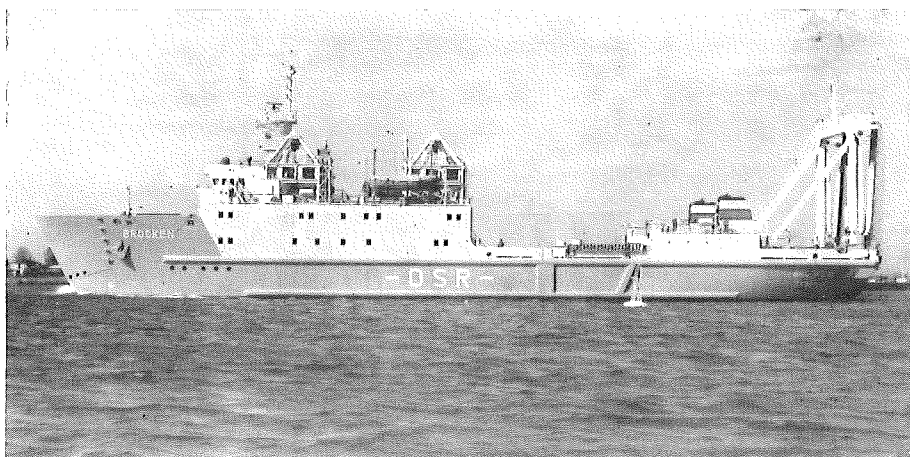


MV „BROCKEN“



<b>Vessel</b>	<b>Built</b>	<b>Commissioning</b>	<b>Call sign</b>
„Brocken“	1975/76	17. 03. 1976	DDVZ
Building Yard: B.V. Scheepswerf en Machinefabriek „Holland“ Hardinxveld-Giessendam/Holland			
Equipped with own ro/ro and lo/lo-handling gear, the specialized vessel is suitable for the carriage of heavy and bulky cargo.			
<b>Technical data:</b>			
Length o.a. (crane jibs turned down)	82,21 m		
Length o.a. (crane jibs turned up)	96,08 m		
Length b.p.	74,00 m		
Beam mld.	16,00 m		
Beam o.f.	16,45 m		
Depth tweendeck (freeboard deck)	4,00 m		
Depth upper deck	7,70 m		
Maximum draft	3,971 m		
Service speed	12 kn		
Operations range related to fuel consumption	9000 sm		
Displacement (draft summer load line)	3568,0 t		
Weight of the empty, fully equipped vessel ready for operation	2192,8 t		
Deadweight	1375,2 t		
Hold capacity, lower hold bulk cargo	927,5 cbm		
Hold capacity, lower hold general cargo	823,7 cbm		
Hold capacity, tweendeck bulk cargo	1467,6 cbm		
Hold capacity, tweendeck general cargo	1374,9 cbm		
<b>Tank capacities:</b>			
	with 95 % filling		
Marine diesel fuel	476,08 cbm	407,00 t	
Diesel	133,79 cbm	108,04 t	
Lubricating oil	20,34 cbm	17,00 t	
Drinking water	57,48 cbm	54,61 t	
Ballast water	1013,14 cbm	962,48 t	
Faeces	73,84 cbm	70,15 t	
Provisions, crew, effects, stores		114,0 t	
<b>Fuel consumption:</b>			
	Diesel	Marine Diesel	Fuel
Sea Day	1,5 t		13,0 t
Harbour day	1,5 t		
<b>Measurement:</b>			
International	1272,90 GRT		
International	528,49 NRT		
Suez-Canal	2347,64 GRT		
Suez-Canal	1930,42 NRT		
<b>Class:</b>			
The vessel has been built according to the regulations and under inspection of DSRK and classified: DSRK KM Ice 1 aut 24 ro/ro-vessel			

<b>Hatch Design:</b>				
One flush deck hatch both in the tweendeck and upper deck, the latter one being screwed up to be watertight. The foremost hatch cover of the upper deck is a hydraulical hinged one with the measurements 7000 x 3000 mm.				
The clear hatch measurements are:				
	upper deck	39705 x 7000		
	tween deck	25780 x 6774		
<b>Cubic capacity of holds:</b>				
		grain		bales
Hold	cbm	cbf	cbm	cbf
Lower Hold	927,5	32.756,5	823,7	23.090,6
Tweendeck	1.467,6	51.831,2	1.374,9	48.557,3
Total	2.395,1	84.587,7	2.198,6	77.647,9
<b>Ventilation:</b>				
Fresh air supply by 4 reversible electrical ventilators which enable a 5-fold renewal of air per hour.				
<b>Heights of the Decks:</b>				
Tweendeck:				
under girders	frames 42-90	2500 mm		
under hatch	frames 221/2-42	2260 mm		
under hatch	frames 42-90	2860 mm		
side tweendeck	frames 42-90	3300 mm		
Lower hold:				
under girders		1940 mm		
under hatch		2260 mm		
side lower hold		2420 mm		
<b>Deck load:</b>				
Upper deck: 9 t/sqm, axle load 20 t				
Tween deck: 4,5 t/sqm				
Lower hold: near the hatch 9 t/sqm on the remaining places 4,5 t/sqm				
Major loads can be taken up by the girders and, after fitting demountable stanchions, by the upper deck and tweendeck at certain places.				
<b>Handling equipment:</b>				
On principle 2 handling technologies are possible:				
1. Ro/Ro-Method				
for heavy lifts up to 550 tons and measurements up to 55 m length and 7 m diametre over ramp at the stern or the bow				
Suitable handling means are				
road trailers				
crawlers				
rail bogies				
for being served from the weatherdeck via ramp to the quay or beach and vice versa				

2. Lo/Lo-Method  
by means of 2 gantry cranes for parcels up to 260 tons and 7 m diameter.  
The quays, other crafts etc. are served via the stern.  
The cranes can be operated individually and in coupled condition. They can serve:  
quay, water behind vessel, other crafts, weather-deck, tweendeck, lower hold.

#### Ramp:

1 symmetrical ramp for bow and stern respectively  
Length 15 m  
Breadth 8 m  
Maximum height 1,3 m  
Load 350 tons  
Served from 0,9 ... 4,0 m above water line  
Brought out fore and aft by cranes  
Weight 45 tons

#### Railbogies:

2 railbogies with swivelling holsters and hydraulical lifting legs.  
Capacity 225 tons each  
Length 6,71 m  
Breadth 4,78 m  
Height 1,45 ... 1,95 m  
Track gauge 4,2 m  
Maximum climbing gradient 70  
Lifting height of the hydraulical cylinders 0,5 m  
To these bogies belong 200 m mobile rails (U-profile) of a length of 8 m and 4 m respectively which are laid out in the working area beforehand. By means of 4 hydraulical winches of 12 tons capacity (2 fore, 2 aft) the railbogies plus parcels are lifted from/on board.  
A mobile Diesel-driven winch (2 x 8 tons) can be used additionally, particularly ashore.

#### Cranes:

2 gantry cranes  
Capacity: 2 x 65 tons each (2 hooks)  
Span: 9 m  
Inside diameter on top 6,5 m on bottom 8,5 m  
Clear height over weatherdeck 8,5 m  
Jib 15 m long  
Range of operation: from fore to 7 m behind after-edge of the vessel with maximum 260 tons (if coupled)  
from fore to 11 m behind afteredge of the vessel maximum 130 tons  
Hook distance 5 m  
Minimum hook distance  
from crane to crane 7 m  
The cranes are equipped with load measuring devices for each hook and with load balances so that they can operate without using a cross bar (Traverse).

#### Derricks:

2 derricks of 5 tons capacity mounted to the cranes

#### Winches:

2 bow-anchor winches 13,8/5,5 t  
2 stern-anchor winches 12/4,8 t  
4 mooring winches 8/3,2 t (2 fore, 2 aft)

#### Further auxiliary loading equipment:

1 metal workshop with gas and electric welding  
1 wood workshop  
2 forklift trucks  
Capacity of the ballast pumps 2 x 150 cbm/h

#### Ship's type and design:

The twin screw-heavy cargo-ro/ro-vessel is a free-decker with a throughgoing upper deck, a bow port and lateral superstructures fore and aft. The navigation bridge is placed in the fore starboard superstructure and connected with the portside by a passage.

The double bottom goes up to the engine room. Within the area of the main engines only amidships a double bottom is available. The tweendeck is plane up to the engine room, from there it is in a raised position.

By 5 watertight bulkheads the vessel is divided into 6 compartments: fore peak, lateral thrust units room, ballast tanks, hold, engine room and after peak. The ship's hull is fully welded and in the area of the decks and double bottom made in longitudinal framing.

#### Accommodation:

8 single rooms	8 places	
5 double rooms	10 places	(1 spare room)
1 mess room	18 places	
1 meeting room	7 places	
1 ambulance room		

#### Steering gear:

2 electro-pneumatic remote control steering installations  
2 SUZ  
2 MUZ  
1 hand / self-steering gear  
1 RUZ  
Lateral thrust units

#### Alarm and communication installations:

1 alarm system  
1 fire alarm system  
1 command system  
1 intercommunication system  
3 phone installation

#### Navigational equipment:

1 gyro compass with 7 repeaters  
1 magnetic compass  
1 depth recorder which is suitable also for shallow sounding

#### Wireless and radio navigation:

1 EBS transmitter 400 W  
1,6 ... 25 MHz DEBEG 7130  
1 main transmitter  
1,6 ... 25 MHz DEBEG 7311 E  
1 receiver 70 KHz ... 30 MHz DEBEG 7201  
1 intermediate waves watch receiver 2182 KHz DEBEG 7241  
1 D/F receiver DEBEG 7400  
1 VHF-installation 57 channels DEBEG 7608  
1 selective calling decoder 60150 HAGENUK SRS 1 with identification decoder  
1 weather chart recorder (SU) FAK-P  
1 life boat radio station 500  
2182 UNITRA RS 101  
8364 KHz  
2 radars DECCA RM 916  
1 DECCA navigator DECCA Mark 21  
5 short wave walky-talkies (Poland) Echo 4 27,5 MHz  
1 VHF radiotelephone, channels 6,12,16 UNITRA FM 315/4

#### Propulsion system:

The main propulsion system consists of two independent irreversible 8-cylinder-fourstroke-Diesel engines with 2 reversing-reduction gears and 2 fixed-pitch propellers.

#### Technical particulars:

Number	2
Producer	SKL Magdeburg
Type	8 VD 26/20 AI-2
Design	in-line, four stroke, Diesel engines
Output	1200 h.p. each
Piston	200 mm
Piston stroke	260 mm
Rated speed	1000 e.p.m.

**Gear:**

Number	2
Producer	Reintjes
Type	WAV 1850
Reduction ratio	3:1

**Propeller:**

Number	2
Vanes	4
Diameter	2000 mm
Direction of rotation	clockwise
Material	aluminium - multimetal-bronze

**Rudders:**

1 electric hydraulic 2 cylinder rudder installation 2 Ra 10/15 (KGW) with 2 semi-balanced rudders placed behind the propellers  
1 lateral thrust units installation S 152 LK (Schottel) 250 h.p.

**Energy supply:**

3 Diesel generators SKL Roßlau 6 VD 18/15 314 h.p. 1500 r.p.m. with generator SRED 409-41 Elmo Dessau 216 kW  
1 emergency and harbour Diesel generator SKL Leipzig 4 VD 21/15 120 h.p. 1000 r.p.m. with generator SSE-D 358-6a Elmo Dessau 88 kW  
System of current: 3 x 380 V 50 Hz without centre point / 220 V 50 Hz

**Heating:**

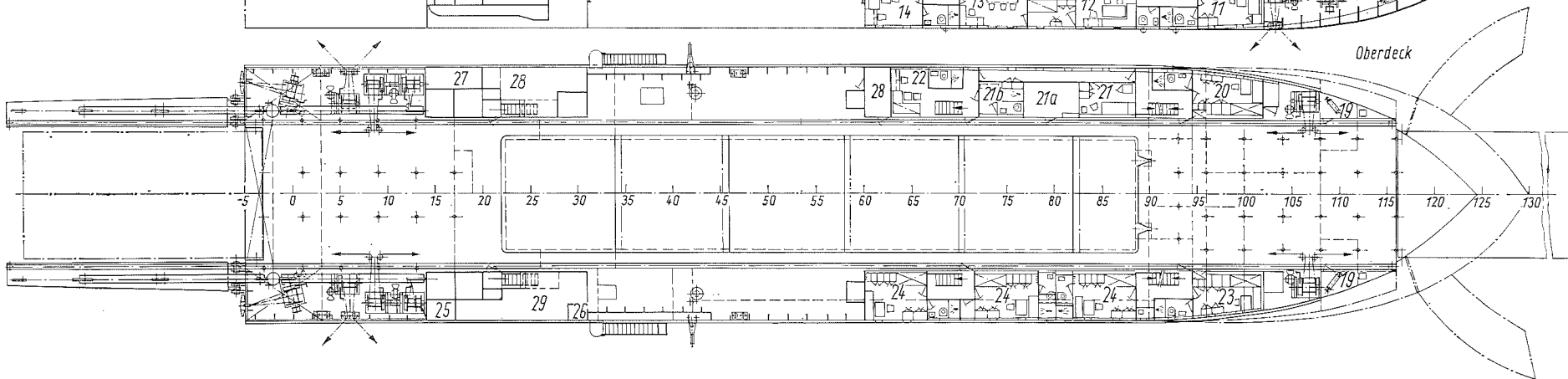
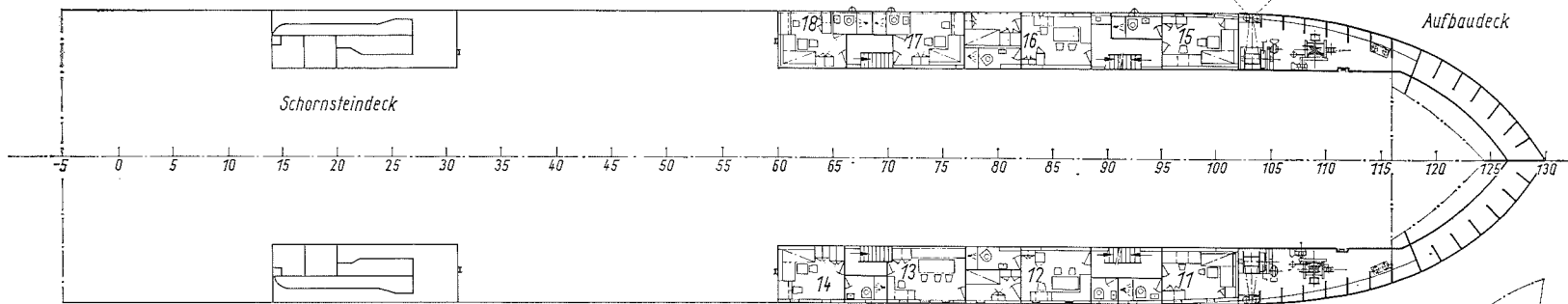
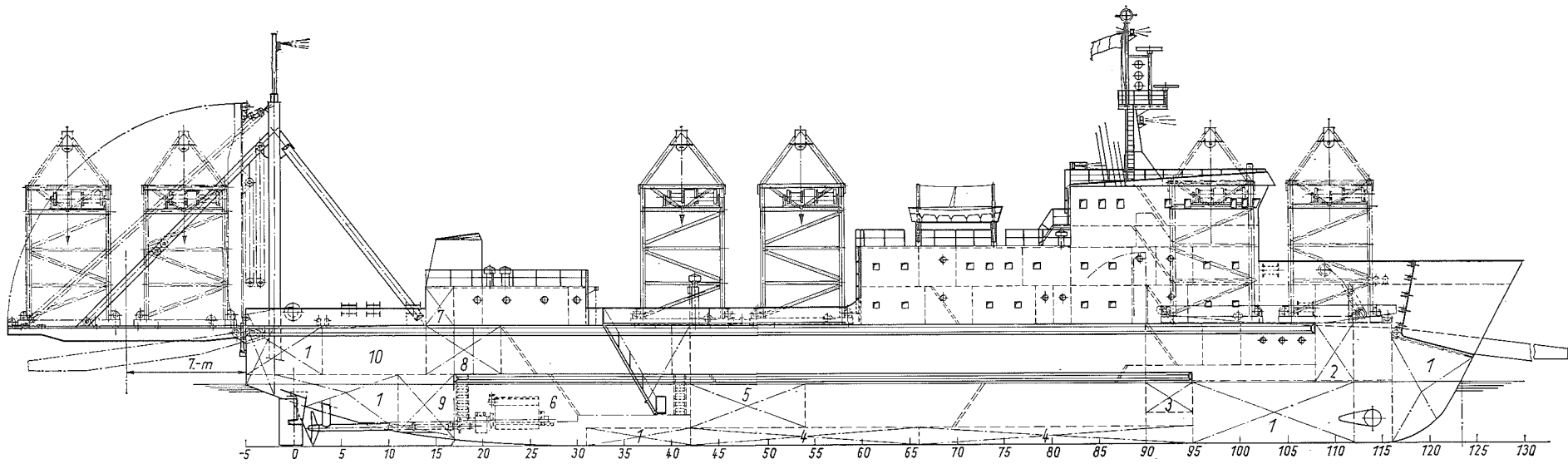
Fully air conditioned  
partially hot-water and electrical respectively

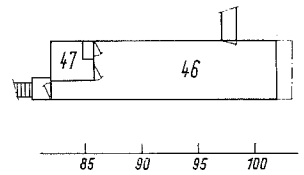
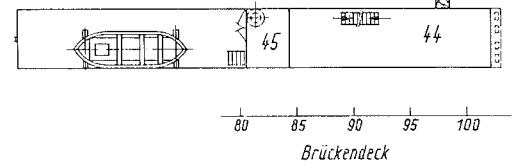
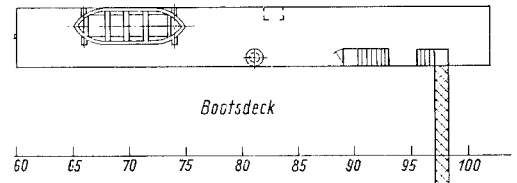
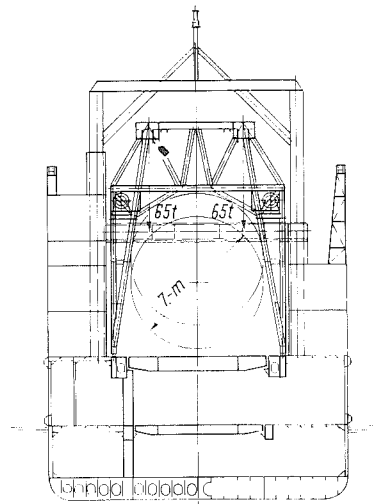
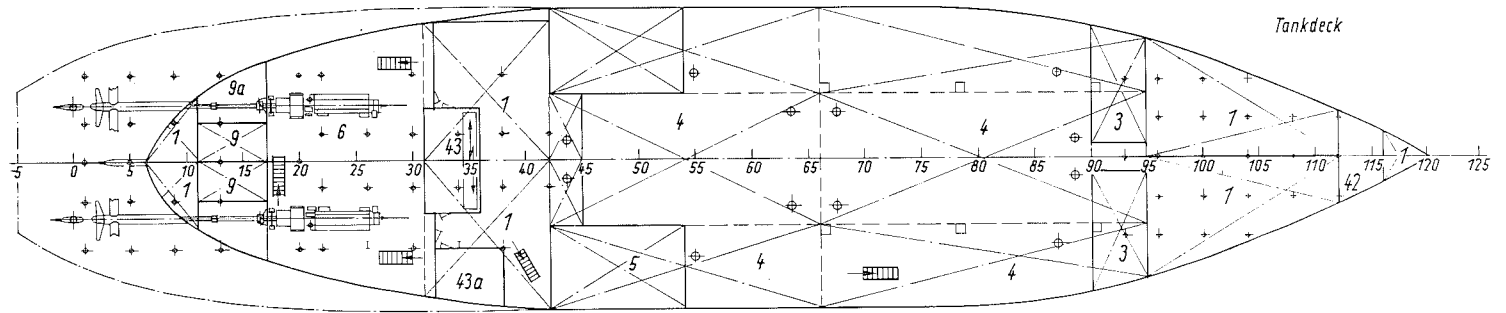
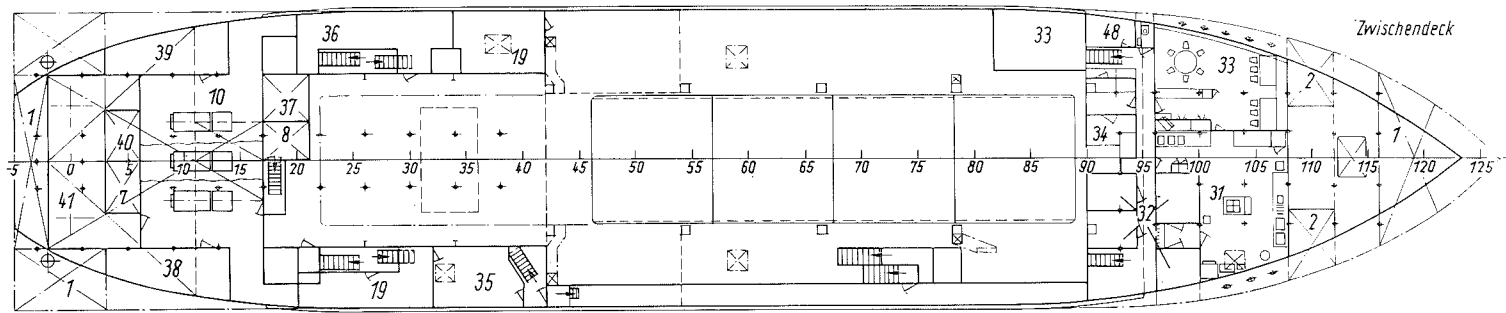
**Fire fighting equipment:**

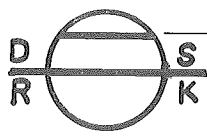
CO<sub>2</sub>, water, foam

**Life saving equipment:**

2 motor boats (6 FK) 6,0 m	20 persons each
4 inflatable life rafts	20 persons each







F

Freibord	Seewasser				Frischwasser			
	Tonnen /cm	Depl	Mom /cm Trimm TM	Tragfähigkeit	Tiefgang auf Marke	Tragfähigkeit	Depl	Tonnen /cm
		3700					3600	
	10,7		53		4,00		3500	10,4
		3600				1300		
	10,6	3500	52	1300		1200	3400	10,3
		3400		1200		1100	3300	
4,00	10,5	3300	51	1100		1000	3200	10,2
		3200		1000		900	3100	
	10,4	3100	50	900		800	3000	10,1
		3000	49	800		700	2900	10,0
	10,3	2900		700		600	2800	
		2800	48	600		500	2700	10,0
	10,2	2700		500		400	2600	9,9
		2600	47	400		300	2500	
	10,1	2500	46	300	3,00	200	2400	9,8
		2400		200		100	2300	9,7
	9,9	2300	45	100		0	2200	9,6
5,00	9,8	2200	44	0			2100	9,5
			43					