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| PDF E<br>HB 04-02-01T2 | <b>Amount of Lubricant – Terms<br/>Definition Lubrication</b> | C:\Handbook<br>02-Bestandteile<br>04-04/06-02.doc |
| 2.4.4.6.1 & 5.1.7.1    | <b>Type of Lubrication</b>                                    | <b>Dat:06.07.00</b>                               |

| Nr. | Terms                              | Definition  |
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| 1   | <b>Lube-Free. Ultrasonic</b>       | No Lubricant is used during stranding or closing. The wires are delubricated already at drawing. During stranding and closing only lubricant free Emulsion will be used as “laying help”. These Emulsions show no remainings afterwards. Max remainings at testing to DIN Standard:<br>If a fibre core is requested, only man made fibre cores are used, which are lubricant free, that means the extracted content is not allowed to be bigger than 3 %.<br>The finished rope will be drawn through an Ultra-Sonic Cleaning Bath.  |
| 2   | <b>No-Lube – Dry Rope</b>          | Free of Lubricant but wires still show remainings of drawing Soap materials and laying-help-material. No lubricant is used during stranding and closing. During stranding and closing only lubricant free Emulsion will be used as “laying help”, which will show no big remainings.<br>Maximum remainings at testing to DIN:<br>If a fibre core is requested, only man made fibre cores are used, which are lubricant free, that means the extracted content is not allowed to be bigger than 3 %.   |
| 3   | <b>Rope dry<br/>A0</b>             | A. The Core is dry, that means without lubricant.<br>The Batch-Content of Fibre Core has to be chosen in such a way, that the extracted content is not above 7%.<br>During stranding and closing only the necessary oildrops to allow the laying are added. Strands, rope and core are heavily wiped after the die-stand.<br>B. Steel Core: only strands lubricated. Otherwise as A.  |
| 4   | <b>Rope outside not lubricated</b> | Compound-Construction, Spiral ropes, Multi-Layer-Spiral-Ropes, and Multiple Operation –Ropes only the Strand- Inner-Layers are light lubricated. The Steel-Core is also only light lubricated. (Heavy wiping) Fibre Cores have a maximum lubricant content of 12 %  |
| 5   | <b>Light Lubricated<br/>A1</b>     | Lubricant is heated up, when applied to strands, to the maximum allowed Temperature Limit, that means it is very liquid. A lubricant has to be used, which is, because of its consistency, suitable. The Lubricant is poured between the wires at the stranding lay point , before the strand is formed. Each single wire should be slightly covered with lubricant. Behind the die and again behind the postformer, (calibration rollers) etc., the strands and rope are wiped heavily (Double wiping). Only a light film of lubricant should cover the wires. The core is only light lubricate. A fibre core should have no visible outside laying lubricant. The lubricant content of the fibre core shall not be above 12 %.The total content of lubricant of the rope should be at approximately 0,8 to 1,2 %<br>Lubricants: e. g. Nyrosten T 55, A 19/200, Cedrakon, Elaskon High Tech 2000 |

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| 6   | <b>Normal Lubrication</b>      | <p>Lubricant is heated when applied to normal requested temperature.</p> <p>A lubricant has to be used, which is, because of its consistency, suitable.</p> <p>The Lubricant is poured between the wires at the stranding lay point , before the strand is formed. Each single wire should be slightly covered with lubricant. Behind the die and again behind the postformer, (calibration rollers) etc., the strands and rope are wiped slightly. A light film of lubricant should cover the wires.</p> <p>The core is only light lubricated. A fibre core should have no visible outside laying lubricant. The lubricant content of the fibre core shall not be above 16 %.The total content of lubricant of the rope should be at approximately 1,0 to 1,5 %</p> <p>Lubricants: e. g. Nyrosten T 55, A 19/200, Cedrakon, Elaskon High Tech 2000.</p> |
| 6.1 | <b>Normal Lubrication A2.1</b> | <p>As 6.</p> <p>Lubricant Transparent, yellow, brown, green.</p> <p>Total amount of Lubricant of rope: 1,0 to 2 %.</p>   |
| 6.2 | <b>Normal Lubrication A2.2</b> | <p>As 6.</p> <p>Lubricant black, asphaltic or brown/golden N 113</p> <p>Total amount of Lubricant of rope: 1,5 to 3 %.</p>   |
| 7   | <b>Heavy Lubrication</b>       | <p>Lubricant is heated when applied to normal requested temperature.</p> <p>A lubricant has to be used, which is, because of its consistency, suitable.</p> <p>The Lubricant is poured between the wires at the stranding lay point , before the strand is formed. Each single wire should be slightly covered with lubricant. Behind the die and again behind the postformer, (calibration rollers) etc., the strands and rope are not wiped . A heavy film of lubricant should cover the wires.</p> <p>The core is heavily lubricated. A fibre core may show visible on the outside laying lubricant. The lubricant content of the fibre core shall not be between 16 % and 25 %.</p> <p>The total content of lubricant of the rope should be at approximately 1,8 to 3,5 %</p> <p>Lubricants: e. g.</p>   |
| 8   | <b>Double Lubrication</b>      | <p>e. g. as corrosion protection when stored for a longer time. Before rope testing on fatigue cycling machines (University of Stuttgart: Hot Steam Cylinder Oil, to compare rope quality without the influence of different lubricant).</p> <p>Rope lubricated as per 6 or 7 and the finished rope is lubricated again. Depending of the application with a thin light lubricant or a very adhesive type of lubricant.</p>  |
| 9   | <b>Field Lubrication</b>       | <p>During Service the ropes should be or must be lubricated, because the original Lubrication in most of the cases will not be sufficient for the whole service life. The method and the type of lubricant used, is depending on the type of application. The lubricant must be compatible with the original lubricant.</p>  |