



TEST REPORT NO. **0505/2008**

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CUSTOMER CHIEFMAR SRL
Via Adamoli
16100 GENOVA

Test samples Rubber Rings

STARTING CONSIDERATIONS:

The tests have been done comparing genuine rings on Rubber rings made in AcriloNitril-Butadien Rubber (NBR) Sh. 85 from company ALFA LAVAL, Alfa Laval item code 543446-03, and its equivalent manufactured by CHIEFMAR. Both samples have been supplied from customer CHIEFMAR and submitted to the same tests.

Concerning the conditioning tests, they have been done using 2 fluids taken from Vessel Suprema of Grimaldi Lines, and they are respectively:

1. Diesel oil type HFO IFO 380, removed from daily service tank.
2. Lubricating oil type me MOBIL GRADE M50, taken from the vessel's main engine carter.



RESULTS OF THE TESTS:

From the carried out analysis it has been obtained as follows:

ORIGINAL PARAMETERS:				
Original properties	Unit	Test Method	Chiefmar Ring Code 543446-03	Alfa Laval Ring Code 543446-03
Density	g/cm³	ASTM D 297	1,36	1,34
Hardness	Shore A	ASTM D 2240	82	89
Compression set : initial deformation of 25 % After 70 Hours at 120 °C	%	ASTM D 395	30	33

VALUE CHANGE AFTER TREATMENT IN FLUID				
1) Diesel Oil type HFO IFO 380 after 72 hours at 150 °C				
Original properties		Test Method	Chiefmar Ring Code 543446-03	Alfa Laval Ring Code 543446-03
Δ Hardness	Shore A	ASTM D 471	-10	-18
Δ Weight	%	ASTM D 471	+ 10,6	+ 36,0
Δ Volume	%	ASTM D 471	+ 13,8	+ 38,0

CONSIDERATION ON VALUE CHANGE IN FLUID Diesel Oil type HFO IFO 380 after 72 hours at 150 °C

Alfa Laval part, code 543446-03, shows, comparing Chiefmar part, a major change of 8 point Shore A in hardness, as for changes in weight and volume we note more swelling in Alfa Laval part, respectively of more 25.40% and 24.20%, respect Chiefmar item.

This brings to further state that Chiefmar part in Diesel Oil Type HFO IFO 380 has clearly the best performance.

A major swelling can bring to a sensible reduction of Physical and Mechanical properties and therefore to a reduction of the sealing, with the risk of having infiltration in the slot, where the gasket has to work.

VALUE CHANGE AFTER TREATMENT IN FLUID

**2) Lubricating oil type ME MOBIL GRADE M50
after 72 hours at 150 °C**

Original properties	Unit	Test Method	Chiefmar Ring Code 543446-03	Alfa Laval Ring Code 543446-03
Δ Hardness	Shore A	ASTM D 471	+ 2	-3
Δ Weight	%	ASTM D 471	-1,40	-0,30
Δ Volume	%	ASTM D 471	-1,60	-0,02

CONSIDERATION ON VALUE CHANGE IN FLUID Lubricating Oil type ME MOBIL GRADE M50 after 72 hours at 150 °C

Both gaskets have changes in Hardness, Weight and volume similar and therefore it would be consider their behavior equivalent or with minimum differences.

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