

## Manufacturing-Certificate-No.: UV\_CPY41239/10

covering the following hoop wrapped composite cylinders

<b>Customer:</b>	TecNautic Nv
<b>Customer's order no.:</b>	2400110
<b>Manufacturer's order no.:</b>	CPY41239/10
<b>Manufacturer's serial nos.:</b>	1Y0957-1Y1056
<b>Owner's serial nos.:</b>	without
<b>Quantity:</b>	100 pcs.
<b>Capacity:</b>	6,8 litres
<b>Gas:</b>	BREATHING GAS
<b>Drawing-No.:</b>	HPC04100REV1

### 1. LINER

#### 1.1 Liner material and heat treatment

The liners for the above mentioned composite cylinders were manufactured from steel cast(s) as indicated in the enclosed collective lists. The liners were heat treated under the following conditions.

The liners were heated to 860°C, quenched in synthetic oil, tempered at 525°C for a period of approx. 30 minutes and subsequently cool in quiet air.

#### 1.2 Hardness testing of the liners

Following the heat treatment all liners of the above mentioned composite cylinders were subjected to a hardness test on the cylindrical part. The hardness values determined were in the range of  $360 \pm 10$  HB.

#### 1.3 Ultrasonic testing of the liners

All liners of the above mentioned composite cylinders were subjected to an ultrasonic test for defects. No defects were registered. All cylinders so tested, were marked with the stamp „UT“ after the manufacturer's serial number.

#### 1.4 Construction testing, internal and external visual examination and check of threads and markings

All liners of the above mentioned composite cylinders were subjected to a construction testing according to the above mentioned drawing, an internal and external visual inspection, and a check of threads and stampmarkings.

## 2. FINISHED COMPOSITE CYLINDERS

### 2.1 Winding material

All liners of the above mentioned composite cylinders were hoop wrapped with Carbon-Fibre+Epoxy resin matrix (Type: T700SC-12K) in accordance with the mentioned drawing. The certificate(s) of the winding material used:

Batch-No.: T52312-03 (CP255) is attached hereto.

### 2.2 Heat treatment of the composite material

All above mentioned composite cylinders were heated to 120°C and after a holding period of 1 hour cooled down in the oven.

### 2.3 Autofrettage and Hydraulic testing:

The above mentioned composite cylinders were subjected to an autofrettage procedure at 600 bar for a period of 120 sec. and hydraulically tested at test pressure. The volumetric expansion results are recorded in the enclosed collective lists.

### 2.4 Stampmarking:

**Top end:** see attached stampmarking drawing CPY41239/10 (details not indicated on the stampmarking drawing, can be traced from the enclosed collective lists).

**Base end:** Heat identification mark.

### 2.5 Destructive testing

As per attached Inspection Report.

On behalf of the Manufacturer

Worthington Cylinders GmbH  
A-3291 Kienberg b. Gaming

#### Encl.:

Stampmarking drawing-No.:

Operating instruction:

Neckthread drawing:

Collective list:

Inspection Report -Test seet-No.

Cast analysis of the liner - No.:

Certificate of the winding material:

**CPY41239/10**

**PED 2021-003**

**M25x2 EN144-1:2000**

**4 page (s)**

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**LT22**

Fibre lot **T52312-03 (CP255)**