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Measuring of meshes of nets

by

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On account of practical problems which arose when the [NEAFC] Scheme of Joint Enforcement was being realized, the Institute for Fishery Products T.N.O. (Netherlands Organization for Applied Scientific Research) was requested to carry out an investigation into the variations in mesh sizes of fishing nets, when measured with the flag gauge, loaded with a weight of 5 kgs, as provided for in the Scheme of Joint Enforcement.

A series of tests was made to determine these differences. Yarns and netting of different synthetic materials were used for this purpose.

Annex I gives a comparison between the effective lateral pressure exerted by wedge-tapered gauges of different material to which a weight of 5 kgs was attached.

This table shows a significant increase of pressure as soon as the wedge is swung to simulate conditions at sea on board a vessel. The effective pressure on the yarn varies from 8.28 to 19.548 kgs. The equivalents show that weights of 2.17 and 1.5 kgs, respectively, when attached to the wedge, would cause a tension which corresponds to that of the ICES gauge, set at 5 kgs.

Annex II represents the mesh sizes of a piece of polyethene netting, measured in the following order:

- Series I: with the wedge (flat gauge as provided for in the Scheme of Joint Enforcement) loaded with a weight of 2,120 grammes.
- Series II: with the ICES gauge, set at 5 kgs.
- Series III: with the wedge, loaded with a weight of 2,450 grammes, after the weight has been swung to simulate conditions at sea.
- Series IV: with the wedge, loaded with a weight of 5 kgs as provided for in article 10 (IV) of the Scheme of Joint Enforcement.
- Series V: with the wedge, loaded with a weight of 5 kgs, after the weight has been swung to simulate conditions at sea.

Each series consists of 20 non-adjacent meshes, viz. 10 in either direction of the netting. All meshes were measured when stretched diagonally lengthwise as provided for in article 10 (IV) of the Scheme of Joint Enforcement. All series consist of the same meshes.

The figures show that a load of 5 kgs, attached to the flat gauge, stretches the mesh considerably. As soon as the weight is swung, the pressure on the mesh sides increases to a great extent, resulting in an average mesh size of > 84.25 mm (series V), compared with 73.6 mm when measured with the ICES gauge, set at 5 kgs (series II).

Annex III gives the results of measurements, carried out in the same way as described in relation to Annex II, it being understood that in this case polyamide netting was used.

Here the difference between the average of series II and the average of series IV is smaller than in Annex II. However, the average of series V shows that swinging the load results here in a greater mesh width than in the corresponding series of Annex II, viz. over 88.5 mm compared with over 84.25 mm.

CONCLUSION

The test bears out that a weight attached to the tapered gauge works in the same way as a loaded triangle. On account of the wedging effect the pressure on the mesh sides is quite different from the pressure exerted by a device with parallel jaws such as the ICES gauge.

In this method of measuring the external conditions exercise a great influence.

Attaching a weight of 5 kgs to the flat gauge has been introduced into the Scheme of Joint Enforcement (article 10 (IV)) to remove any doubt as to whether the gauge passes easily through the mesh.

Intended to exclude bias, this method includes the influence of external conditions which cannot be calculated beforehand. Such a method is not an appropriate means to the end in view.

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EFFECTIVE PRESSURE ON THE YARN

ANNEX I

exerted by different types of gauges, all having a thickness of 2 mm and a taper of 2 cm in 8 cm and loaded with a weight of 5 kgs. as provided for in the Recommendation Scheme of Joint Enforcement (Art. 10 (IV)).

AVERAGES of 10 measurements

- for equivalents 1 averages of 3 measurements

EQUIVALENT = the weight which, being attached to the wedge, exerts, other things being equal, the same tension on the yarn as the ICES gauge with a fixed pressure of 5 kgs.

VALUES : in kilograms

Material →	Polyamide				Polyester				Polyethene				
	after 1 minute's rest	after 10 minutes of 1 cm and 1 minute's rest	after 10 minutes of 2 cm and 1 minute's rest	after 1 minute's rest	after 10 minutes of 1 cm and 1 minute's rest	after 10 minutes of 2 cm and 1 minute's rest	after 10 minutes of 2 cm and 1 minute's rest	after 1 minute's rest	after 10 minutes of 1 cm and 1 minute's rest	after 10 minutes of 1 cm and 1 minute's rest	after 10 minutes of 2 cm and 1 minute's rest	after 10 minutes of 2 cm and 1 minute's rest	after 10 minutes of 2 cm and 1 minute's rest
WEDGE stainless steel	9.333 2.460	12.305 1.710	14.925 1.550	8.635 3.070	12.960 2.450	16.503 2.000	12.145 2.400	15.695 1.700	17.620 1.550				
smooth; calibration not engraved	8.948 2.850	10.678 2.050	13.768 1.550	8.293 2.970	12.618 2.300	16.429 1.920	12.120 2.000	16.050 1.550	18.175 1.500				
WEDGE brass	9.145 2.600	12.752 1.970	14.047 1.720	9.930 3.070	13.369 2.520	17.508 2.100	12.235 2.150	14.680 1.950	17.425 1.600				
smooth; calibration not engraved	9.690 2.650	12.030 2.150	13.290 1.550	9.428 2.650	13.068 2.150	16.425 1.800	13.183 2.100	15.702 1.600	19.040 1.350				
WEDGE as provided for in the Scheme of Joint Enforcement	8.280 2.170	12.153 1.960	14.775 1.765	10.210 2.400	13.858 2.100	17.565 1.760	12.050 2.450	16.790 1.800	19.548 1.500				
calibration engraved	9.194 2.450	10.945 2.000	13.140 1.600	10.870 2.250	13.865 2.050	16.715 1.800	12.788 2.120	16.195 1.600	18.748 1.320				

ANNEX II

MEASUREMENTS OF MESH SIZES OF POLYETHYLENE NETTING OF DOUBLE TWINE

CONDITION : WET - VALUES IN MILLIMETERS

N-DIRECTION : THE DIRECTION AT RIGHT ANGLES TO THE GENERAL COURSE OF THE TWINE (NORMAL)

T-DIRECTION : THE DIRECTION PARALLEL TO THE GENERAL COURSE OF THE TWINE (TWINWISE)

ORDER OF MEASURING	TYPE OF GAUGE	SERIES	MESH NUMBER										AVERAGE*				
			1	2	3	4	5	6	7	8	9	10	per direction	per series			
I	Wedge as provided for in the Scheme of Joint Enforcement, loaded with a weight of 2120 grammes	I a) N-direction of the netting b) T-direction of the netting	65	75	76	76	82	76	75	74	75	75	74	75	75	74,9	74,55
			74	73	74	71	74	73	71	76	75	81	74,2				
II	ICES gauge, set at 5 kgs	II a) N-direction of the netting b) T-direction of the netting	62	78	75	72	81	77	76	74	71	72	73,8	73,6			
			71	73	73	70	74	68	77	74	80	73,4					
III	Wedge as in I, loaded with a weight of 2450 grammes, measurement when the weight was at rest after having been swinging	III a) N-direction of the netting b) T-direction of the netting	65	81	80	80	85	81	80	78	77	78	78,5	78,85			
			77	77	76	75	80	80	75	85	81	86	79,2				
IV	Wedge as in I, loaded with a weight of 5 kgs	IV a) N-direction of the netting b) T-direction of the netting	68	82	82	82	87	83	83	83	77	85	81,2	81,25			
			80	77	80	77	81	80	77	89	83	89	81,3				
V	Wedge as in I, loaded with a weight of 5 Kgs Timing of measurement as in III	V a) N-direction of the netting b) T-direction of the netting	68	85	84	84	90	87	89	82	83	85	83,8	84,25			
			84	83	82	82	84	84	80	90	88	90	84,7				

* = >90; the wedge passed fully through the mesh

Annex III

MEASUREMENTS OF MESH SIZES OF POLYAMIDE NETTING OF DOUBLE TWINE
THERMOFIXED UNDER TENSION

CONDITION: WET - VALUES IN MILLIMETERS

N - direction : the direction at right angles to the general course of the twine (normal)
T - direction : the direction parallel to the general course of the twine (twincwise)

order of measuring	Type of gauge	Series	Mesh number										Average per direction series				
			1	2	3	4	5	6	7	8	9	10					
I	Wedge as provided for in the scheme of Joint Enforcement, loaded with a weight of 2120 grammes	a) N-direction of the netting	75	75	75	75	73	75	75	75	75	75	75	75	75	74,8	75,6
		b) T-direction of the netting	75	75	75	75	76	80	78	80	75	75	75	75	75	76,4	
II	ICES gauge, set at 5 kgs	a) N-direction of the netting	77	75	73	76	74	76	74	76	74	76	74	76	74	75,1	75,85
		b) T-direction of the netting	79	79	76	76	77	75	76	79	76	79	76	73	76,6		
III	Wedge as in I, loaded with a weight of 2450 grammes. Measurement when the weight was at rest after having been swinging.	a) N-direction of the netting	78	80	80	83	80	83	80	82	81	85	82	84	81,5	82,5	
		b) T-direction of the netting	85	83	83	84	83	84	83	83	84	86	86	83	83,5		
IV	Wedge as in I, loaded with a weight of 5 kgs.	a) N-direction of the netting	82	81	80	81	79	81	80	82	81	83	81	81	81,1	81,55	
		b) T-direction of the netting	84	84	81	81	83	81	82	81	82	83	81	80	82,0		
V	Wedge as in I, loaded with a weight of 5 kgs. Timing of measurements as in III	a) N-direction of the netting	86	89	86	90*	88	90*	88	90	90	90*	88	90*	> 88,7	88,5	
		b) T-direction of the netting	90*	90*	88	89	88	87	87	87	87	90*	88	86	> 88,3		

* = > 90; the wedge passed fully through the mesh

