nuiTHELMA

TEST CERTIFICATE
UNMANNED TESTING OF UNDERWATER BREATHING APPARATUS

(Tests carried out in accordance with NORSOK U-101:1999)

Name of test centre: NUI / NUI-Thelma

Date: 2012.09.20 Number of pages in this certificate: 3

Name of underwater breathing apparatus tested: Amron BIBS Mask model 350M

Maker of underwater breathing apparatus:
Amron International, Inc., 1380 Aspen Way, Vista, CA 92081-8349 USA

Tests carried out for: Amron International, Inc

Tests carried out: May 2012

Reference to report: Amron350M-report, NUI-Thelma, 2012

Units

Unit 1:.....350A

Unit 2:.....350B

Unit 3:.....350C

Unit 4:.....350D

Unit 5:.....350E

Certified depth range based on this certificate:

With air from 10 msw to 50 msw, with heliox from 10msw to 350msw

Tests carried out by: Name: Hallvard Persvik

Signature: .....

Position: Test Technician

Date: 20 September 2012

Tests supervised by: Name: Bård Holland

Signature: .....

Position: Senior Engineer

Date: 20 September 2012

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Postboks 23 Ytre Laksevåg
5848 Bergen
Org. Nr: 984 610 394

Test Certificate verified by:

Name: Trond Bøe Myklebust

Signature: .....

Position: Surveyor, DNV

Date: 21 September 2012

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WORK OF BREATHING AND RELATED FACTORS

a) *Test depths* (msw) (Boldface appropriate figure(s)): 0, **10,** 20, **30**, 40, **50**, 60, 100, 150, 200, 250, 300, 350, 400

b) *Breathing mixture:* Air

c) *Supply pressure*: 0.8 – 1.2 MPa

d) *Return line pressure*: 0.1 – 0.3 MPa

a) *Test depths* (msw) (Boldface appropriate figure(s)): 0, **10,** 20, 30, 40, **50**, 60, **100**, 150, **200**, 250, **300**, **350**, 400

b) *Breathing mixture:* Heliox 2-20%

c) *Supply pressure*: 0.6 – 1.3 MPa

d) *Return line pressure*: 0.1 – 0.3 MPa

e) *Manner of rigging the breathing apparatus and the position of the demand valve (Note: See Subclause 6.3.2):*

In dry chamber, filled with 1% heliox
Supply from high pressure gas quads >Tescom Supply Regulator (4432-64J281) > quick connectors
Exhaust: Divex Back Pressure Regulator (RP700) > atmosphere

f) Temperature of ambient gas in the test chamber: 25°C

g) *Temperature and relative humidity of the inspired breathing mixture*
(Note: See Subclause 5.9, 6.2.7, 6.2.10, 6.3.10 and 6.3.11

Measured Temperature: 25°C

Estimated Relative humidity <<1% ("dry")

h) *Does the UBA incorporate a heating device* No

i) *Does the UBA incorporate a humidifier?* No

j) *Work of Breathing*
(Air at 50 msw) (See Subclause 5.2 and 5.3)

RMV	*Work of breathing (in J/l)*					
l/min	*Max <180msw*	*Measured value*				
		Unit 1	*Unit 2*	*Unit 3*	*Unit 4*	*Unit 5*
7.5	*0.8*	*0.56*	*0.58*	*0.55*	*0.59*	*0.60*
15.0	*1.1*	*0.64*	*0.55*	*0.60*	*0.62*	*0.63*
22.5	*1.4*	*0.68*	*0.51*	*0.56*	*0.59*	*0.62*
40.0	*3.0*	*0.41*	*0.27*	*0.55*	*0.66*	*0.51*
62.5	*5*	*1.50*	*1.57*	*1.88*	*2.45*	*1.41*

Comments (Note: See Subclause 5.2)
All within requirements

k)Respiratory pressure (Ideally less than ± 1.5kPa but never greater than ± 2.5kPa
(Air at 50 msw) (See Subclause 5.3 and 5.5)

RMV	***Respiratory pressures (in kPa)***											
l/min	*Inhaled pressures*						*Exhaled pressures*					
		Measured						*Measured*				
	Max	*Unit 1*	*Unit2*	*Unit3*	*Unit4*	*Unit5*	*Max*	*Unit1*	*Unit2*	*Unit3*	*Unit4*	*Unit5*
7.5	*-2.5*	*-0.34*	*-0.35*	*-0.37*	*-0.27*	*-0.39*	*2.5*	*0.41*	*0.39*	*0.36*	*0.22*	*0.36*
15.0	*-2.5*	*-0.43*	*-0.35*	*-0.38*	*-0.35*	*-0.48*	*2.5*	*0.43*	*0.40*	*0.39*	*0.26*	*0.40*
22.5	*-2.5*	*-0.46*	*-0,44*	*-0.44*	*-0.33*	*-0.51*	*2.5*	*0.41*	*0.42*	*0.46*	*0.30*	*0.43*
40.0	*-2.5*	*-0.53*	*-0,57*	*-0.51*	*-0.32*	*-0.55*	*2.5*	*0.57*	*0.51*	*0.50*	*0.29*	*0.49*
62.5	*-*	*-0.69*	*-0.52*	*-0.61*	*-0.36*	*-0.92*	*-*	*1.50*	*4.71*	*1.88*	*1.30*	*4.3*

Comments (Note: See Subclause 5.3)

All within requirements

j) *Work of Breathing*
(Heliox at 350 msw) (See Subclause 5.2 and 5.3)

RMV	***Work of breathing (in J/l)***					
l/min	*Max >180msw*	*Measured value*				
		Unit 1	*Unit 2*	*Unit 3*	*Unit 4*	*Unit 5*
7.5	*0.65*	*0.60*	*0.61*	*0.62*	*0.61*	*0.62*
15.0	*0.80*	*0.71*	*0.69*	*0.66*	*0.63*	*0.67*
22.5	*0.95*	*0.72*	*0.60*	*0.69*	*0.61*	*0.74*
40.0	*1.30*	*0.61*	*0.29*	*0.63*	*0.64*	*0.60*
62.5	*5*	*1.72*	*0.99*	*1.90*	*1.51*	*2.52*

Comments (Note: See Subclause 5.2)

All within requirements

k)Respiratory pressure (Ideally less than ± 1.5kPa but never greater than ± 2.5kPa
(Heliox at 350 msw) (See Subclause 5.3 and 5.5)

RMV	***Respiratory pressures (in kPa)***											
l/min	*Inhaled pressures*						*Exhaled pressures*					
		Measured						*Measured*				
	Max	*Unit 1*	*Unit2*	*Unit3*	*Unit4*	*Unit5*	*Max*	*Unit1*	*Unit2*	*Unit3*	*Unit4*	*Unit5*
7.5	*-2.5*	*-0.38*	*-0.44*	*-0.47*	*-0.43*	*-0.40*	*2.5*	*0.39*	*0.35*	*0.41*	*0.42*	*0.38*
15.0	*-2.5*	*-0.52*	*-0.53*	*-0.51*	*-0.44*	*-0.47*	*2.5*	*0.41*	*0.39*	*0.40*	*0.43*	*0.41*
22.5	*-2.5*	*-0.51*	*-0.52*	*-0.55*	*-0.45*	*-0.53*	*2.5*	*0.42*	*0.40*	*0.43*	*0.46*	*0.45*
40.0	*-2.5*	*-0.62*	*-0.54*	*-0.57*	*-0.60*	*-0.53*	*2.5*	*1.47*	*1.63*	*1.24*	*1.60*	*1.17*
62.5	*-*	*-3.8*	*-2.81*	*-3.91*	*-5.3*	*-5.0*	*-*	*0.89*	*1.39*	*1.11*	*1.51*	*1.24*

Comments (Note: See Subclause 5.3)

All within requirements