**آزمون­های تخصصی پوشش های خطوط لوله­های مورد استفاده در صنایع نفت، گاز و آب**

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| --- | --- | --- | --- | --- |
| ***Epoxy Powder*** | | | | |
| ***ISO 21809-1*** | Density | | | 1 |
| ***ISO 21809-1*** | Gel time @ 200 °C | | | 2 |
| ***ISO 21809-2*** | Particle size | | | 3 |
| ***ISO 21809-1*** | Moisture content, max % | | | 4 |
| ***ISO 21809-1*** | Glass transition temperature  Tg1  Tg2  **∆H** | | | 5 |
| ***ISO 21809-2*** | Cathodic Disbonding 28 Days 65 °C, 1.5 V | | | 6 |
| ***ISO 21809-2*** | 3.0° ppd flexibility, at -30 °C | | | 7 |
| ***ISO 21809-2*** | Hot Water Adhesion 24 hr At 75±3 °C | | | 8 |
| ***Adhesive*** | | | | |
| ***ISO 1183*** | Density @ 23±2 °C gr/cm3 | | | 9 |
| ***ISO 3146*** | Melting index (2.16 kg/190 °C) gr/10 min  (Granule) | | | 10 |
| ***ASTM D3418*** | Melting Point (DSC), min °C | | | 11 |
| ***ISO 527-1 and -2 or***  ***ISO 527-1 and -3 or***  ***ASTM D638*** | Elongation at break % min | | | 12 |
| ***ISO 527-1 and -2 or***  ***ISO 527-1 and -3 or***  ***ASTM D638*** | Tensile strength @ Yield 23±2 °C, min MPa | | | 13 |
| ***ISO 15512*** | Water content, max % | | | 14 |
| ***ISO 306 or ASTM D1525*** | VICAT Softening A/50 (9.8 N) min °C | | | 15 |
| ***Poly Ethylene*** | | | | |
| ***ISO 1183 (all parts) or***  ***ASTM D792 or***  ***ASTM D1505*** | Density @ 23±2 °C gr/cm3 | | | 16 |
| ***ISO 3146 or***  ***ISO 11357-1 and -3 or***  ***ASTM D3418*** | Melting index (2.16 kg/190 °C) gr/10 min  (Granule) | | | 17 |
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| ***ISO 527-1 and -2 or***  ***ISO 527-1 and -3 or***  ***ASTM D638*** | Elongation at break %, min | | | 19 |
| ***ISO 1133*** | Melting point (DSC), min , °C | | | 20 |
| ***ISO 527-1 and -2 or***  ***ISO 527-1 and -3 or***  ***ASTM D638*** | Tensile strength, at break 23±2°C, min, MPa | | | 21 |
| ***ISO 527-1 and -2 or***  ***ISO 527-1 and -3 or***  ***ASTM D638*** | Yield strength, at 23±2°C, min, MPa | | | 22 |
| ***ISO 868*** | Hardness Shore D min | | | 23 |
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**آزمون­های تخصصی پوشش های خطوط لوله­های مورد استفاده در صنایع آب آشامیدنی**

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| --- | --- | --- |
| *Drinking Water Pipe line coatings* | | |
| *ASTM D 1475* | Density @ 25°C | 1 |
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| *AWWA C 210* | Immersion – 1 Wt.% Sulfuric Acid | 3 |
| *AWWA C 210* | Immersion – 1 Wt.% Sodium Hydroxide | 4 |
| *ASTM D 4752* | Rub Test | 5 |
| *ASTM D 2697* | Volume Weight Percent | 6 |
| *ASTM D 2369* | Solid Weight Percent | 7 |
| *ASTM D 562* | Krebs Viscosity @ 60°C | 8 |
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**"برخی از تجهیزات"**

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| --- | --- |
| Melt Flow Index (MFI) | Shore D- Hardness |
| http://www.santamco.com/Imager.ashx?id=319 | http://www.gotech.biz/gotech_admin/upload/2302171313481441038382.jpg |
| Cathodic Disbonding | **Tensile+200° C Oven (Peeling-LapShear)** |
| Image result for cathodic disbonding setup | http://www.santamco.com/Imager.ashx?id=52089 |
| Vicat Softening Point | **DSC** |
|  |  |
| Optical Microscopy | **-40°C Freezer** |
|  | Image result for ‫فریزر ژال طب‬‎ |
| Softening point | **Penetration** |
| Z:\پژوهشکده پوششهای سطح و فناوریهای نوین\گروه پژوهشی روکش‌های سطح و خوردگی\دکتر یاری\PHOTO\Softening point.jpg | Z:\پژوهشکده پوششهای سطح و فناوریهای نوین\گروه پژوهشی روکش‌های سطح و خوردگی\دکتر یاری\PHOTO\penetration.jpg |
| Particle Size Analysis | |
| Image result for malvern mastersizer 2000 | |