

OPTIBEAM

optimale Kurzwellen-Antennen

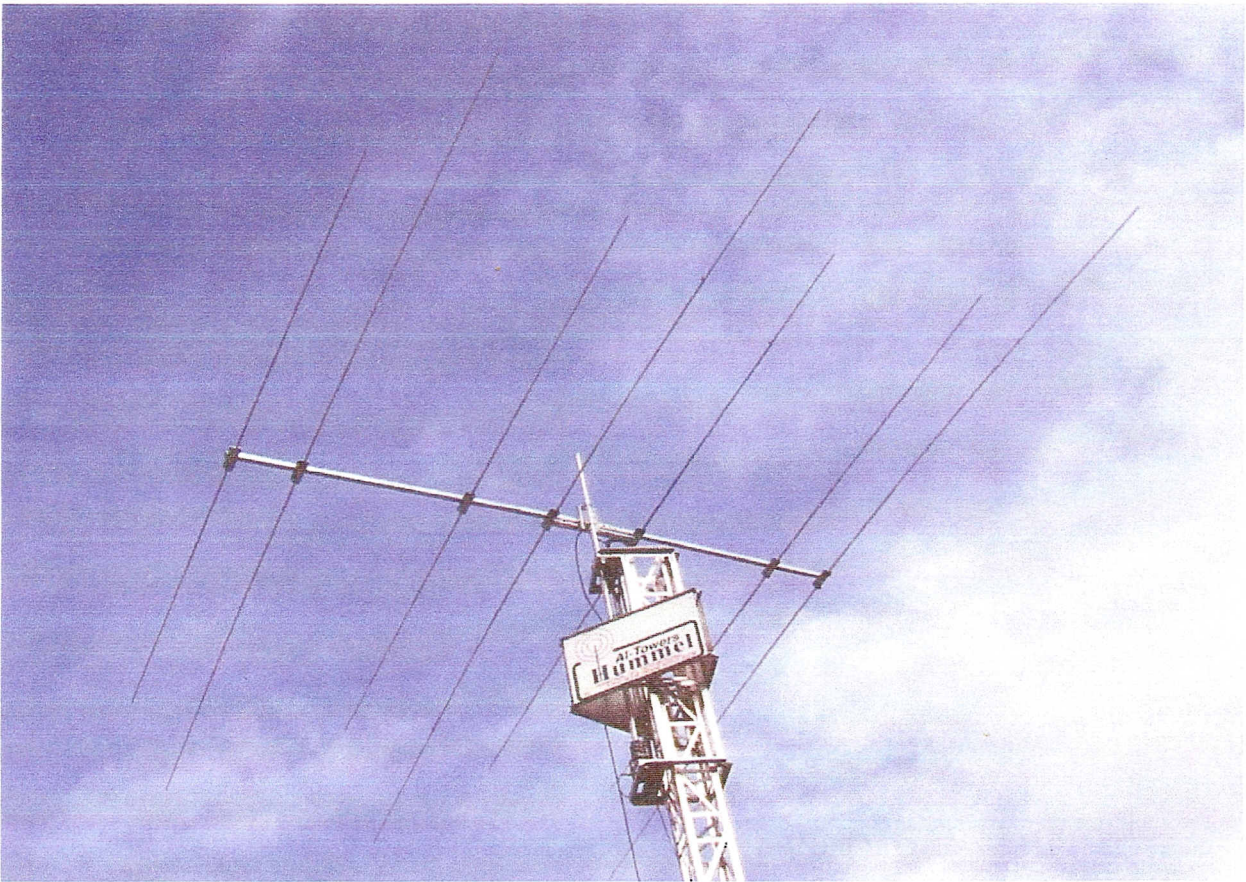
computer-designed / computer-optimiert

entwickelt von Funkamateuren für Funkamateure

optimum short-wave antennas

computer-designed / computer-optimized

developed by hams for hams



O B 7 - 2 WARC

7 Element Yagi 17/12

!!! Quality made in Germany !!!

1. Introduction

The OB7-2WARC is a high performing WARC Duoband Antenna for the 18 and 24 MHz amateur radio bands.

OptiBeam shortwave antennas are designed and optimized by support of modern techniques such as computerized antenna simulation and are finally adjusted by extensive tests in praxis.

The core of the antenna consists of a direct coupled 2-element-drivercell where the drivers are connected with a phase line of square tubes.

There is a separate reflector for each of the two bands. Furthermore there is a separate director for the 17m band and two separate directors for the 12m band.

By this new concept of feeding in combination with a special order of all elements and the exclusive use of full size elements highest efficiency, optimum bandwidth concerning high gain, clear pattern and low SWR together with unlimited power handling are achieved.

In the following table the essential electrical and mechanical data can be seen:

Bands		17m / 12m
Gain (dbd)*		5,1 / 6,0
Gain (dbi)**		10,6 / 11,5
F/B (db)		24 / 22
SWR:	18,13 24,95	1,1 1,0
Impedance (Ohm)		50
Elements		7
Active elements 17/12		3 / 4
Max. element length (m)		8,50
Boom length (m)		5,10
Weight (kg)		18

- * = average gain over a dipole in free space
 gain of monobanders for comparison: 2-element Yagi: 4 dbd, 3-element Yagi: 5-6 dbd
 ** = average gain at 20m above ground

2. Assembly

The included schematic diagram is needed for the assembly and the following information is given:

- > type of element (R=Reflector, S=Driver, D = Director) and the position on the boom
- > measurements of the element sections (length and diameter)
- > lengths of the element halves
- > distances between the elements.

The lengths are given in m (meters) and the diameters are given in mm (millimeters).

2.1 Sorting the parts

The antenna partly consists of already pre assembled parts.

All parts of the antenna are marked.

For faster and easier assembly it is recommended to sort the parts per band.

2.2 Assembly of boom

The square boom consists of three parts which have to be assembled each by two coupling pieces that are already installed at one side of the boom parts.

For each coupling piece 4 screws are needed. The screws have to be tightened finally not before the parts of the boom really **fit** to each other perfectly.

2.3 Construction of the elements

For the element to boom brackets 4-cornered plates are used and the insulation of the elements is done by 2 special plastic tube holders (see picture page).

The middle sections of the elements have to be fixed **exactly centred** on the plates (orientation = black middle line on parasites / insulator middle piece on driven elements). For that the element middle sections have to be put in to the tube holders (only concerning the driven elements one tube holder has to be opened for this process). Then the screws of the tube holders have to be **tightened solidly**. The screws of the driver middle sections divided with the insulators have to point **straight upwards**.

Next the other element sections have to be assembled. Insert the following sections in the previous sections with their side which has two drill-holes **equal in size**. The tubes have to be put in until the drill-holes of both sections overlap perfectly (concerning the outer 12mm tubes of the driven elements the **middle one** of the three drill-holes has to be chosen).

Then the corresponding screws (20mm tube = longer screw / 16mm tube = shorter screw) have to be pushed through **from the side of the enlarged drill-hole** of the previous segment. On the opposite side the washers have to be inserted and the self securing nuts have to be screwed on and **tightened solidly** (hold the screw heads with the included special screw-driver against turning, the screw heads dive into the enlarged drill-hole, see picture page). This method results in an extremely solid mechanical connection and rattle sounds inside the segment overlaps are totally avoided.

By this way of assembling the element sections the required lengths of the sections and the element halves are achieved automatically.

While mounting the elements pay attention that all screw heads show **upwards**. Keep in mind that the elements hang below the boom. Therefore the screw heads have to be on the same side of the elements where the plates are located at.

2.4 Attaching the elements to the boom

The elements fixed on the plates have to be mounted on the **underside** of the boom at the marked positions while the connecting screws of the boom should remain horizontal. The square boom makes a straightening of the elements unnecessary.

The plates are attached to the boom by 2 square brackets which embrace the boom from the top and 4 self securing nuts (see picture page). When tightening the square brackets pay attention that all elements are **parallel** to each other.

The driven elements (from the rear S12, S17) should **not** be tightened **before the installation of the phase line** is done (see fig. 2.5) as they might have to be moved slightly on the boom.

The plates of the outer elements end directly in line with the tips of the boom.

In case the antenna cannot be reached easily while assembling or even for more convenience in general we recommend to assemble the driver cell together with the phase line and the coax connector separately and then mount it below the boom in one piece.

2.5 Installation of the phase line

The driven elements (S12, S17) are connected with 2 parallel 20mm square tubes (=phase line).

The square tubes have to be in **direct contact** to the elements (put the washers only below the screw heads). First remove the element screws and washers. Then insert the predrilled square tubes (move the elements slightly if needed) by means of the element screws. Likewise insert the coax connector at the bottom of the phase line (=elements below boom) directly with the screws of S12 (see picture page). Be sure that the screw at the backside of the connector which holds the strap is **tightened solidely**.

Finally the phase line square tubes have to be **tightened really solidly** together with the driven elements (=important electrical contact) and the driven elements have to be mounted below the boom by means of the element plates (see fig. 2.4).

2.6 Installation of the boom to mast clamp

The boom-to-mast clamp is a completely pre assembled part (see picture page). It has to be attached slightly out of the balance point between S12 and S17.

3. Connection of coax cable

The feeding of the antenna is done by 50 Ohm coax cable.

For connection a PL-259 connector is required. The connector should be sealed against water entry.

Close to the feed point the cable should be winded to a choke coil with 5 to 6 turns of about 20 cm of diameter. Hereby the antenna is electrically balanced and unwanted radiation of the cable itself is prevented.

Instead of the choke coil a 1:1 balun can be used as well.

4. Adjustment of the antenna

An adjustment of the antenna is not necessary if the given dimensions are exactly observed.

By some influences of the direct surroundings it may happen that the resonance of the antenna (=point of best SWR) shifts on one or several bands.

By minimum changes of the according driver lengths (=shortening or lengthening of the outer 12mm sections) the resonant frequency of the according band can be shifted to the desired point.

By a slight decrease of the lengths of both element halves (put outer section in to the last drill-hole) the resonant frequency will be shifted upwards, by an increase (pull final section out to the first drill-hole) it will be shifted downwards.

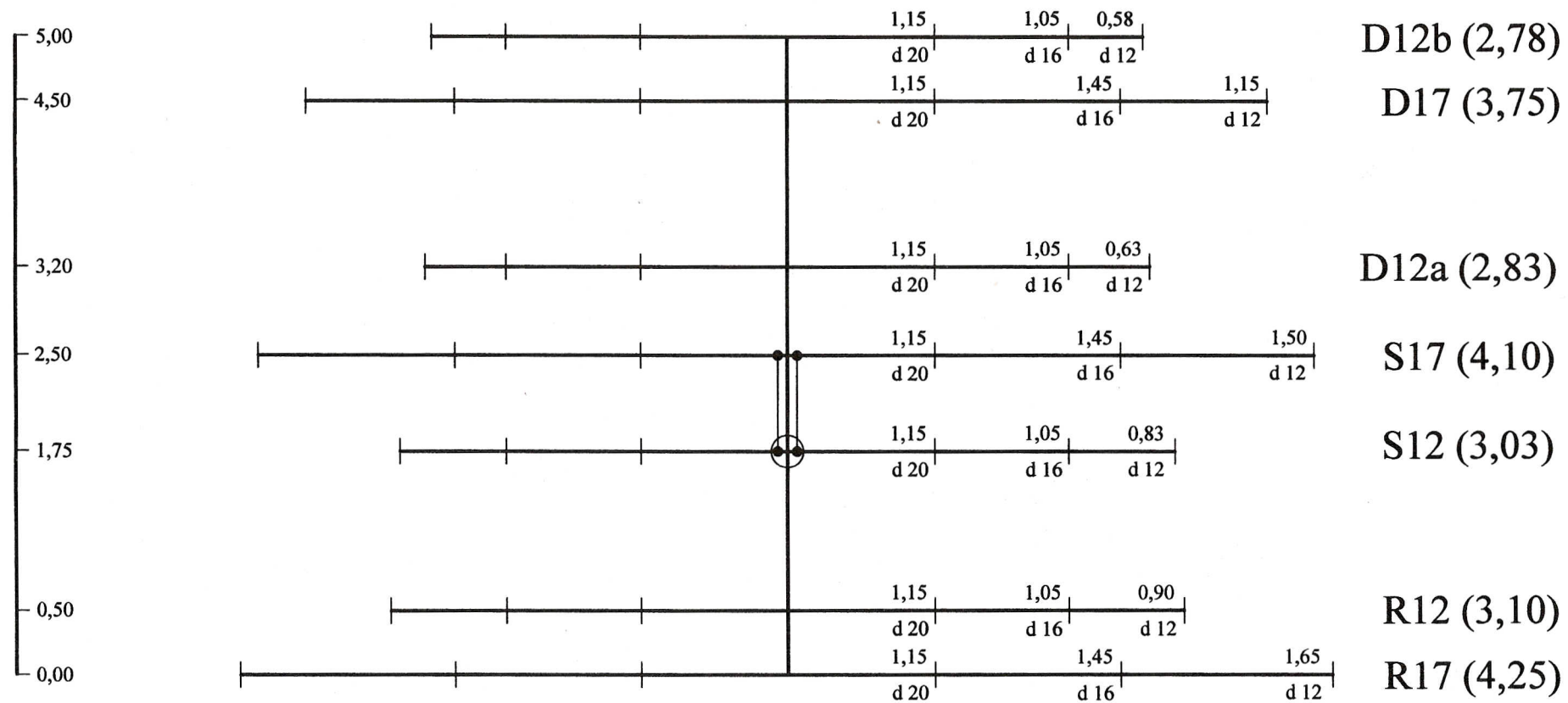
Normally these adjustments don't have to be done as the antenna does not react very sensitive against influences of the surroundings and the SWR curve is flat anyway.

5. Position of the antenna at strong winds

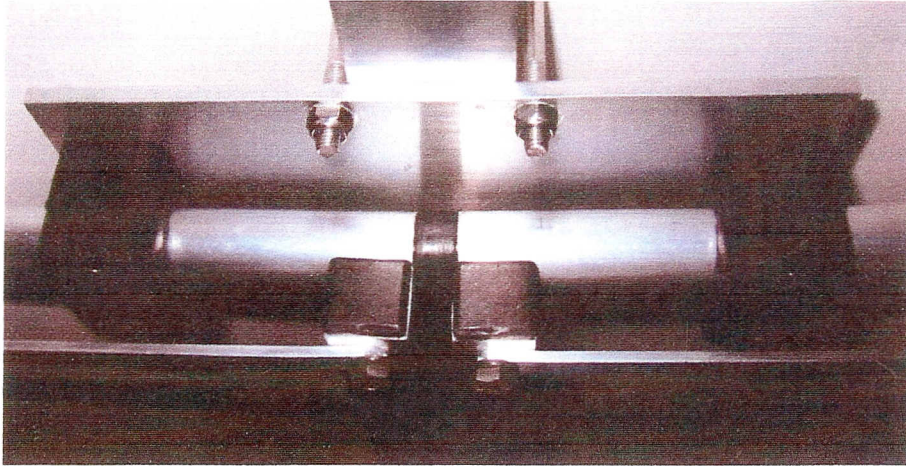
At strong winds the antenna should be placed in a way that the tips of the elements **show straight into the wind** which means that the boom stands broadside to it.

Hereby physical stress to the full size elements is avoided and their duration is enlarged.

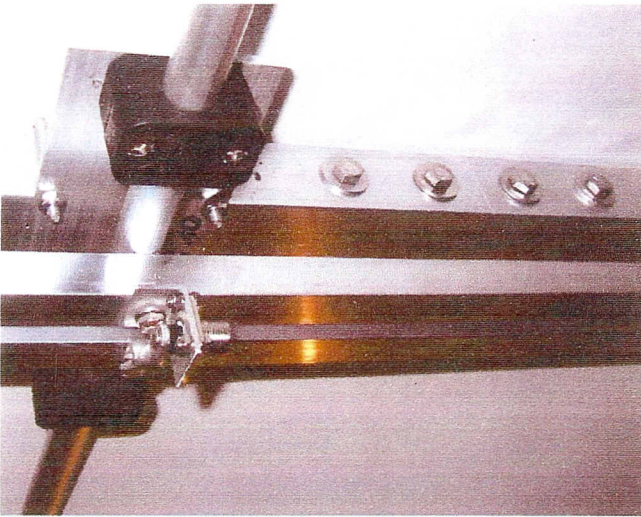
OptiBeam OB7-2WARC



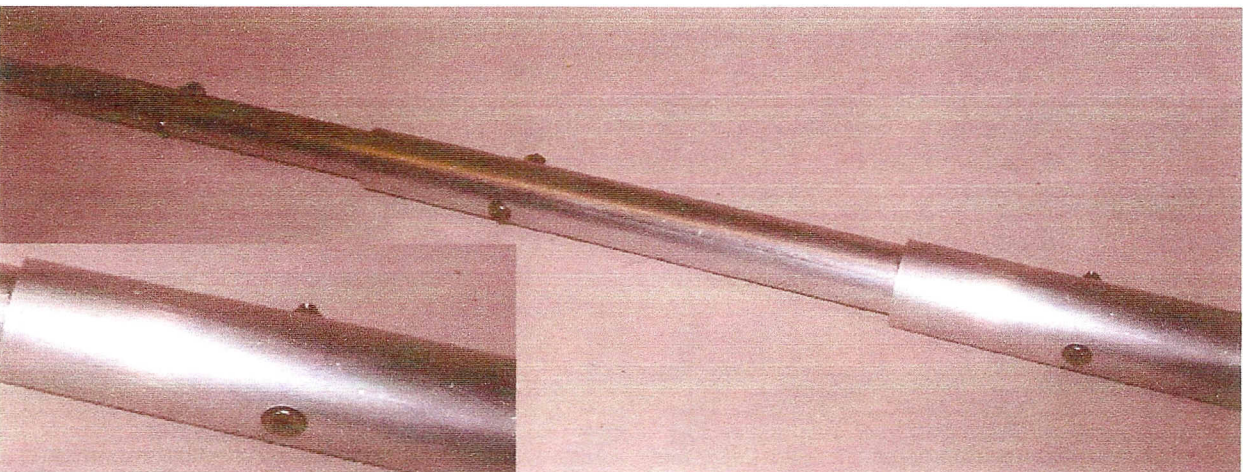
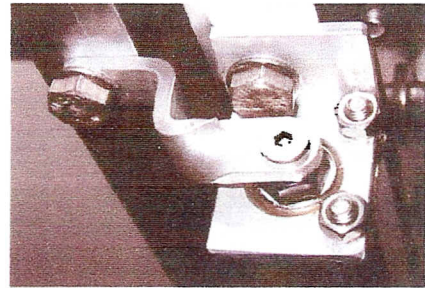
alle Längenmaße in m ; alle Durchmesser in mm



Ansicht Element-Plattform
Strahlerelement mit
Phasenleitung
(+ Phasenleitungsstüb
Modell OB9-5) /
view element platform
driven element with
phaseline (+ phaseline stub
model OB9-5)



Ansicht Koax-Anschlußbuchse SO239 mit Strahler-
element und Phasenleitung /
view coax connector SO239 with driven element
and phaseline



Ansicht Elementübergänge 25/20mm - 20/16mm - 16/12mm /
close up view element transitions 25/20mm - 20/16mm - 16/12mm