

MARKEZ® Z1352 offers an almost universal chemical compatibility for use in semiconductor, Oil and Gas, and general chemical applications. Its unique cross-linking processing results in an enhanced chemical resistance to strong acids and amine resistance. Used as a cost effective alternative to 6380, 1050LF and 605.

ABOUT MARKEZ® #Z1352

MARKEZ® Z1352 is a top of the line material designed for a wide variety of applications.

- Cost effective
- Nearly universal chemical compatibility
- Hot Amine Resistance
- Excellent Acid Resistance
- Good dynamic properties - Long service life

Commonly used in the chemical industry, lab instrumentation, and semiconductor applications.

APPLICATION EXAMPLES

MARKEZ® Z1352 has almost universal chemical compatibility.

- Inorganic & Organic Acids & Alkine
- Ketones, Esters, Ethers, Aldehydes
- Chemicals relavent to Petro-Chem equipment, Sour gas
- Solvents
 - Acetone, Heptane
 - Glycol ethers, Naphtha
 - Toluene, Turpentine
 - White spirit, Xylene
 - Methyl ethyl ketone (MEK)
 - Dimethylformamide (DMF)

APPLICATION EXAMPLES

- Chem sprayers, injectors and reactors
- Liquid chromatography equipment
- Aerospace Fuels, Skydrol & Oils
- Semiconductor Applications
 - Dry etch, Strip, LPCVD, Litho/Track, ECP, Exhaust valves

ADDITIONAL INFORMATION

- Service Temperature of 5° to 608°F
- Compatible with steam < 580°F
- Compatible with amines < 400°F
- Spec: ASTM

This information is accurate and reliable to the best of our knowledge. However, Marco Rubber makes no warranty, expressed or implied, that parts manufactured from this material will perform satisfactorily in the customer's application. It is the customer's responsibility to evaluate parts prior to use.

PHYSICAL PROPERTIES

| ORIGINAL PROPERTIES | ASTM Method | Typical Test Results |
|---|-------------|----------------------|
| Color | | Black |
| Material Type | FFKM | FFKM |
| Hardness, Shore A | D1415 | 77 |
| Tensile Strength, MPa (psi) | D412 | 15.9 (2,305) |
| Elongation at Break | D412 | 1.2 |
| Modulus @ 100%, MPa (psi) | D412 | 13.9 (2,016) |
| Compression Set, 70 hrs. @ 200°C, (392°F) | D395 | 0.247 |
| Specific Gravity Gravity, g/cm ³ | | 1.99 |

| GENERAL CHEMICAL COMPATIBILITY TESTING | COMPATIBILITY RATING | Typical Test Results (% Volume Swell) |
|---|----------------------|---------------------------------------|
| Inorganic acid | A | <10% |
| Organic acid | A | <10% |
| Alkalis | A | <10% |
| Water / Steam | A | <10% |
| Ketons | A | <10% |
| Esters | A | <10% |
| Ethers | A | <10% |
| Adelhydes | A | <10% |
| Alcohols | A | <10% |
| HydroCarbons | A | <10% |
| Sour gas | A | <10% |
| Lubricants | A | <10% |
| Fluorinated fluids | C | 30-50% |
| Amines (Room Temperature) | A | <10% |
| Hot amines (≤100°C) | A | <10% |
| Hot amines (>100°C) *Markez Z1352 provides excellent chemical compatibility with most chemicals, including Amines up to 200°C. Performance °F the material used may vary depending on the Amine and temperature used. | B* | 10-30% |

| CHEMICAL TESTING - WATER | Test | Typical Test Results |
|--------------------------|----------------------------|----------------------|
| 200°C for 672 hrs. | Tensile strength change, % | 2 |
| 200°C for 672 hrs. | Elongation change, % | 16 |
| 200°C for 672 hrs. | Hardness, Shore A | -3 |
| 200°C for 672 hrs. | Volume change, % | 4.1 |
| CHEMICAL TESTING - WATER | Test | Typical Test Results |
| 225°C for 168 hrs. | Tensile strength change, % | -16 |
| 225°C for 168 hrs. | Elongation change, % | 4 |
| 225°C for 168 hrs. | Hardness, Shore A | -3 |
| 225°C for 168 hrs. | Volume change, % | 3 |
| CHEMICAL TESTING - STEAM | Test | Typical Test Results |
| 200°C for 168 hrs. | Tensile strength change, % | -19 |
| 200°C for 168 hrs. | Elongation change, % | 44 |
| 200°C for 168 hrs. | Hardness, Shore A | -4 |
| 200°C for 168 hrs. | Volume change, % | 3 |
| CHEMICAL TESTING - STEAM | Test | Typical Test Results |
| 200°C for 672 hrs. | Tensile strength change, % | -17 |
| 200°C for 672 hrs. | Elongation change, % | 41 |
| 200°C for 672 hrs. | Hardness, Shore A | -6 |
| 200°C for 672 hrs. | Volume change, % | 3 |

| CHEMICAL TESTING - ACIDS - Nitric acid 65% | Test | Typical Test Results |
|--|----------------------------|----------------------|
| 80°C for 70 hrs. | Tensile strength change, % | -30 |
| 80°C for 70 hrs. | Elongation change, % | 6 |
| 80°C for 70 hrs. | Hardness, Shore A | -5 |
| 80°C for 70 hrs. | Volume change, % | 5 |
| CHEMICAL TESTING - ACIDS - Glacial acetic acid | Test | Typical Test Results |
| 100°C for 336 hrs. | Tensile strength change, % | -13 |
| 100°C for 336 hrs. | Elongation change, % | -15 |
| 100°C for 336 hrs. | Hardness, Shore A | -5 |
| 100°C for 336 hrs. | Volume change, % | 5 |
| CHEMICAL TESTING - ACIDS - Formic acid 85% | Test | Typical Test Results |
| 200°C for 168 hrs. | Tensile strength change, % | -14 |
| 200°C for 168 hrs. | Elongation change, % | -5 |
| 200°C for 168 hrs. | Hardness, Shore A | -5 |
| 200°C for 168 hrs. | Volume change, % | 7 |

| CHEMICAL TESTING - ACIDS - Sulfuric acid 98% | Test | Typical Test Results |
|--|----------------------------|----------------------|
| 180°C for 168 hrs. | Tensile strength change, % | -10 |
| 180°C for 168 hrs. | Elongation change, % | 25 |
| 180°C for 168 hrs. | Hardness, Shore A | -8 |
| 180°C for 168 hrs. | Volume change, % | 4 |

| CHEMICAL TESTING - ALKALINE & AMINES - Ethylene diamine | Test | Typical Test Results |
|---|----------------------------|----------------------|
| 100°C for 72 hrs. | Tensile strength change, % | -35 |
| 100°C for 72 hrs. | Elongation change, % | 13 |
| 100°C for 72 hrs. | Hardness, Shore A | -4 |
| 100°C for 72 hrs. | Volume change, % | 6 |

| CHEMICAL TESTING - ALKALINE & AMINES - N-methyl-diethanolamine (MDEA) | Test | Typical Test Results |
|---|----------------------------|----------------------|
| 150°C for 168 hrs. | Tensile strength change, % | -22 |
| 150°C for 168 hrs. | Elongation change, % | -2 |
| 150°C for 168 hrs. | Hardness, Shore A | -2 |
| 150°C for 168 hrs. | Volume change, % | 2 |

| CHEMICAL TESTING - ALKALINE & AMINES - N-methyl-diethanolamine (MDEA) | Test | Typical Test Results |
|---|----------------------------|----------------------|
| 200°C for 168 hrs. | Tensile strength change, % | -38 |
| 200°C for 168 hrs. | Elongation change, % | -6 |
| 200°C for 168 hrs. | Hardness, Shore A | -5 |
| 200°C for 168 hrs. | Volume change, % | 8 |

| CHEMICAL TESTING - ALKALINE & AMINES - Diglycolamine | Test | Typical Test Results |
|--|----------------------------|----------------------|
| 150°C for 168 hrs. | Tensile strength change, % | -35 |
| 150°C for 168 hrs. | Elongation change, % | 11 |
| 150°C for 168 hrs. | Hardness, Shore A | -10 |
| 150°C for 168 hrs. | Volume change, % | 20 |

| CHEMICAL TESTING - ALKALINE & AMINES - Ethanolamine | Test | Typical Test Results |
|---|----------------------------|----------------------|
| 150°C for 72 hrs. | Tensile strength change, % | -30 |
| 150°C for 72 hrs. | Elongation change, % | 9 |
| 150°C for 72 hrs. | Hardness, Shore A | -9 |
| 150°C for 72 hrs. | Volume change, % | 17 |

| CHEMICAL TESTING - ALKALINE & AMINES - Dipropylamine | Test | Typical Test Results |
|--|----------------------------|----------------------|
| 150°C for 168 hrs. | Tensile strength change, % | -27 |
| 150°C for 168 hrs. | Elongation change, % | -14 |
| 150°C for 168 hrs. | Hardness, Shore A | -4 |
| 150°C for 168 hrs. | Volume change, % | 6 |

| CHEMICAL TESTING - ALKALINE & AMINES - Dipropylamine | Test | Typical Test Results |
|--|----------------------------|----------------------|
| 200°C for 168 hrs. | Tensile strength change, % | -29 |
| 200°C for 168 hrs. | Elongation change, % | -10 |
| 200°C for 168 hrs. | Hardness, Shore A | -5 |
| 200°C for 168 hrs. | Volume change, % | 7 |
| CHEMICAL TESTING - ALKALINE & AMINES - NH ₃ , 28% | Test | Typical Test Results |
| 100°C for 336 hrs. | Tensile strength change, % | -19 |
| 100°C for 336 hrs. | Elongation change, % | -16 |
| 100°C for 336 hrs. | Hardness, Shore A | -3 |
| 100°C for 336 hrs. | Volume change, % | 4 |