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| Datum / date<br>07.05.2019   | <b>Werkstoffdatenblatt</b><br><b>material test report</b> |  |
| Revision / revision<br>1     |   |  |
| Seite / page<br>1 von / of 1 |   | Techniparts B.V. - O-ring-stocks.eu<br>Rondweg 26<br>8091XB Wezep<br>Netherlands   |

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| Werkstoffnr. / mat.no. <b>189010302</b> | Werkstofftyp<br>material type <b>HNBR 90</b>                               |
| Farbe<br>colour schwarz<br>black        | Temp. bereich<br>temp. range -35°C / +160°C<br>(-40°C / +170°C short time) |

| Eigenschaft<br>property                | Einheit<br>unit   | Prüfmethode<br>test method | Prüfparameter<br>test parameter | Wert<br>value |
|--|-------------------|----------------------------|---------------------------------|---------------|
| Härte / hardness                       | Shore A           | ASTM D 2240                |                                 | 90±5          |
| Dichte / specific gravity              | g/cm <sup>3</sup> | ASTM D 297                 |                                 | 1,28 ±0,03    |
| Reißfestigkeit / tensile strength      | MPa               | ASTM D 412                 |                                 | 26,2          |
| Modul bei 100% / modulus at 100%       | MPa               | ASTM D 412                 |                                 | 19,2          |
| Reißdehnung / ultimate elongation      | %                 | ASTM D 412                 |                                 | 144           |
| Weiterreißfestigkeit / tear resistance | N/mm              | ASTM D 624 B               |                                 | 42            |
| Weiterreißfestigkeit / tear resistance | N/mm              | ISO 34-1                   |                                 | 9,2           |
| Druckverformungsrest / compression set | %                 | ASTM D 395 B/1             | 168h / 100°C                    | 19            |
| Druckverformungsrest / compression set | %                 | ASTM D 395 B/1             | 24h / 150°C                     | 11            |
| Druckverformungsrest / compression set | %                 | ASTM D 395 B/1             | 70h / 125°C                     | 18,5          |
| Druckverformungsrest / compression set | %                 | ASTM D 395 B/1             | 70h / 150°C                     | 30            |
| low temp. TR10                         | °C                | ISO 2921                   | TR10                            | -18           |
| low temp. DSC glass transition         | °C                | DIN 53765                  | DSC glass trans.                | -21           |
| low temp. brittle point                | °C                | ASTM D 2137 A              | brittle point                   | -35           |

| Eigenschaftsänderungen nach Alterung / changes of properties after ageing |                             |                   |   |   |   |   |                        |                        |
|---|-----------------------------|-------------------|---|---|---|---|------------------------|------------------------|
| Medium medium   | Prüf-methode<br>test method | Zeit<br>time<br>h | Temp<br>eratur<br>tempe<br>rature<br>°C | Härte<br>hardness<br><br>Punkte<br>points | Reiß-<br>festigkeit<br>tensile<br>strength<br>% | Reiß-<br>dehnung<br>ultimate<br>elongation<br>% | Gewicht<br>weight<br>% | Volumen<br>volume<br>% |
| Luft / air  | ASTM D 573                  | 94                | 150                                     | +5  | +8  | -25   |                        |                        |
| Pentosin  | ASTM D 471                  | 96                | 140                                     | -2  | -8  | -12   | +7                     | +10                    |
| EN 14141:2003 (annex B) tested – Cerisie 565/2011                         |                             |                   |   |   |   |   |                        |                        |
| Wasser / water  | ISO 1817                    | 24                | 23                                      | -2  | -2,44   | -2,32   | +0,19                  | +0,53                  |
| Wasser / water  | ISO 1817                    | 72                | 23                                      | -0,1                                      | -3,36   | -3,02   | +0,32                  | +0,46                  |
| Methanol  | ISO 1817                    | 24                | 23                                      | -1,8                                      | -20,63  | -12,29  | +5,59                  | +10,25                 |
| Methanol  | ISO 1817                    | 72                | 23                                      | -7,6                                      | -18,97  | -8,81   | +5,6                   | +10,79                 |
| Diesel  | ISO 1817                    | 24                | 23                                      | -11,3                                     | -12,3   | -7,74   | +12,87                 | +19,16                 |
| Diesel  | ISO 1817                    | 72                | 23                                      | -18                                       | -15,33  | -13,28  | +19,39                 | +28,99                 |
| Oil SAE 15W40   | ISO 1817                    | 24                | 23                                      | -1,6                                      | +1,15   | -3,02   | +0,16                  | +0,89                  |
| Oil SAE 15W40   | ISO 1817                    | 72                | 23                                      | +0,3                                      | -1,19   | -3,02   | +0,05                  | +0,25                  |
| N ethylene glycol / water<br>(50/50)                                      | DIN 53521                   | 94                | 120                                     | +0,3                                      | -5  | -4  | +0,8                   | +1,2                   |
| Pentan / pentane  | ASTM D 471                  | 70                | 23                                      | -9  |   |   |                        | +7,5                   |

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| Specifications: | OIL/GAS APPLICATIONS - ANTI EXPLOSIVE DECOMPRESSION -<br>( NORSOK M710 - Annex A Approved - Sour Fluid Resistance 23/02/2012 )<br>( NORSOK M710 - Annex B Approved - RGD 5,33 mm -<br>( EN 14141:2003 - Annex B Approved - Fluid Resistance 26/09/2011 )<br>( NACE TM0187 TESTED - SOUR FLUID TEST ) - 2% - 5% - 20 % H2S<br>( Sour Fluid test Arrhenius ISO23936-2 / Norsok M710 ) - SAUDI ARAMCO 06-SAMSS-001 |
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| Die oben angegebenen Daten sind nach bestem Wissen und mit modernen Laborstandards an genormten Prüfkörpern ermittelt worden. Insbesondere beim Vergleich dieser Daten mit Werten, die an Fertigteilen ermittelt werden, kann es zu Abweichungen kommen. | The above indicated data were determined to the best knowledge according to modern laboratory standards on standardised test specimen. If these data are compared with data which were determined on finished parts it may come to variations. |
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