ANNEXURE D
RUBBER SPECIFICATION FENDER LEGS

PORT OF NGQURA CONTAINER TERMINAL ADDENDUM

1. Rubber Properties

Property	Testing Standard	Condition	Requirement
Tensile Strength	ASTM D 412 Die C; BS ISO 37	Original	16.0 MPa (min)
		Aged for 96 hours at 70°C	12.8 MPa (min)
Elongation at Break	ASTM D 412 Die C; BS ISO 37	Original	350%
		Aged for 96 hours at 70°c	280%
Hardness	ASTM D 2240; BS ISO 7619-1; DIN ISO -7619-1	Original	78° Shore A (max)
		Aged for 96 hours at 70°C	Original + 8° Shore A (max)
Compression Set	ASTM D 695 Method B; ISO 815-1	22 hours at 70°C	30% (max)
Tear Resistance	ASTM D 624 Die B; BS ISO 34-1	Original	70 kN/m (min)
Ozone Resistance	ASTM D 1149; DIN ISO 1431-1; BS ISO 1431-1	50ppm at 20% strain, 40°C 100 hours	No cracks
Seawater Resistance	ASTM D 471; BS ISO 1817	28 days at 95°C	Hardness:±10° Shore A (max) Volume: ~+10/-5% (max)
Abrasion	BS 903 A9, Method B	3000 revolutions	1.5cc (max)
Bond Strength	ASTM D 429 Method B; BS ISO 813	Rubber to steel	7N/mm (min)
Dynamic Fatigue	ASTM D 430-95 Method B	15,000 cycles	Grade 0-2
Density*	ISO 2781	Original	Max 1.2 g/cc
Polymer*	ASTM D6370	Original	Min 45%
Carbon Black *	ASTM D6370	Original	Min 20%
Ash*	ASTM D297	Original	Max 5%
Polymer filler Ratio*	-	Original	Min 1.20

* *These tests are done after delivery of fenders at site. The rubber fenders will be inspected and one or two fenders will be selected at random. A small **30-50 grams sample** will be cut from the body of the fender and sent to third party laboratory for testing. Note that this is not a destructive test. Test result should satisfy the specification above.*

PROCEDURE FOR RUBBER SAMPLE COLLECTION

The following is the complete procedure for collecting a 30-50 gram rubber sample from a post-production fender.

Supplies

QUANTITY	ITEMS
1	Stanley 21-115 surform shaver
1	9" x 12" (225 x 300) manilla envelope
1	2 oz diamond multi-purpose mini cup with lid
1	Roll of duct tape
1	Alcohol (water if no alcohol available)
1	Clean rag or towel

Procedure

STEPS	PROCEDURE
1	Using a clean rag or cloth towel and alcohol, clean the area from which you will be taking the sample. It is important to remove any dirt or other foreign matter that could contaminate the sample.
2	Tape the 9" x 12" manilla envelope underneath the sampling site. Tip: Place a crumpled-up piece of paper in the envelope to open the mouth of the envelope. This will allow the shavings to fall easier into the envelope.
3	Use the Stanley 21-115 surform shaver to scrape rubber shavings from the sampling site and into the envelope.
4	When you feel you have shaved off enough rubber to fill the 2 oz diamond multi-purpose mini cup, untape the envelope from the fender, and pour the shavings into the cup.
5	If the shavings collected do not fill the cup, repeat steps 2 - 4. The shaving should simply fill the cup fully without packing the shaving tightly into the cup. Note: it does not hurt to have more than you need.