1. **Numerical Analysis of Sail Shape**

2. **Mast Setting** (Pre-Bend Condition)
   - 2-a. Spreader Deflection
   - 2-b. Mast Rake
   - 2-c. Mast Step
   - 2-d. Side Stay Tension

3. **Mast Setting** (Sailing Condition)
   - 3-a. Spreader Deflection
   - 3-b. Side Stay Tension

4. **Main Sail Trim**
   - 4-a. Main Sheet
   - 4-b. Vang
   - 4-c. Outhaul
   - 4-d. Cunningham
   - 4-e. Puller

5. **Jib Sail Trim**
   - 5-a. Jib Leader
   - 5-b. Jib Tack
Numerical Analysis of Sail Shape

1. Camber: Parameter of sail depth in % of chord length
2. Draft: Parameter of maximum depth position in % of chord length
3. Twist: Parameter of chord angle to the boom
4. Entry: Parameter of the leading edge angle of sail to the chord
5. Exit: Parameter of the trailing edge angle of sail to the chord

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Numerical Analysis of Sail Shape

1. **Camber**: Parameter of sail depth in % of chord length
2. **Draft**: Parameter of maximum depth position in % of chord length
3. **Twist**: Parameter of chord angle to the boom
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**Numerical Analysis of Sail Shape**

**** Shape Graphs ****

**Vertical Axis**
- **Item**
  - Camber
  - Draft
  - Twist
  - Entry
  - Exit
- **Bigger**
  - Deep
  - Aft
  - Open
  - Wide
  - Open
- **Smaller**
  - Flat
  - Fore
  - Close
  - Narrow
  - Close

**Horizontal Axis**
- **0%** ... Bottom of Sail
- **25%** ... Bottom Stripe
- **50%** ... Middle Stripe
- **75%** ... Top Stripe
- **100%** ... Top of Sail

**Camber**

- Standard Trim
- Main Sheet -5kg
- Main Sheet +5kg

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Numerical Analysis of Sail Shape

**** Minor Stress Map ****

Wrinkles

Wrinkles are observed in Minor Stress Map

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470 Class
Mast Setting
(Pre-Bend Condition)
North Sails Japan, Inc.
Pre-Bend, Deflection

Spreader Length 460mm, Rake = 6720mm, SideStay = 290kg

<table>
<thead>
<tr>
<th>Mast Setting</th>
<th>Pre-Bend, Deflection</th>
</tr>
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</table>

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Pre-Bend, Deflection

Spreader Length 460mm, Rake = 6720mm, SideStay = 290kg

Mast Setting

Spreader Deflection

Pre-Bend, Deflection

Spreader Length 460mm, Rake = 6720mm, SideStay = 290kg
Pre-Bend, Deflection

Spreader Length 460mm, Rake = 6720mm, SideStay = 290kg

Mast Setting

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Pre-Bend, Deflection

Spreader Length 460mm, Rake = 6720mm, SideStay = 290kg

Mast Setting

Spreader Deflection

Pre-Bend, Deflection

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Pre-Bend, Rake

Spreader Length 460mm, Deflection = 120mm, SideStay = 290kg
Pre-Bend, Rake
Spreader Length 460mm, Deflection = 120mm, SideStay = 290kg
Mast Setting

Mast Step

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Pre-Bend, Mast Step

Spreader Length 460mm, Deflection = 120mm, SideStay = 290kg, Rake = 6720mm

Mast Setting

Mast Step
Pre-Bend, Mast Step

Spreader Length 460mm, Deflection = 120mm, SideStay = 290kg, Rake = 6720mm
Pre-Bend, Mast Step
Spread Length 460mm, Deflection = 120mm, SideStay = 290kg, Rake = 6720mm
Pre-Bend, Side Stay Tension

Spreader Length 460mm, Rake = 6720mm, Deflection = 120mm

Mast Setting

Side Stay Tension

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Mast Setting

Side Stay Tension

Pre-Bend, Side Stay Tension
Spreader Length 460mm, Rake = 6720mm, Deflection = 120mm

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Pre-Bend, Side Stay Tension

Spreader Length 460mm, Rake = 6720mm, Deflection = 120mm

Mast Setting

Side Stay Tension

Pre-Bend - Side Stay Tension

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470 Class

Mast Setting

(Sailing Condition)

North Sails Japan, Inc.
Mast Setting

Spreader Deflection
Twist

0.0 5.0 10.0 15.0 20.0 25.0 30.0
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Deflection 120mm
Deflection 135mm
Deflection 150mm

Bottom → Top

Close → Open
Mast Setting  Spreader Deflection

Spreader Deflection: 120mm
Spreader Deflection: 150mm
Mast Setting

Spreader Deflection

Spreader Deflection: 120mm

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Mast Setting

Spreader Deflection: 135mm
Spreader Deflection: 150mm
Mast Setting

Side Stay Tension
Mast Setting

Side Stay Tension
Side Stay Tension : 229kg
Mast Setting

Side Stay Tension

Side Stay Tension: 294kg
Side Stay Tension : 349kg
470 Class
Main Sail Trim
North Sails Japan, Inc.
Main Sail Trim

Main Sheet Tension
Main Sheet: Normal Trim – 5kg

Main Sail Trim

Main Sheet Tension

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Main Sheet: Normal Trim
Main Sheet: Normal Trim +5kg
Main Sheet: Normal Trim – 5kg
Main Sail Trim

Main Sheet: Normal Trim

Main Sheet Tension

2004 Copyright, North Sails Japan Inc.
Main Sheet: Normal Trim +5kg
Main Sail Trim

Vang Tension
Main Sail Trim

Draft

Back

Front

Bottom  Top

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

40.0% 42.0% 44.0% 46.0% 48.0% 50.0% 52.0% 54.0% 56.0%

- Standard Trim
- Vang 15mm
- Vang 30mm

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Main Sail Trim

Vang Tension

Twist

Open

Close

Bottom

Top

0.0

5.0

10.0

15.0

20.0

25.0

30.0

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Standard Trim

Vang 15mm

Vang 30mm

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Main Sail Trim | Vang Tension

Exit

-35.0 -30.0 -25.0 -20.0 -15.0 -10.0 -5.0 0%

Standard Trim
Vang 15mm
Vang 30mm

Open
Close

Bottom  Top

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Main Sail Trim  Vang Tension

Vang: Normal Trim