEAD

Anchor head	Head size, mm	Bearing area, cm ²	Anchor rod diameter, mm	Working load, kN	Ultimate holding capacity, kN
ZHD-1	360x180	500	20	80	120
ZHD-2	360x100	400	20	80	120
ZHD-3	295x89	220	16	40	60
ZHD-4	205,5x65	110	16	40	60

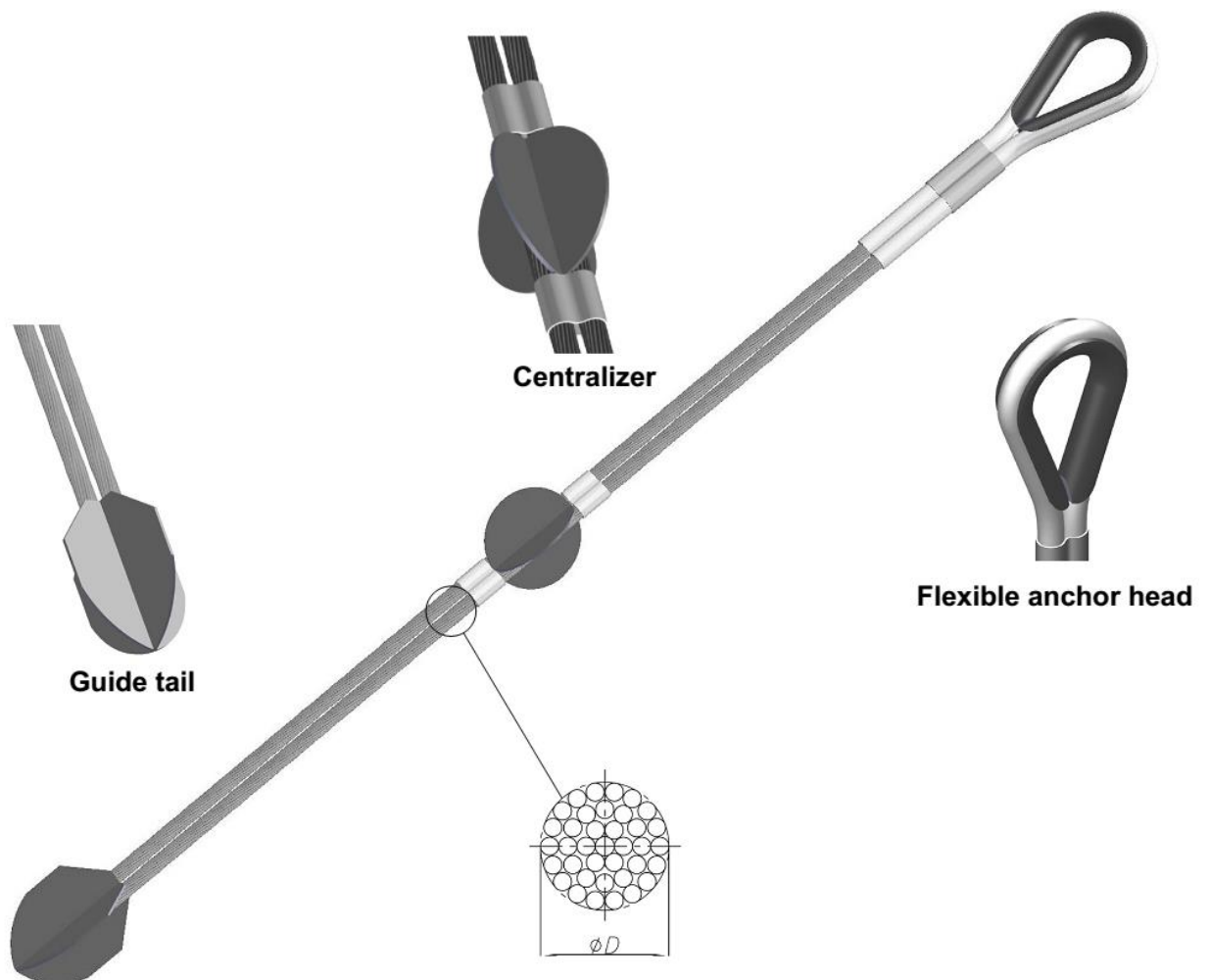
TECHNICAL CHARACTERISTICS OF ANCHOR ROD

Steel type	Nominal Diameter [mm]	Yield strenght [N/mm ²]	Tensile strenght [N/mm ²]	Elongation, %	Cross-sectional area [mm ²]	Ultimate load [kN]	Weight [kg/m]
Steel 76	16	500	883	5-14	200	160	1,56
Steel 76	20	500	883	5-14	314	250	2,44



CABLE FLEXIBLE ANCHOR

Type	Rope diameter, D [mm]	Conventional yield strength [kN]	Tensile strength [N/mm ²]	Anchor rupture strength [kN]
T12	12	206	1670	240
T14	14	285	1670	330
T17	17	410	1670	475
T20	20	525	1570	610
T21	21	605	1570	700
T22	22,5	686	1570	795





ROCKFALL PROTECTION DRAPERY SYSTEM

- maximum protection from rockfalls on rocky slopes
- 8 types of drapes with strength up to 1000 kN
- combination: drapery system with barrier at the top



ROCKFALL PROTECTION BARRIER

- for rockfalls with kinetic energies up to 5000 kJ
- adaptation to individual slope geometry characteristics

SNOW RETENTION BARRIER

- for snow depth up to 5 m
- minimum components - maximum safety



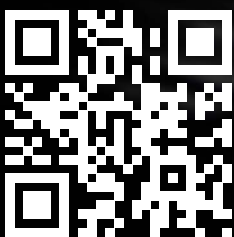
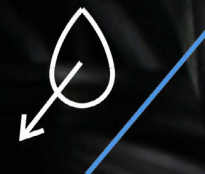
LANDSLIDE PROTECTION SYSTEM 2D-GEO

- individual selection of several system configurations
- wide range of ground anchors and meshes



MUDFLOW BARRIER

- custom design only
- for big and little valleys



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