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INDIAN RUBBER MANUFACTURERS RESEARCH ASSOCIATION

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(A NABL (ISO - 17025-2005) Accredited Laboratory)

E-mail : info@irmra.org • Website : www.irmra.org.

TECHNICAL REPORT / M & R

RPT / 825 / 15-16 - M & R

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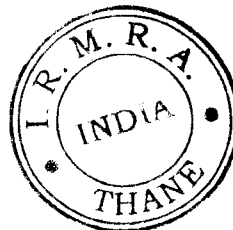
Sample : EPDM Rubber U Channel-RS Code-201516/0278 Specn. AS;217:81:Mar-2014

| Test (Condition) | Method | Unit | Specified Value | Observed Value | Remarks |
|--|------------------|--------------------|--|-------------------------------------|---------|
| Tensile Strength (Before ageing) | IS-3400-I | Kg/cm ² | 40Min | 65 | +ve |
| Hardness (Before ageing) | IS-3400- XXIII | Shore A | 65±5 | 67 | +ve |
| Change in Hardness (@100°C/70hrs) | IS-3400-XXIII&IV | Points | +10/-5 | +5 | +ve |
| Ozone Resistance (100pphm/@40°C/100hrs/ 20%strain) | IS-3400-XX | - | No cracks shall be observed | No cracks observed up to 100 hours. | +ve |
| Resistance to Bending (Reverse bending on 4mm dia mandrel by 180°) | Table-I | -- | No cracks shall be observed | Passes the test. | +ve |
| Visual Observation (Resistance to Heat @100°C/70hrs) | Table-I | - | No cracks, tackiness or free carbonaceous material shall be observed | Passes the test. | +ve |

Note : +ve indicate the results match with specified value.
-ve indicate the results do not match with the specified value.

Prepared and Checked By

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Sample : EPDM Rubber U Channel-RS Code-201516/0278 Specn. AS:217:81:Mar-2014

| Test (Condition) | Method | Unit | Specified Value | Observed Value | Remarks |
|------------------------|----------|------|-----------------|---|---------|
| Polymer Identification | ISO:4650 | -- | EPDM Rubber | Ethylene Propylene Diene Rubber [EPDM] | +ve |

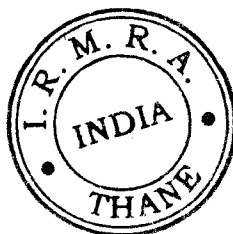
Encl.: FTIR graph.

Note:+ve indicate the results match with specified value.

-ve indicate the results do no match with specified value.

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Sample : EPDM Rubber U Channel-RS Code-201516/0254

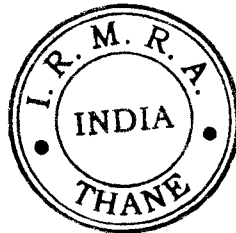
Specn. AS:217:81:Mar-2014

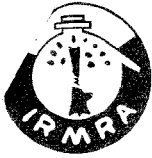
| Test (Condition) | Method | Unit | Specified Value | Observed Value | Remarks |
|--|-----------------------|--------------------|--|-------------------------------------|---------|
| Tensile Strength (Before ageing) | IS-3400-I | Kg/cm ² | 40Min | 70 | +ve |
| Hardness (Before ageing) | IS-3400, XXIII | Shore A | 65±5 | 61 | +ve |
| Change in Hardness (@100°C/70hrs) | IS-3400-Part-XXIII&IV | Points | +10/-5 | +7 | +ve |
| Ozone Resistance (100pphm/@40°C/100hrs/ 20%strain) | IS-3400-XX | - | No cracks shall be observed | No cracks observed up to 100 hours. | +ve |
| Resistance to Bending (Reverse bending on 4mm dia mandrel by 180°) | Table-I | -- | No cracks shall be observed | Passes the test. | +ve |
| Visual Observation (Resistance to Heat @100°C/70hrs) | Table-I | - | No cracks, tackiness or free carboneous material shall be observed | Passes the test. | +ve |

Note : +ve indicate the results match with specified value.
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Sample : EPDM Rubber U Channel-RS Code-201516/0254

Specn. AS;217:81:Mar-2014

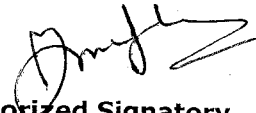
| Test (Condition) | Method | Unit | Specified Value | Observed Value | Remarks |
|------------------------|----------|------|-----------------|---|---------|
| Polymer Identification | ISO:4650 | -- | EPDM Rubber | Ethylene Propylene iene Rubber [EPDM] | +ve |

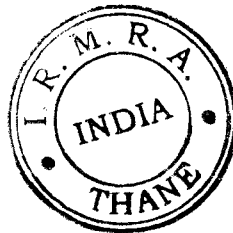
Encl.: FTIR graph.

Note: +ve indicate the results match with specified value.

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Sample : EPDM Rubber Glazing-16mm flock channel-RS Code-201516/0118

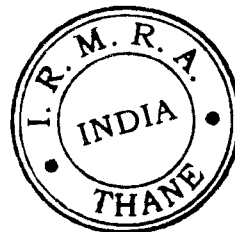
Specn. As:217:81:Mar-2014

| Test (Condition) | Method | Unit | Specified Value | Observed Value | Remarks |
|--|-----------------------|--------------------|--|-------------------------------------|---------|
| Tensile Strength (Before ageing) | IS-3400-I | Kg/cm ² | 40Min | 89 | +ve |
| Micro Hardness (Before ageing) | IS-3400, XXIII | IRHD | 65±5 | 70 | +ve |
| Change in Hardness (@100°C/70hrs) | IS-3400-Part-XXIII&IV | Points | +10/-5 | +9 | +ve |
| Ozone Resistance (100pphm/@40°C/100hrs/ 20%strain) | IS-3400-XX | - | No cracks shall be observed | No cracks observed up to 100 hours. | +ve |
| Resistance to Bending (Reverse bending on 4mm dia mandrel by 180°) | Table-I | -- | No cracks shall be observed | Passes the test. | +ve |
| Visual Observation (Resistance to Heat @100°C /70hrs) | Table-1 | - | No cracks, tackiness or free carbonaceous material shall be observed | Passes the test. | +ve |

Note : +ve indicates the result match with specified value.
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Sample : EPDM Rubber Glazing-16mm flock channel-RS Code-201516/0118

Specn. As:217:81:Mar-2014

| Test (Condition) | Method | Unit | Specified Value | Observed Value | Remarks |
|------------------------|----------|------|-----------------|--|---------|
| Polymer Identification | ISO:4650 | -- | EPDM Rubber | Ethylene Propylene Diene Rubber [EPDM] | +ve |

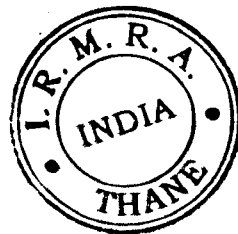
Encl.: FTIR graph.

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Sample : EPDM Rubber U Channel-RS Code-201516/0117 Specn. As:217:81:Mar-2014

| Test (Condition) | Method | Unit | Specified Value | Observed Value | Remarks |
|--|-----------------------|--------------------|--|-------------------------------------|---------|
| Tensile Strength (Before ageing) | IS-3400-I | Kg/cm ² | 40Min | 89 | +ve |
| Hardness (Before ageing) | IS-3400, XXIII | Shore A | 65±5 | 65 | +ve |
| Change in Hardness (@100°C/70hrs) | IS-3400-Part-XXIII&IV | Points | +10/-5 | +4 | +ve |
| Ozone Resistance (100pphm/@40°C/100hrs /20%strain) | IS-3400-XX | - | No cracks shall be observed | No cracks observed up to 100 hours. | +ve |
| Resistance to Bending (Reverse bending on 4mm dia mandrel by 180°) | Table-I | -- | No cracks shall be observed | Passes the test. | +ve |
| Visual Observation (Resistance to Heat @100°C /70hrs) | Table-1 | - | No cracks, tackiness or free carbonaceous material shall be observed | Passes the test. | +ve |

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Sample : EPDM Rubber U Channel-RS Code-201516/0117

Specn. As:217:81:Mar-2014

| Test (Condition) | Method | Unit | Specified Value | Observed Value | Remarks |
|------------------------|----------|------|-----------------|---|---------|
| Polymer Identification | ISO:4650 | -- | EPDM Rubber | Ethylene Propylene Diene Rubber [EPDM] | +ve |

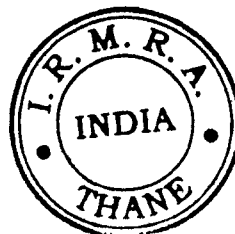
Encl.: FTIR graph.

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Sample : EPDM Rubber Glazing Lock key 45mm-RS Code-201516/0116

Specn. As:276:68:Dec.2004

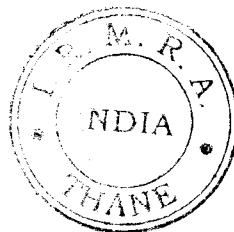
| Test (Condition) | Method | Unit | Specified Value | Observed Value | Remarks |
|--|-------------------|---------|--------------------------------------|-------------------------------------|---------|
| Hardness (Insert) (Before Ageing) | IS-3400, XXIII | Shore A | 70±5 | 73 | +ve |
| Hardness (Glazing) (Before Ageing) | IS-3400, XXIII | Shore A | 65±5 | 63 | +ve |
| Change in Hardness (Glazing) (@100°C/70hrs) | IS-3400 -XXIII-IV | Points | ±10 | +3 | +ve |
| Change in Hardness (Insert) (@100°C/70hrs.) | IS-3400 -XXIII-IV | Points | ±10 | +5 | +ve |
| Ozone Resistance (Glazing) (1ppm/40°C/20%strain/100hrs) | IS-3400-XX | -- | No cracks till 100hrs | No cracks observed up to 100 hours. | +ve |
| Ozone Resistance (Insert) (1ppm/40°C/20%strain/100hrs.) | IS-3400-XX | -- | No cracks till 100hrs | No cracks observed up to 100 hours. | +ve |
| Lip Opening Pressure (Glazing) | ASTM C-542-82 | kg/cm | 0.7Min | 0.8 | +ve |
| Visual Observation (Glazing) | Table-I | - | Good workmanship, free from porosity | Passes the test. | +ve |
| Visual Observation (Insert) | Table-II | -- | Good workmanship, free from porosity | Passes the test. | +ve |

Note : +ve indicates the result match with specified value.

-ve indicates the result does not match with the specified value.

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Sample : EPDM Rubber Glazing Lock key 45mm-RS Code-201516/0116
Specn. As:276:68:Dec.2004

| Test (Condition) | Method | Unit | Specified Value | Observed Value | Remarks |
|---------------------------------------|-------------|---------|-----------------|---|---------|
| Polymer Identification (Glazing) | ISO:4650 | -- | EPDM Rubber | Ethylene Propylene Diene Rubber [EPDM] | +ve |
| Polymer Identification (Insert) | ISO:4650 | % | EPDM Rubber | Ethylene Propylene Diene Rubber [EPDM] | +ve |
| Polymer Content (Insert) | ASTM E-1131 | % by wt | 25Min | 26.0 | +ve |
| Polymer Content (Glazing) | ASTM E-1131 | % by wt | 25Min | 32.8 | +ve |
| Specific Gravity (Glazing) | IS-3400-IX | - | 1.25Max | 1.24 | +ve |

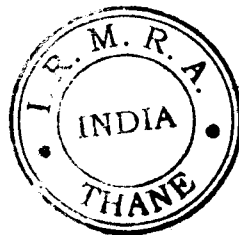
Encl.: FTIR & TGA graphs.

Note: +ve indicate the results match with specified value.

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Sample : EPDM Rubber Glazing Lock key 25mm-RS Code-201516/0115

Specn. As:276:68:Dec.2004

| Test (Condition) | Method | Unit | Specified Value | Observed Value | Remarks |
|--|-------------------|---------|--------------------------------------|-------------------------------------|---------|
| Hardness (Insert) (Before Ageing) | IS-3400, XXIII | Shore A | 70±5 | 71 | +ve |
| Hardness (Glazing) (Before Ageing) | IS-3400, XXIII | Shore A | 65±5 | 61 | +ve |
| Change in Hardness (Glazing) (@100°C/70hrs.) | IS-3400 -XXIII-IV | Points | ±10 | +4 | +ve |
| Change in Hardness (Insert) (@100°C/70hrs.) | IS-3400 -XXIII-IV | Points | ±10 | +8 | +ve |
| Ozone Resistance (Glazing) (1ppm/40°C/20%strain/100hrs) | IS-3400-XX | -- | No cracks till 100hrs | No cracks observed up to 100 hours. | +ve |
| Ozone Resistance (Insert) (1ppm/40°C/20%strain/100hrs) | IS-3400-XX | -- | No cracks till 100hrs | No cracks observed up to 100 hours. | +ve |
| Lip Opening Pressure (Glazing) | ASTM C-542-82 | kg/cm | 0.7Min | 0.8 | +ve |
| Visual Observation (Glazing) | Table-I | - | Good workmanship ,free from porosity | Passes the test. | +ve |
| Visual Observation (Insert) | Table-II | -- | Good workmanship ,free from porosity | Passes the test. | +ve |

Note : +ve indicates the result match with specified value.

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Sample : EPDM Rubber Glazing Lock key 25mm-RS Code-201516/0115

Specn. As:276:68:Dec.2004

| Test (Condition) | Method | Unit | Specified Value | Observed Value | Remarks |
|---------------------------------------|-------------|---------|-----------------|---|---------|
| Polymer Identification (Glazing) | ISO:4650 | -- | EPDM Rubber | Ethylene Propylene Diene Rubber [EPDM] | +ve |
| Polymer Identification (Insert) | ISO:4650 | % | EPDM Rubber | Ethylene Propylene Diene Rubber [EPDM] | +ve |
| Polymer Content (Insert) | ASTM E-1131 | % by wt | 25Min | 25.1 | +ve |
| Polymer Content (Glazing) | ASTM E-1131 | % by wt | 25Min | 33.1 | +ve |
| Specific Gravity (Glazing) | IS-3400-IX | - | 1.25Max | 1.24 | +ve |

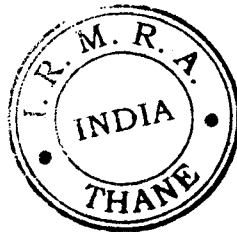
Encl.: FTIR & TGA graphs.

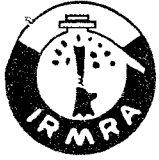
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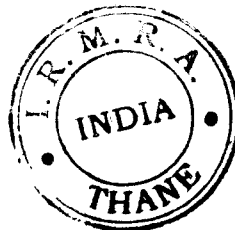
Sample : EPDM Rubber Glazing Lock key 25mm-RS Code-201516/0114
Specn. As:276:68:Dec.2004

| Test (Condition) | Method | Unit | Specified Value | Observed Value | Remarks |
|---|-------------------|---------|--------------------------------------|-------------------------------------|---------|
| Hardness (Insert) (Before Ageing) | IS-3400, XXIII | Shore A | 70±5 | 70 | +ve |
| Hardness (Glazing) (Before Ageing) | IS-3400, XXIII | Shore A | 65±5 | 65 | +ve |
| Change in Hardness (Glazing) (@100°C/70hrs.) | IS-3400 -XXIII-IV | Points | ±10 | +8 | +ve |
| Change in Hardness (Insert) (@100°C/70hrs) | IS-3400 -XXIII-IV | Points | ±10 | +8 | +ve |
| Ozone Resistance (Glazing) (1ppm/40°C/20%strain/100hrs) | IS-3400-XX | -- | No cracks till 100hrs | No cracks observed up to 100 hours. | +ve |
| Ozone Resistance (Insert) (1ppm/40°C/20%strain/100hrs) | IS-3400-XX | -- | No cracks till 100hrs | No cracks observed up to 100 hours. | +ve |
| Lip Opening Pressure (Glazing) | ASTM C-542-82 | kg/cm | 0.7Min | 0.9 | +ve |
| Visual Observation (Glazing) | Table-I | - | Good workmanship ,free from porosity | Passes the test. | +ve |
| Visual Observation (Insert) | Table-II | -- | Good workmanship ,free from porosity | Passes the test. | +ve |

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Specn. As:276:68:Dec.2004

| Test (Condition) | Method | Unit | Specified Value | Observed Value | Remarks |
|---------------------------------------|-------------|---------|-----------------|---|---------|
| Polymer Identification (Glazing) | ISO:4650 | -- | EPDM Rubber | Ethylene Propylene Diene Rubber [EPDM] | +ve |
| Polymer Identification (Insert) | ISO:4650 | % | EPDM Rubber | Ethylene Propylene Diene Rubber [EPDM] | +ve |
| Polymer Content (Insert) | ASTM E-1131 | % by wt | 25Min | 25.2 | +ve |
| Polymer Content (Glazing) | ASTM E-1131 | % by wt | 25Min | 25.9 | +ve |
| Specific Gravity (Glazing) | IS-3400-IX | - | 1.25Max | 1.23 | +ve |

Encl.: FTIR & TGA graphs.

Note: +ve indicate the results match with specified value.

-ve indicate the results do not match with specified value.

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