



Transport Guidelines
V90-3.0MW
Practical Information on Transport
For guidance only
Item no. 950049.R0 - Class I

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1. Preface

Please note that the following pages do not contain details on the measurements and weight of individual turbine components. This information can be found in the General Specifications for the turbine type in question.

As for details on turbine installation procedures please contact our Service Department.

Sea Transport

According to the Vestas Group Insurance policy we hereinafter refer to the following:

The marine transit rates agreed for this insurance apply only to cargoes and/or interests carried by mechanically self-propelled vessels of steel construction, classed by classification societies (to be informed upon request). Provided such vessels are:

- a)
 - (i) not bulk and/or combination carriers over 10 years of age.
 - (ii) not mineral oil tankers exceeding 50,000 GRT which are over 10 years of age.

- b)
 - (i) not over 15 years of age, OR
 - (ii) over 15 years of age but not over 25 years of age and have established and maintained a regular pattern of trading on an advertised schedule to load and unload at specified ports.

2. Road Structure

The road structure fully depends on the contours of the land whether based on crowned roads or side sloped design.

2.1 Drainage

Water should always be drained from the road and can never be allowed to stay on the road.

It should be drained either to the surrounding fields or be led to a drainage point beside the road. In order to do so, it is necessary to plan for this already at the base level.

2.2 Material

Base material must be interlocking rock/stone NOT containing clay but sand/gravel or other non-water binding material.

The finish material must be compatible non-slippery gravel.

2.3 Load capacity

The thickness of the base depends on the underlying soil – a soil analysis may be necessary.

The thickness of the finishing material should be min. 30 cm to ensure that there is enough material for grading the road afterwards to avoid bringing up heavy material from the base material.

Load capacity per axle should never be less than 15 ton/metric per axle.

3. Delivery Requirements

Parameter	Units	Value
Delivery	*****	*****
Access Road Minimum Width (Straight roads)	m	5.0
Access Road Minimum Bend Radius	See drawings pages 14 to 16	
Access Road Maximum Longitudinal Slope *)	degrees	8°
Access Road Maximum Lateral Slope	degrees	0-2°
Access Road Minimum Specification (Axle Load)	-	15 t
Erection – See Erection Manual	*****	*****

*) Based on drained roads consisting of crushed rock or similar with top layer of non-slippery gravel.

Gradients in excess of 8° (1:7, 14%) are subject to acceptance by haulier and Crane Hire Company

4. Transport

4.1 At Sea

The transport will typically consist of the following:

Quantity	Description
1	Complete Nacelle
2	160 ft Container containing 2 and 1 Blade(s)
4	Tower Sections
1	40 ft Container loaded with Cables/Controllers etc. (within legal limits)
1	40 ft container loaded with Tools and Generator for Erection

4.2 On Land by Truck

The transport will typically consist of the following:

Quantity	Description
1	Float loaded with complete Nacelle
1	Extendible Trailer for Blade Transport
4	Trailers for Towers
1	Trailer loaded with Cables/Controllers
1	Trailer loaded with 40 ft Container with Tools and Generator for Erection

The above is for guidance only

5. Required Equipment

NACELLE				
Float including Tractor		50.000 kg		
Nacelle		83.000 kg		
Adapter Ring for Bottom Frame		500 kg		
Lifting Yoke		1.500 kg		
Total Dimensions for Trailer Combination		33,3 x 3.40 x 4.35 m		
BLADES				
Trailer and Tractor + 1 set (3 pcs.) blades		70.000 kg		
Total Dimensions for Trailer Combination		47,00 x 3,50 x 4,10 m		
TOWER SECTIONS (80 m tower)				
Section nr.	Length	Max. Diameter	Min. Diameter	Weight
Section 1	13350mm	4190mm	3807mm	52.000kg
Section 2	20355mm	3807mm	3284mm	47.500kg
Section 3	20460mm	3284mm	2773mm	32.800kg
Section 4	23285mm	2773mm	2316mm	29.500kg

7. Trailer Transport V90 Nacelle

Nacelle on Tractor Trailer Combination

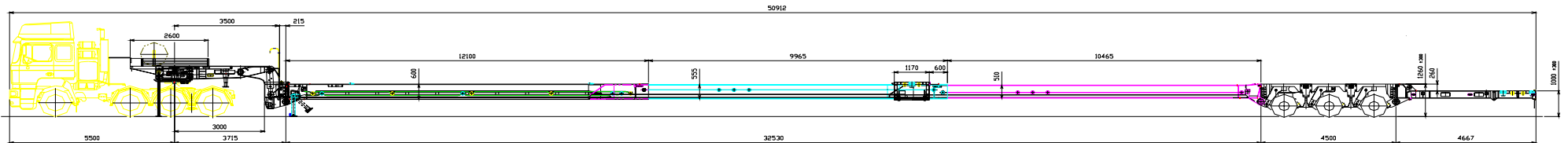


Nacelle lifted onto ship



8. Blade Transport Trailer

V90 Extendible Blade Transport Trailer



9. Truck Loaded with Blades

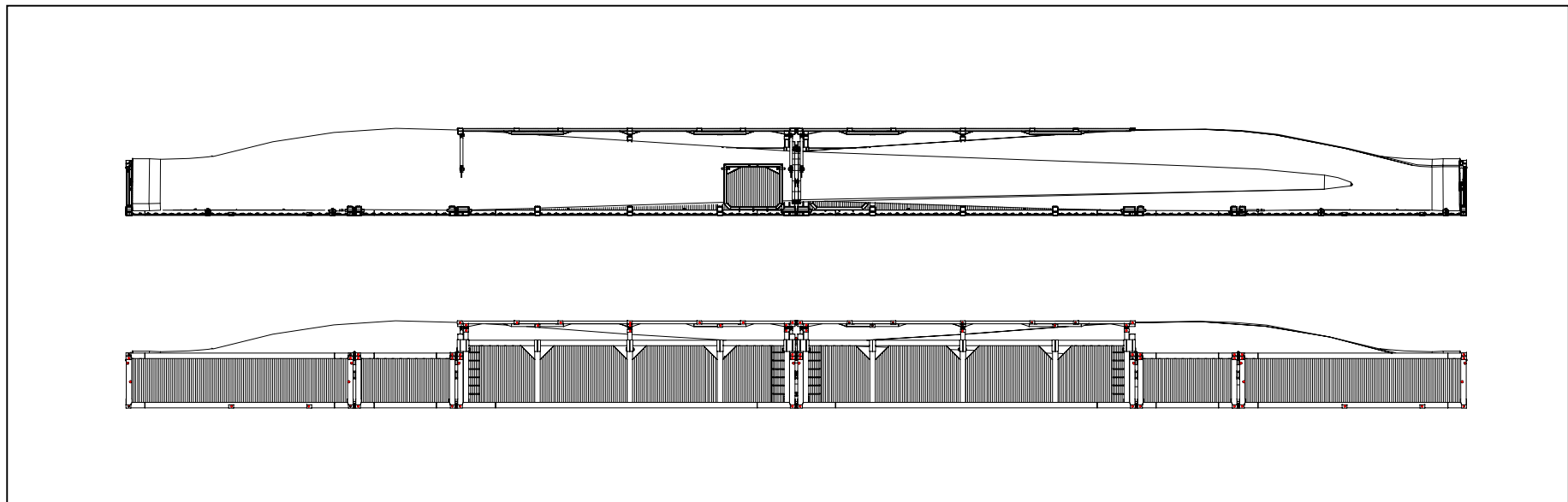
V90 TRANSPORT TRAILER FOR BLADES



10. Blade Container, Sea Transport

V90
160 ft CFC CONTAINER FOR TRANSPORT OF BLADES

Total weight of the loaded container is approx. 40000 kg
Container dimensions: 48.364 x 3.150 x 2.438



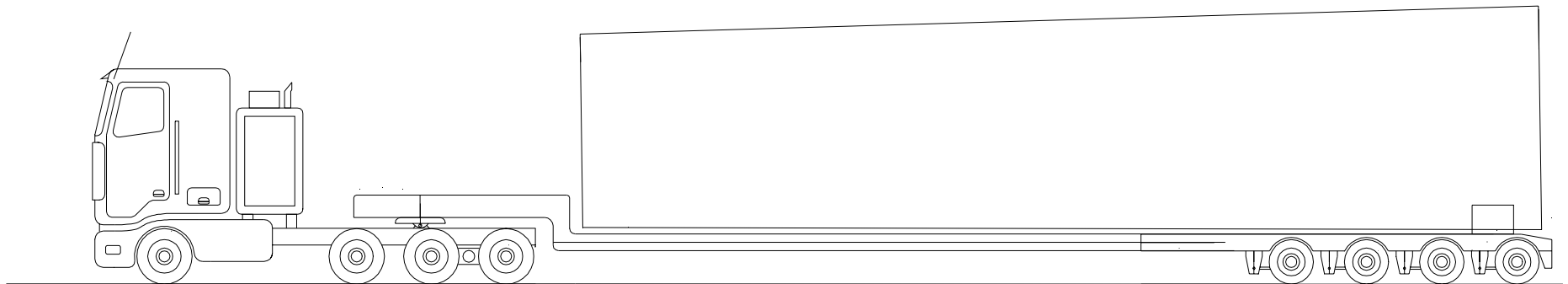
Container lifted with a reach-stacker



Container loading



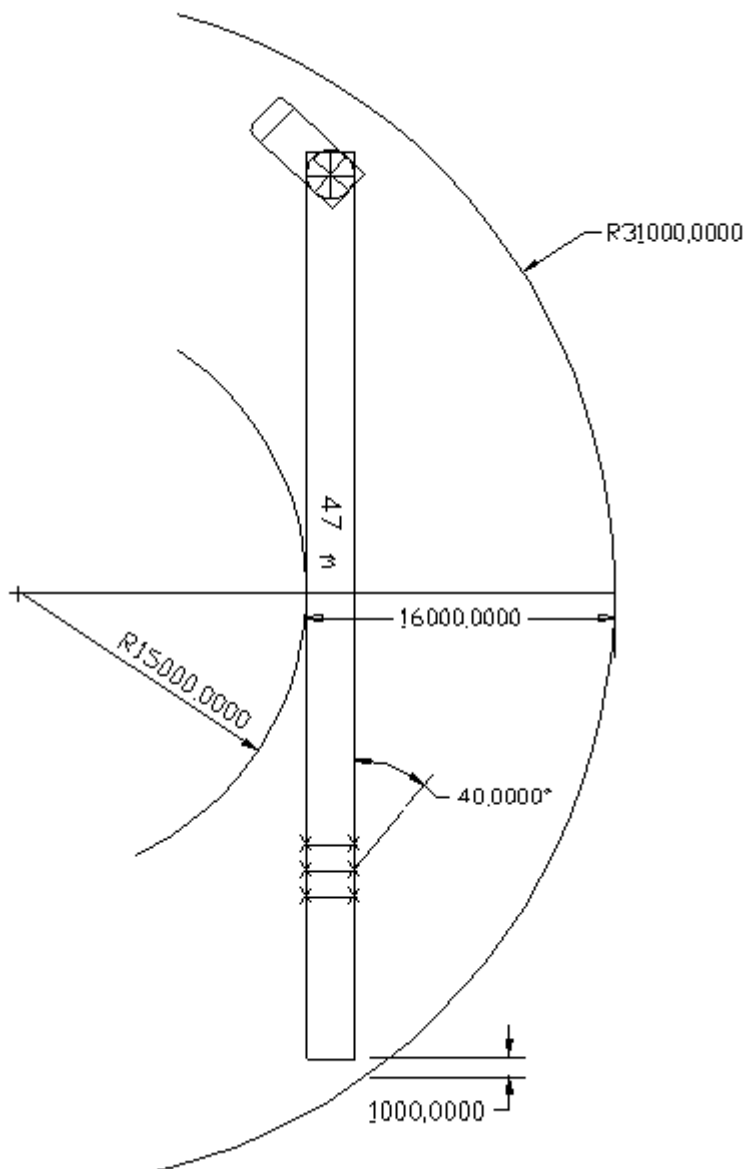
11. Transport of Tower Section



12. Road Transport V90 Blades

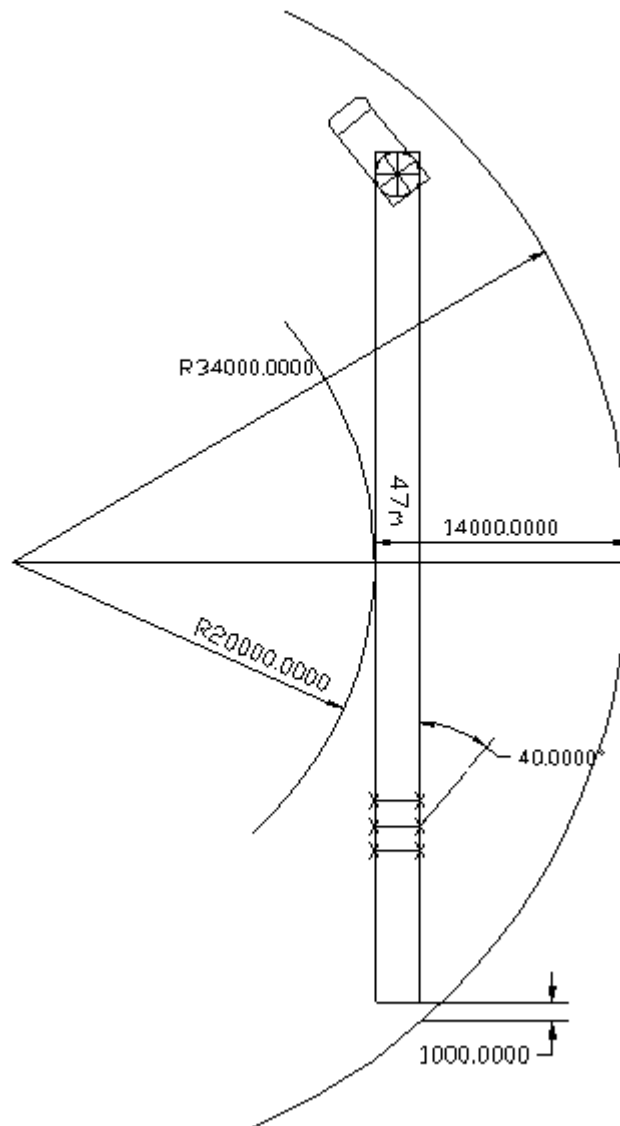
12.1 Road Radius 15 m

Radius required for a 47 m extendible trailer with electric/hydraulic manually controlled turnable wheels.



12.2 Road Radius 20 m

Radius required for a 47 m extendible trailer with electric/hydraulic manually controlled turnable wheels.



12.3 Road Radius 25 m

Radius required for a 47 m extendible trailer with electric/hydraulic manually controlled turnable wheels.

