

## Product Catalogue

NETZSCH Oilfield Products Upstream



# Company

## NETZSCH Group

Since 1873 NETZSCH has been developing and manufacturing instruments and machines for research and industry. Today the group consists of three global business units and employs more than 2200 people.

- Business Unit Analyzing & Testing
- Business Unit Grinding & Dispersing
- Business Unit Pumps

## NETZSCH Holding

The NETZSCH Holding builds the bridge between the owning family and the business units and is mainly involved in the group strategy and the financial management.



## Business Unit Pumps

For more than five decades we've been supplying worldwide NEMO® progressing cavity pumps, TORNADO® rotary lobe pumps, screw pumps, macerators/grinders, dosing systems and equipment for custom built and challenging solutions for your applications.

With a production of over 40000 pumps per year we underline our technology and market leadership.

## NETZSCH Oilfield Products

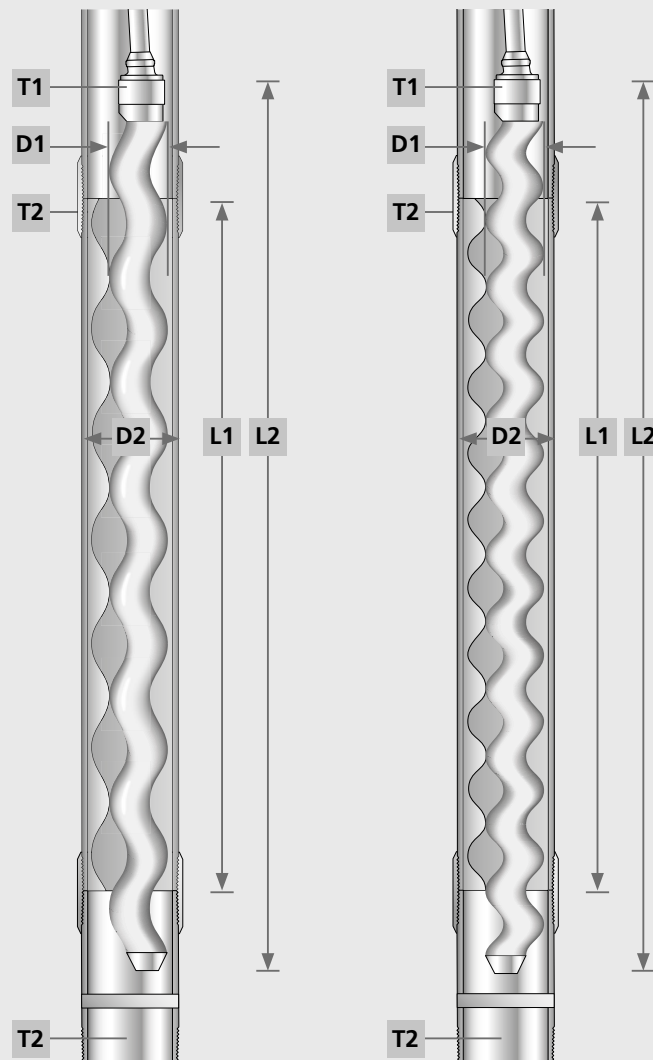
As a part of the NETZSCH company group NETZSCH Oilfield Products GmbH specializes in the delivery of systems with progressing cavity pumps for the production of crude oil and other highly viscous materials; the pumps above are used throughout Europe, the CIS and Africa.

Whether it is a large oilfield operator or a small production company – the

experts at NETZSCH Oilfield Products GmbH give their attention to all projects.

At the same time we try to correspond to the increasing technological demands by highly efficient development work. Success in corporate research and development work with universities and operators of our pumps in the field confirms this fact.

# PCP – Pump



## Pump Equipment

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### Conversion

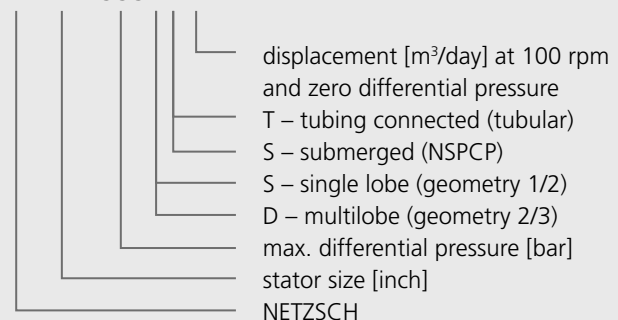
1 mm = 0,0394 inch  
1 inch = 25,4 mm

**Additional pump models have to be requested separately.**

All stator connections T2 are according API standard 5B. All rotor connections T1 are according API standard 11B.

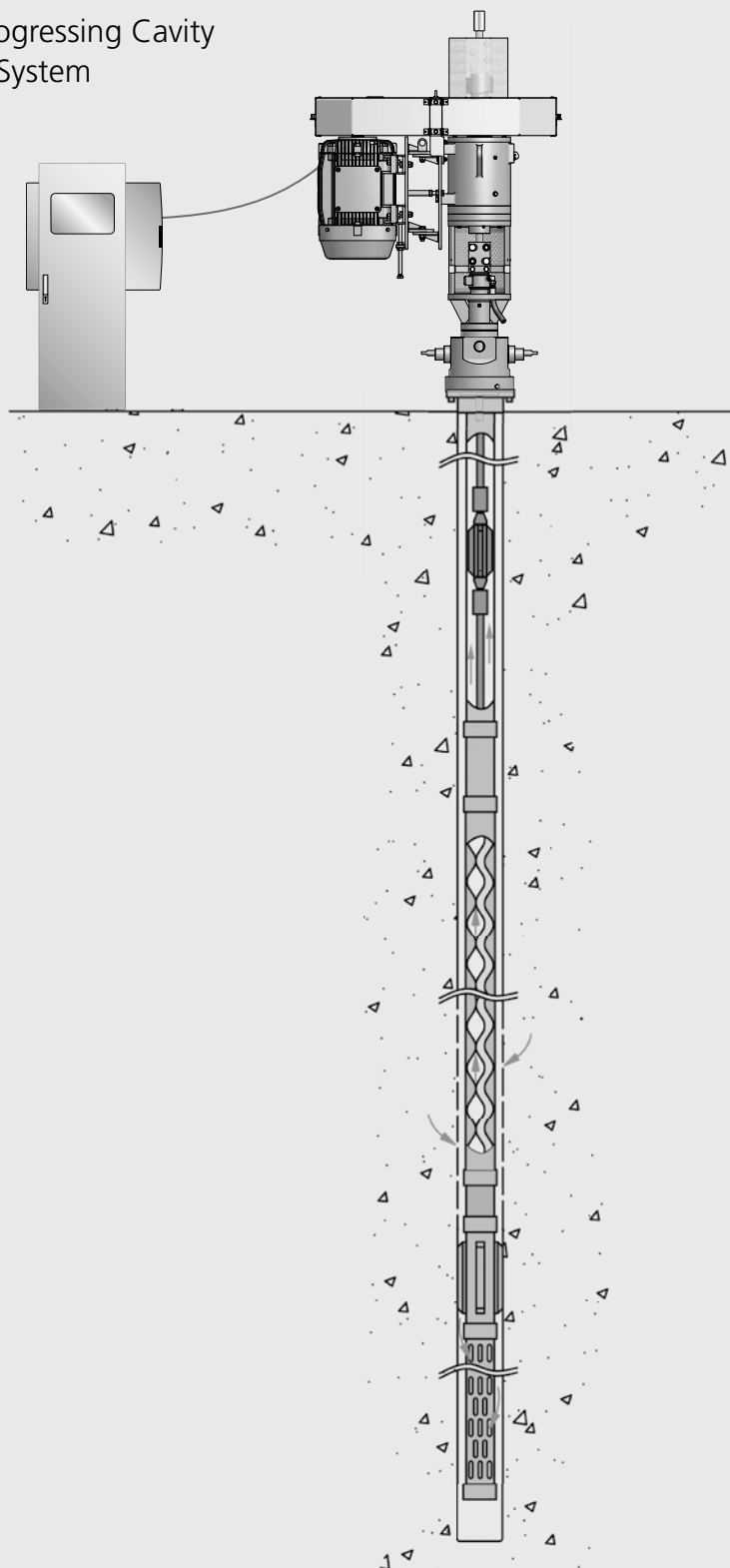
## PC Pump Nomenclature

NTZ BBB\*CCC DD E



# PCP – Pump System

## The Progressing Cavity Pump System



## Efficiency

The NETZSCH downhole progressing cavity pumps (PCP) systems are simple in structure, have very few moving parts, low hydraulic losses and high efficiency in performance. The general efficiency is normally between 40% and 70%; compared to a 30% efficiency for plunger pumping units and 35% for electrical submerged centrifugal pumps.

The range of volumetric efficiency of NETZSCH downhole PC pump systems is 75% – 95%.

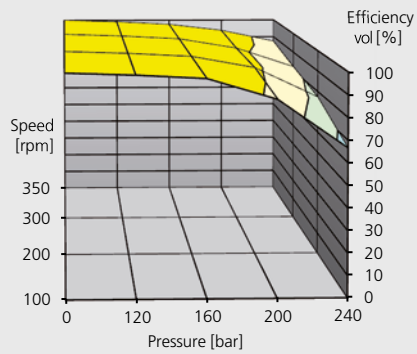
## Efficient handling of fluid

- high viscosity oil – up to 5000 cP at the well head
- high sand content – up to 40% at the suction side
- high gas content – app. 40% free gas at the suction side
- water cut – up to 100%
- density – up to 0.82 kg/dm<sup>3</sup>
- temperature – up to max. 140°C
- pressure – up to 300 bar
- production – up to 300 m<sup>3</sup>/day (1900 bpd)

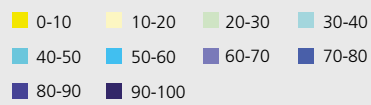
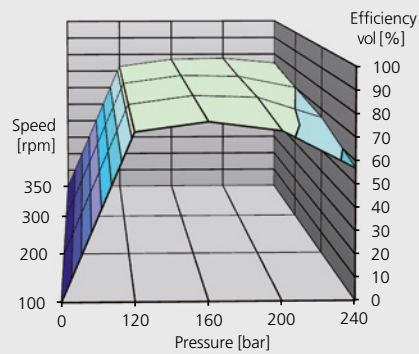
## Key Advantages

- low operating cost
- low investment cost
- energy saving
- easy production control

Volumetric efficiency



Overall efficiency



## Application Range

- oil production
- gas well deliquification
- conveying of thermal water

## Pump Equipment – Pump

### Model 1.66"

| pump model       | production rate               |     | max. differential pressure |      | rotor     |              |           |        | stator    |        |
|------------------|-------------------------------|-----|----------------------------|------|-----------|--------------|-----------|--------|-----------|--------|
|                  |                               |     |                            |      | thread T1 | dia-meter D1 | length L1 | weight | length L2 | weight |
|                  | m <sup>3</sup> /d/<br>100 rpm | bpd | bar                        | psi  |           | mm           | mm        | kg     | mm        | kg     |
| NTZ 166*065ST0.8 | 0,8                           | 5   | 65                         | 942  | 1/2"      | 19           | 1.340     | 1,8    | 825       | 4,3    |
| NTZ 166*120ST0.8 | 0,8                           | 5   | 120                        | 1740 | 1/2"      | 19           | 1.940     | 2,7    | 1.425     | 7,5    |
| NTZ166*150ST0.8  | 0,8                           | 5   | 150                        | 2176 | 1/2"      | 19           | 2.615     | 3,6    | 1.850     | 9,7    |
| NTZ 166*180ST0.8 | 0,8                           | 5   | 180                        | 2611 | 1/2"      | 19           | 2.915     | 4,0    | 2.150     | 11,3   |
| NTZ 166*240ST0.8 | 0,8                           | 5   | 240                        | 3481 | 1/2"      | 19           | 3.615     | 5,0    | 2.850     | 14,9   |
| NTZ 166*065ST1.1 | 1,1                           | 7   | 65                         | 942  | 1/2"      | 19           | 1.640     | 2,2    | 1.125     | 5,9    |
| NTZ 166*120ST1.1 | 1,1                           | 7   | 120                        | 1740 | 1/2"      | 19           | 2.480     | 3,4    | 1.965     | 10,3   |
| NTZ 166*150ST1.1 | 1,1                           | 7   | 150                        | 2176 | 1/2"      | 19           | 3.295     | 4,5    | 2.530     | 13,2   |
| NTZ 166*180ST1.1 | 1,1                           | 7   | 180                        | 2611 | 1/2"      | 19           | 3.715     | 5,0    | 2.950     | 15,4   |
| NTZ 166*240ST1.1 | 1,1                           | 7   | 240                        | 3481 | 1/2"      | 19           | 4.695     | 6,6    | 3.936     | 20,5   |

stator diameter D2: 42,0 mm, stator thread T2: 1.66" NU pin; min. tubing: 1.66"; min. casing: 3 1/2" – 17.05 lb/ft

### Model 2 3/8"

| pump model       | production rate               |     | max. differential pressure |      | rotor     |              |           |        | stator    |        |
|------------------|-------------------------------|-----|----------------------------|------|-----------|--------------|-----------|--------|-----------|--------|
|                  |                               |     |                            |      | thread T1 | dia-meter D1 | length L1 | weight | length L2 | weight |
|                  | m <sup>3</sup> /d/<br>100 rpm | bpd | bar                        | psi  |           | mm           | mm        | kg     | mm        | kg     |
| NTZ 238*065ST1.6 | 1,6                           | 10  | 65                         | 942  | 5/8"      | 31           | 1.500     | 6,8    | 975       | 12,3   |
| NTZ 238*120ST1.6 | 1,6                           | 10  | 120                        | 1740 | 5/8"      | 31           | 2.220     | 10,0   | 1.695     | 21,4   |
| NTZ 238*150ST1.6 | 1,6                           | 10  | 150                        | 2176 | 5/8"      | 31           | 2.965     | 13,4   | 2.190     | 27,7   |
| NTZ 238*180ST1.6 | 1,6                           | 10  | 180                        | 2611 | 5/8"      | 31           | 3.325     | 15,1   | 2.550     | 32,2   |
| NTZ 238*240ST1.6 | 1,6                           | 10  | 240                        | 3481 | 5/8"      | 31           | 4.165     | 18,6   | 3.390     | 42,9   |
| NTZ 238*065ST3.2 | 3,2                           | 20  | 65                         | 942  | 5/8"      | 28           | 1.710     | 4,2    | 1.185     | 15,2   |
| NTZ 238*120ST3.2 | 3,2                           | 20  | 120                        | 1740 | 5/8"      | 28           | 2.673     | 6,6    | 2.148     | 27,6   |
| NTZ 238*150ST3.2 | 3,2                           | 20  | 150                        | 2176 | 5/8"      | 28           | 3.441     | 8,5    | 2.666     | 34,3   |
| NTZ 238*180ST3.2 | 3,2                           | 20  | 180                        | 2611 | 5/8"      | 28           | 3.885     | 9,5    | 3.110     | 40,0   |
| NTZ 238*240ST3.2 | 3,2                           | 20  | 240                        | 3481 | 5/8"      | 28           | 4.996     | 12,5   | 4.221     | 54,3   |

stator diameter D2: 66,0 mm; stator thread T2: 2 3/8" EU pin

min. tubing: 2 3/8"; min. casing: 3 1/2" – 9,2 lb/ft; All pump models 2 3/8" are also available with NU thread.

## Model 2 7/8"

| pump model       | production rate               |     | max. differential pressure |      | rotor     |              |           |        | stator    |        |
|------------------|-------------------------------|-----|----------------------------|------|-----------|--------------|-----------|--------|-----------|--------|
|                  |                               |     |                            |      | thread T1 | dia-meter D1 | length L1 | weight | length L2 | weight |
|                  | m <sup>3</sup> /d/<br>100 rpm | bpd | bar                        | psi  |           | mm           | mm        | kg     | mm        | kg     |
| NTZ 278*065ST4.0 | 4                             | 25  | 65                         | 942  | 3/4"      | 38,1         | 1.985     | 11     | 1.425     | 24,6   |
| NTZ 278*120ST4.0 | 4                             | 25  | 120                        | 1740 | 3/4"      | 38,1         | 3.065     | 17     | 2.505     | 43,0   |
| NTZ 278*150ST4.0 | 4                             | 25  | 150                        | 2176 | 3/4"      | 38,1         | 3.945     | 21,7   | 3.135     | 54,0   |
| NTZ 278*180ST4.0 | 4                             | 25  | 180                        | 2611 | 3/4"      | 38,1         | 4.485     | 24,5   | 3.675     | 63,3   |
| NTZ 278*240ST4.0 | 4                             | 25  | 240                        | 3481 | 3/4"      | 38,1         | 5.820     | 31,2   | 5.010     | 86,3   |
| NTZ 278*065ST7.0 | 7                             | 44  | 65                         | 942  | 3/4"      | 38,1         | 1.985     | 8,8    | 1.425     | 24,4   |
| NTZ 278*120ST7.0 | 7                             | 44  | 120                        | 1740 | 3/4"      | 38,1         | 3.070     | 13,5   | 2.510     | 43,0   |
| NTZ 278*150ST7.0 | 7                             | 44  | 150                        | 2176 | 3/4"      | 38,1         | 3.945     | 17,2   | 3.135     | 53,7   |
| NTZ 278*180ST7.0 | 7                             | 44  | 180                        | 2611 | 3/4"      | 38,1         | 4.485     | 19,3   | 3.675     | 63,0   |
| NTZ 278*240ST7.0 | 7                             | 44  | 240                        | 3481 | 3/4"      | 38,1         | 5.830     | 25,2   | 5.026     | 86,0   |
| NTZ 278*065ST10  | 10                            | 63  | 65                         | 942  | 7/8"      | 41,3         | 2.315     | 12,3   | 1.755     | 29,5   |
| NTZ 278*120ST10  | 10                            | 63  | 120                        | 1740 | 7/8"      | 41,3         | 3.659     | 19,4   | 3.099     | 52,0   |
| NTZ 278*150ST10  | 10                            | 63  | 150                        | 2176 | 7/8"      | 41,3         | 4.693     | 24,8   | 3.883     | 65,3   |
| NTZ 278*180ST10  | 10                            | 63  | 180                        | 2611 | 7/8"      | 41,3         | 5.365     | 28,5   | 4.555     | 76,6   |
| NTZ 278*240ST10  | 10                            | 63  | 240                        | 3481 | 7/8"      | 41,3         | 7.008     | 26,8   | 6.198     | 104,2  |
| NTZ 278*300ST10  | 10                            | 63  | 300                        | 4350 | 7/8"      | 41,3         | 8.464     | 46     | 7.654     | 128,6  |
| NTZ 278*065ST14  | 14                            | 88  | 65                         | 942  | 7/8"      | 41,3         | 2.885     | 15,3   | 2.325     | 38,9   |
| NTZ 278*120ST14  | 14                            | 88  | 120                        | 1740 | 7/8"      | 41,3         | 4.685     | 25     | 4.125     | 69,0   |
| NTZ 278*150ST14  | 14                            | 88  | 150                        | 2176 | 7/8"      | 41,3         | 6.060     | 31,5   | 5.256     | 87,9   |
| NTZ 278*180ST14  | 14                            | 88  | 180                        | 2611 | 7/8"      | 41,3         | 6.960     | 36     | 6.150     | 103,0  |
| NTZ 278*240ST14  | 14                            | 88  | 240                        | 3481 | 7/8"      | 41,3         | 9.060     | 46,5   | 8.250     | 138,1  |
| NTZ 278*060DT16  | 16                            | 101 | 60                         | 870  | 7/8"      | 42,5         | 1.910     | 13,3   | 1.350     | 22,2   |
| NTZ 278*090DT16  | 16                            | 101 | 90                         | 1305 | 7/8"      | 42,5         | 2.547     | 17,7   | 1.987     | 33,2   |
| NTZ 278*120DT16  | 16                            | 101 | 120                        | 1740 | 7/8"      | 42,5         | 3.185     | 22,2   | 2.625     | 43,8   |
| NTZ 278*150DT16  | 16                            | 101 | 150                        | 2176 | 7/8"      | 42,5         | 4.073     | 28,4   | 3.263     | 54,5   |
| NTZ 278*180DT16  | 16                            | 101 | 180                        | 2611 | 7/8"      | 42,5         | 4.710     | 32,5   | 3.900     | 65,1   |
| NTZ 278*240DT16  | 16                            | 101 | 240                        | 3481 | 7/8"      | 42,5         | 6.060     | 42     | 5.256     | 87,6   |

stator diameter D2: 78,6 mm; stator thread T2: 2 7/8" EU pin

min. tubing: 2 3/8"; min. casing: 4 1/2" – 11.6 lb/ft; All pump models 2 7/8" are also available with NU thread.

## Pump Equipment – Pump

### Model 2 7/8" (continuation)

| pump model      | production rate               |     | max. differential pressure |      | rotor     |              |           |        | stator    |        |
|-----------------|-------------------------------|-----|----------------------------|------|-----------|--------------|-----------|--------|-----------|--------|
|                 |                               |     |                            |      | thread T1 | dia-meter D1 | length L1 | weight | length L2 | weight |
|                 | m <sup>3</sup> /d/<br>100 rpm | bpd | bar                        | psi  |           | mm           | mm        | kg     | mm        | kg     |
| NTZ 278*060DT20 | 20                            | 126 | 60                         | 870  | 7/8"      | 42,5         | 2.225     | 15,4   | 1.665     | 27,4   |
| NTZ 278*090DT20 | 20                            | 126 | 90                         | 1305 | 7/8"      | 42,5         | 3.020     | 20,7   | 2.460     | 41,0   |
| NTZ 278*120DT20 | 20                            | 126 | 120                        | 1740 | 7/8"      | 42,5         | 3.815     | 26     | 3.255     | 54,3   |
| NTZ 278*150DT20 | 20                            | 126 | 150                        | 2176 | 7/8"      | 42,5         | 4.935     | 34,1   | 4.125     | 68,9   |
| NTZ 278*180DT20 | 20                            | 126 | 180                        | 2611 | 7/8"      | 42,5         | 5.730     | 39,4   | 4.920     | 82,1   |
| NTZ 278*240DT20 | 20                            | 126 | 240                        | 3481 | 7/8"      | 42,5         | 7.320     | 50,6   | 6.510     | 107,0  |
| NTZ 278*060DT25 | 25                            | 157 | 60                         | 870  | 7/8"      | 42,5         | 2.615     | 18,1   | 2.055     | 33,8   |
| NTZ 278*090DT25 | 25                            | 157 | 90                         | 1305 | 7/8"      | 42,5         | 3.605     | 25     | 3.045     | 51,0   |
| NTZ 278*120DT25 | 25                            | 157 | 120                        | 1740 | 7/8"      | 42,5         | 4.595     | 31,6   | 4.035     | 67,3   |
| NTZ 278*150DT25 | 25                            | 157 | 150                        | 2176 | 7/8"      | 42,5         | 5.910     | 40,9   | 5.100     | 85,1   |
| NTZ 278*180DT25 | 25                            | 157 | 180                        | 2611 | 7/8"      | 42,5         | 6.900     | 47,6   | 6.090     | 101,6  |
| NTZ 278*240DT25 | 25                            | 157 | 240                        | 3481 | 7/8"      | 42,5         | 8.880     | 61,5   | 8.070     | 132,6  |
| NTZ 278*060DT32 | 32                            | 201 | 60                         | 870  | 7/8"      | 42,5         | 3.185     | 21,7   | 2.625     | 43,8   |
| NTZ 278*090DT32 | 32                            | 201 | 90                         | 1305 | 7/8"      | 42,5         | 4.460     | 30,7   | 3.900     | 65,1   |
| NTZ 278*120DT32 | 32                            | 201 | 120                        | 1740 | 7/8"      | 42,5         | 5.810     | 39,1   | 5.250     | 87,6   |
| NTZ 278*150DT32 | 32                            | 201 | 150                        | 2176 | 7/8"      | 42,5         | 7.335     | 49,1   | 6.525     | 109,0  |
| NTZ 278*180DT32 | 32                            | 201 | 180                        | 2611 | 7/8"      | 42,5         | 8.610     | 57,7   | 7.800     | 130,0  |
| NTZ 278*240DT32 | 32                            | 201 | 240                        | 3481 | 7/8"      | 42,5         | 11.235    | 77     | 10.425    | 171,3  |

stator diameter D2: 78,6 mm; stator thread T2: 2 7/8" EU pin

min. tubing: 2 3/8"; min. casing: 4 1/2" – 11.6 lb/ft; All pump models 2 7/8" are also available with NU thread.

### Model 3 1/2"

| pump model        | production rate               |     | max. differential pressure |      | rotor     |              |           |        | stator    |        |
|-------------------|-------------------------------|-----|----------------------------|------|-----------|--------------|-----------|--------|-----------|--------|
|                   |                               |     |                            |      | thread T1 | dia-meter D1 | length L1 | weight | length L2 | weight |
|                   | m <sup>3</sup> /d/<br>100 rpm | bpd | bar                        | psi  |           | mm           | mm        | kg     | mm        | kg     |
| NTZ 350*065ST16.4 | 16,4                          | 103 | 65                         | 942  | 1"        | 54           | 2.920     | 32,5   | 2.325     | 54,8   |
| NTZ 350*100ST16.4 | 16,4                          | 103 | 100                        | 1450 | 1"        | 54           | 4.120     | 45,8   | 3.525     | 83,0   |
| NTZ 350*120ST16.4 | 16,4                          | 103 | 120                        | 1740 | 1"        | 54           | 4.720     | 52,2   | 4.131     | 97,3   |
| NTZ 350*150ST16.4 | 16,4                          | 103 | 150                        | 2176 | 1"        | 54           | 6.095     | 67,1   | 5.250     | 124,0  |

## Model 3 1/2" (continuation)

|                   |                               |     |                            |      | rotor     |              |           |        | stator    |        |
|-------------------|-------------------------------|-----|----------------------------|------|-----------|--------------|-----------|--------|-----------|--------|
| pump model        | production rate               |     | max. differential pressure |      | thread T1 | dia-meter D1 | length L1 | weight | length L2 | weight |
|                   | m <sup>3</sup> /d/<br>100 rpm | bpd | bar                        | psi  |           | mm           | mm        | kg     | mm        | kg     |
| NTZ 350*180ST16.4 | 16,4                          | 103 | 180                        | 2611 | 1"        | 54           | 6.995     | 77,0   | 6.150     | 145,0  |
| NTZ 350*200ST16.4 | 16,4                          | 103 | 200                        | 2900 | 1"        | 54           | 7.895     | 86,1   | 7.056     | 166,1  |
| NTZ 350*240ST16.4 | 16,4                          | 103 | 240                        | 3481 | 1"        | 54           | 9.095     | 99,0   | 8.250     | 194,3  |
| NTZ 350*300ST16.4 | 16,4                          | 103 | 300                        | 4350 | 1"        | 54           | 11.155    | 125,0  | 10.310    | 243,0  |
| NTZ 350*065ST20   | 20                            | 126 | 65                         | 942  | 1"        | 54           | 2.910     | 33,0   | 2.315     | 54,3   |
| NTZ 350*100ST20   | 20                            | 126 | 100                        | 1450 | 1"        | 54           | 4.190     | 46,0   | 3.595     | 84,3   |
| NTZ 350*120ST20   | 20                            | 126 | 120                        | 1740 | 1"        | 54           | 4.990     | 55,5   | 4.395     | 103,0  |
| NTZ 350*150ST20   | 20                            | 126 | 150                        | 2176 | 1"        | 54           | 6.435     | 72,0   | 5.590     | 131,0  |
| NTZ 350*180ST20   | 20                            | 126 | 180                        | 2611 | 1"        | 54           | 7.395     | 81,5   | 6.556     | 154,0  |
| NTZ 350*200ST20   | 20                            | 126 | 200                        | 2900 | 1"        | 54           | 8.035     | 89,0   | 7.196     | 111,0  |
| NTZ 350*240ST20   | 20                            | 126 | 240                        | 3481 | 1"        | 54           | 9.635     | 107,0  | 8.790     | 206,1  |
| NTZ 350*065ST25   | 25                            | 157 | 65                         | 942  | 1"        | 54           | 3.070     | 29,9   | 2.475     | 58,1   |
| NTZ 350*100ST25   | 25                            | 157 | 100                        | 1450 | 1"        | 54           | 4.350     | 42,0   | 3.755     | 88,1   |
| NTZ 350*120ST25   | 25                            | 157 | 120                        | 1740 | 1"        | 54           | 4.995     | 48,1   | 4.400     | 103,3  |
| NTZ 350*150ST25   | 25                            | 157 | 150                        | 2176 | 1"        | 54           | 6.435     | 62,0   | 5.590     | 131,2  |
| NTZ 350*180ST25   | 25                            | 157 | 180                        | 2611 | 1"        | 54           | 7.395     | 70,5   | 6.550     | 153,7  |
| NTZ 350*200ST25   | 25                            | 157 | 200                        | 2900 | 1"        | 54           | 8.355     | 79,2   | 7.510     | 176,3  |
| NTZ 350*240ST25   | 25                            | 157 | 240                        | 3481 | 1"        | 54           | 9.645     | 91,0   | 8.800     | 206,6  |
| NTZ 350*300ST25   | 25                            | 157 | 300                        | 4350 | 1"        | 54           | 11.790    | 112,0  | 10.945    | 256,9  |
| NTZ 350*060DT33   | 33                            | 208 | 60                         | 870  | 1"        | 54           | 2.320     | 25,5   | 1.725     | 40,6   |
| NTZ 350*090DT33   | 33                            | 208 | 90                         | 1305 | 1"        | 54           | 3.145     | 34,3   | 2.550     | 60,0   |
| NTZ 350*120DT33   | 33                            | 208 | 120                        | 1740 | 1"        | 54           | 3.970     | 43,1   | 3.375     | 79,5   |
| NTZ 350*150DT33   | 33                            | 208 | 150                        | 2176 | 1"        | 54           | 5.045     | 54,7   | 4.200     | 98,9   |
| NTZ 350*180DT33   | 33                            | 208 | 180                        | 2611 | 1"        | 54           | 5.945     | 64,9   | 5.100     | 120,1  |
| NTZ 350*200DT33   | 33                            | 208 | 200                        | 2900 | 1"        | 54           | 6.605     | 71,3   | 5.760     | 135,7  |
| NTZ 350*240DT33   | 33                            | 208 | 240                        | 3481 | 1 1/8"    | 54           | 7.595     | 81,2   | 6.750     | 159,0  |
| NTZ 350*300DT33   | 33                            | 208 | 300                        | 4350 | 1 1/8"    | 54           | 9.245     | 98,1   | 8.406     | 198,0  |
| NTZ 350*100DT40   | 40                            | 252 | 100                        | 1450 | 1"        | 54           | 4.090     | 45,4   | 3.501     | 82,2   |
| NTZ 350*120DT40   | 40                            | 252 | 120                        | 1740 | 1"        | 54           | 4.945     | 56,0   | 4.350     | 102,3  |
| NTZ 350*150DT40   | 40                            | 252 | 150                        | 2176 | 1"        | 56           | 4.340     | 70,1   | 5.460     | 128,4  |
| NTZ 350*200DT40   | 40                            | 252 | 200                        | 2900 | 1"        | 54           | 7.835     | 85,7   | 6.996     | 164,5  |

stator diameter D2: 95,2 mm; stator-thread T2: 3 1/2" EU pin

min. tubing: 2 7/8"; min. casing: 5 1/2" – 20 lb/ft; All pump models 3 1/2" are also available with NU thread.

## Pump Equipment – Pump

| Model 4"         |                               |     |                            |      |           |              |           |        |           |        |
|------------------|-------------------------------|-----|----------------------------|------|-----------|--------------|-----------|--------|-----------|--------|
| pump model       | production rate               |     | max. differential pressure |      | rotor     |              |           |        | stator    |        |
|                  |                               |     |                            |      | thread T1 | dia-meter D1 | length L1 | weight | length L2 | weight |
|                  | m <sup>3</sup> /d/<br>100 rpm | bpd | bar                        | psi  |           | mm           | mm        | kg     | mm        | kg     |
| NTZ 400*065ST33  | 33                            | 208 | 65                         | 942  | 1"        | 56           | 3.670     | 35,2   | 3.297     | 71,6   |
| NTZ 400*090ST33  | 33                            | 208 | 100                        | 1450 | 1"        | 56           | 4.670     | 44,5   | 4.297     | 94,9   |
| NTZ 400*120ST33  | 33                            | 208 | 120                        | 1740 | 1"        | 56           | 6.145     | 58,4   | 5.772     | 129,2  |
| NTZ 400*150ST33  | 33                            | 208 | 150                        | 2176 | 1"        | 56           | 7.795     | 73,0   | 6.956     | 161,9  |
| NTZ 400*180ST33  | 33                            | 208 | 180                        | 2611 | 1"        | 56           | 8.995     | 84,6   | 8.156     | 190,0  |
| NTZ 400*200ST33  | 33                            | 208 | 200                        | 2900 | 1"        | 56           | 10.195    | 96,3   | 9.350     | 217,5  |
| NTZ 400*240ST33  | 33                            | 208 | 240                        | 3481 | 1"        | 56           | 11.870    | 110,2  | 11.025    | 256,7  |
| NTZ 400*100ST40* | 40                            | 252 | 100                        | 1450 | 1 1/8"    | 58           | 5.611     | 61,0   | 5.016     | 115,0  |
| NTZ 400*120ST40* | 40                            | 252 | 120                        | 1740 | 1 1/8"    | 58           | 6.901     | 74,9   | 6.306     | 145,1  |
| NTZ 400*150ST40* | 40                            | 252 | 150                        | 2176 | 1 1/8"    | 58           | 8.519     | 91,3   | 7.674     | 176,5  |
| NTZ 400*180ST40* | 40                            | 252 | 180                        | 2611 | 1 1/8"    | 58           | 10.115    | 108,6  | 9.270     | 213,2  |
| NTZ 400*200ST40* | 40                            | 252 | 200                        | 2900 | 1 1/8"    | 58           | 11.027    | 119,3  | 10.182    | 234,2  |
| NTZ 400*060ST50  | 50                            | 315 | 60                         | 870  | 1"        | 58           | 4.210     | 43,5   | 3.807     | 82,4   |
| NTZ 400*090ST50  | 50                            | 315 | 90                         | 1305 | 1"        | 58           | 6.175     | 63,9   | 5.550     | 127,8  |
| NTZ 400*120ST50  | 50                            | 315 | 120                        | 1740 | 1"        | 58           | 7.765     | 78,2   | 7.170     | 164,9  |
| NTZ 400*150ST50  | 50                            | 315 | 150                        | 2176 | 1 1/8"    | 58           | 9.980     | 99,9   | 9.135     | 210,1  |
| NTZ 400*180ST50  | 50                            | 315 | 180                        | 2611 | 1 1/8"    | 58           | 11.600    | 117,0  | 10.761    | 247,5  |
| NTZ 400*065ST33  | 33                            | 208 | 65                         | 942  | 1"        | 56           | 3.670     | 35,2   | 3.297     | 71,6   |
| NTZ 400*090ST33  | 33                            | 208 | 100                        | 1450 | 1"        | 56           | 4.670     | 44,5   | 4.297     | 94,9   |
| NTZ 400*120ST33  | 33                            | 208 | 120                        | 1740 | 1"        | 56           | 6.145     | 58,4   | 5.772     | 129,2  |
| NTZ 400*150ST33  | 33                            | 208 | 150                        | 2176 | 1"        | 56           | 7.795     | 73,0   | 6.956     | 161,9  |
| NTZ 400*180ST33  | 33                            | 208 | 180                        | 2611 | 1"        | 56           | 8.995     | 84,6   | 8.156     | 190,0  |
| NTZ 400*200ST33  | 33                            | 208 | 200                        | 2900 | 1"        | 56           | 10.195    | 96,3   | 9.350     | 217,5  |
| NTZ 400*240ST33  | 33                            | 208 | 240                        | 3481 | 1"        | 56           | 11.870    | 110,2  | 11.025    | 256,7  |
| NTZ 400*100ST40  | 40                            | 252 | 100                        | 1450 | 1 1/8"    | 58           | 5.611     | 61,0   | 5.016     | 115,0  |
| NTZ 400*120ST40  | 40                            | 252 | 120                        | 1740 | 1 1/8"    | 58           | 6.901     | 74,9   | 6.306     | 145,1  |
| NTZ 400*150ST40  | 40                            | 252 | 150                        | 2176 | 1 1/8"    | 58           | 8.519     | 91,3   | 7.674     | 176,5  |
| NTZ 400*180ST40  | 40                            | 252 | 180                        | 2611 | 1 1/8"    | 58           | 10.115    | 108,6  | 9.270     | 213,2  |
| NTZ 400*200ST40  | 40                            | 252 | 200                        | 2900 | 1 1/8"    | 58           | 11.027    | 119,3  | 10.182    | 234,2  |
| NTZ 400*060ST50* | 50                            | 315 | 60                         | 870  | 1"        | 58           | 4.210     | 43,5   | 3.807     | 82,4   |
| NTZ 400*090ST50* | 50                            | 315 | 90                         | 1305 | 1"        | 58           | 6.175     | 63,9   | 5.550     | 127,8  |
| NTZ 400*120ST50* | 50                            | 315 | 120                        | 1740 | 1"        | 58           | 7.765     | 78,2   | 7.170     | 164,9  |

## Model 4" (continuation)

| pump model       | production rate               |     | max. differential pressure |      | rotor     |              |           |        | stator    |        |
|------------------|-------------------------------|-----|----------------------------|------|-----------|--------------|-----------|--------|-----------|--------|
|                  |                               |     |                            |      | thread T1 | dia-meter D1 | length L1 | weight | length L2 | weight |
|                  | m <sup>3</sup> /d/<br>100 rpm | bpd | bar                        | psi  |           | mm           | mm        | kg     | mm        | kg     |
| NTZ 400*150ST50* | 50                            | 315 | 150                        | 2176 | 1 1/8"    | 58           | 9.980     | 99,9   | 9.135     | 210,1  |
| NTZ 400*180ST50* | 50                            | 315 | 180                        | 2611 | 1 1/8"    | 58           | 11.600    | 117,0  | 10.761    | 247,5  |
| NTZ 400*060DT50  | 50                            | 315 | 60                         | 870  | 1"        | 58           | 2.710     | 33,5   | 2.337     | 48,7   |
| NTZ 400*090DT50  | 50                            | 315 | 90                         | 1305 | 1"        | 58           | 3.730     | 45,4   | 3.135     | 72,1   |
| NTZ 400*120DT50  | 50                            | 315 | 120                        | 1740 | 1"        | 58           | 4.760     | 57,9   | 4.387     | 95,8   |
| NTZ 400*150DT50  | 50                            | 315 | 150                        | 2176 | 1"        | 58           | 6.095     | 74,9   | 5.472     | 120,8  |
| NTZ 400*180DT50  | 50                            | 315 | 180                        | 2611 | 1 1/8"    | 58           | 7.125     | 84,5   | 6.280     | 144,5  |
| NTZ 400*200DT50  | 50                            | 315 | 200                        | 2900 | 1 1/8"    | 58           | 7.931     | 95,6   | 7.092     | 163,1  |
| NTZ 400*240DT50  | 50                            | 315 | 240                        | 3481 | 1 1/8"    | 58           | 9.175     | 110,0  | 8.330     | 191,7  |
| NTZ 400*060ST62* | 62                            | 390 | 60                         | 870  | 1"        | 58           | 4.990     | 54,4   | 4.617     | 101,0  |
| NTZ 400*090ST62* | 62                            | 390 | 90                         | 1305 | 1"        | 58           | 7.225     | 78,5   | 7.710     | 177,1  |
| NTZ 400*120ST62* | 62                            | 390 | 120                        | 1740 | 1 1/8"    | 58           | 9.385     | 101,0  | 9.012     | 201,9  |
| NTZ 400*150ST62* | 62                            | 390 | 150                        | 2176 | 1 1/8"    | 58           | 11.870    | 127,1  | 11.179    | 253,3  |
| NTZ 400*060DT66  | 66                            | 415 | 60                         | 870  | 1"        | 58           | 3.340     | 41,0   | 2.745     | 62,0   |
| NTZ 400*090DT66  | 66                            | 415 | 90                         | 1305 | 1"        | 58           | 4.685     | 56,1   | 4.090     | 94,1   |
| NTZ 400*120DT66  | 66                            | 415 | 120                        | 1740 | 1 1/8"    | 58           | 6.085     | 73,9   | 5.490     | 126,4  |
| NTZ 400*150DT66  | 66                            | 415 | 150                        | 2176 | 1 1/8"    | 58           | 7.680     | 92,9   | 6.835     | 157,3  |
| NTZ 400*180DT66  | 66                            | 415 | 180                        | 2611 | 1 1/8"    | 58           | 9.025     | 108,8  | 8.180     | 188,3  |
| NTZ 400*200DT66  | 66                            | 415 | 200                        | 2900 | 1 1/8"    | 58           | 10.073    | 120,6  | 9.234     | 212,5  |
| NTZ 400*240DT66  | 66                            | 415 | 240                        | 3481 | 1 1/8"    | 58           | 11.770    | 139,5  | 10.925    | 251,4  |
| NTZ 400*060ST78* | 78                            | 490 | 60                         | 870  | 1 1/8"    | 58           | 5.070     | 48,0   | 4.475     | 103,1  |
| NTZ 400*090ST78* | 78                            | 490 | 90                         | 1305 | 1 1/8"    | 58           | 7.145     | 67,6   | 6.556     | 151,0  |
| NTZ 400*120ST78* | 78                            | 490 | 120                        | 1740 | 1 1/8"    | 58           | 9.545     | 89,0   | 8.950     | 206,3  |
| NTZ 400*150ST78* | 78                            | 490 | 150                        | 2176 | 1 1/8"    | 58           | 11.870    | 109,8  | 11.025    | 254,1  |
| NTZ 400*060DT83  | 83                            | 522 | 60                         | 870  | 1"        | 58           | 4.060     | 49,7   | 3.465     | 78,3   |
| NTZ 400*080DT83  | 83                            | 522 | 80                         | 1160 | 1"        | 58           | 5.087     | 61,4   | 4.492     | 103,5  |
| NTZ 400*120DT83  | 83                            | 522 | 120                        | 1740 | 1 1/8"    | 58           | 5.087     | 59,0   | 4.714     | 86,1   |
| NTZ 400*150DT83  | 83                            | 522 | 150                        | 2176 | 1 1/8"    | 58           | 9.370     | 112,1  | 8.747     | 196,0  |
| NTZ 400*180DT83  | 83                            | 522 | 180                        | 2611 | 1 1/8"    | 58           | 7.775     | 91,0   | 7.162     | 133,0  |
| NTZ 400*200DT83  | 83                            | 522 | 200                        | 2900 | 1 1/8"    | 58           | 11.890    | 139,7  | 11.295    | 260,1  |

stator diameter D2: 102 mm; stator thread T2: 3 1/2" EU box \* stator thread T2: 4" NU pin  
min. tubing: 2 7/8"; min. casing: 5 1/2" – 20 lb/ft; All pump models 4" are also available with NU thread.

## Pump Equipment – Pump

### Model 4" (continuation)

| pump model       | production rate               |     | max. differential pressure |      | rotor     |              |           |        | stator    |        |
|------------------|-------------------------------|-----|----------------------------|------|-----------|--------------|-----------|--------|-----------|--------|
|                  |                               |     |                            |      | thread T1 | dia-meter D1 | length L1 | weight | length L2 | weight |
|                  | m <sup>3</sup> /d/<br>100 rpm | bpd | bar                        | psi  |           | mm           | mm        | kg     | mm        | kg     |
| NTZ 400*060DT110 | 110                           | 692 | 60                         | 870  | 1"        | 58           | 5.170     | 63,3   | 4.797     | 105,3  |
| NTZ 400*090DT110 | 110                           | 692 | 90                         | 1305 | 1 1/8"    | 58           | 7.495     | 91,0   | 7.122     | 158,8  |
| NTZ 400*120DT110 | 110                           | 692 | 120                        | 1740 | 1 1/8"    | 58           | 9.745     | 117,7  | 9.372     | 210,5  |
| NTZ 400*150DT110 | 110                           | 692 | 150                        | 2176 | 1 1/8"    | 58           | 11.890    | 143,0  | 11.301    | 260,0  |
| NTZ 400*060DT142 | 142                           | 893 | 60                         | 870  | 1 1/8"    | 58           | 6.595     | 78,1   | 6.222     | 138,2  |
| NTZ 400*090DT142 | 142                           | 893 | 90                         | 1305 | 1 1/8"    | 58           | 9.500     | 112,4  | 9.127     | 205,2  |
| NTZ 400*110DT142 | 142                           | 893 | 110                        | 1595 | 1 1/8"    | 58           | 11.885    | 139,8  | 11.340    | 264,0  |

sator diameter D2: 102 mm; stator thread T2: 3 1/2" EU box;

min. tubing: 2 7/8"; min. casing: 5 1/2" – 20 lb/ft; All pump models 4" are also available with NU thread.

### Model 4 1/2"

| pump model       | production rate               |     | max. differential pressure |      | rotor     |              |           |        | stator    |        |
|------------------|-------------------------------|-----|----------------------------|------|-----------|--------------|-----------|--------|-----------|--------|
|                  |                               |     |                            |      | thread T1 | dia-meter D1 | length L1 | weight | length L2 | weight |
|                  | m <sup>3</sup> /d/<br>100 rpm | bpd | bar                        | psi  |           | mm           | mm        | kg     | mm        | kg     |
| NTZ 450*060DT74  | 74                            | 465 | 60                         | 870  | 1"        | 71,5         | 2770      | 54     | 2175      | 58     |
| NTZ 450*090DT74  | 74                            | 465 | 90                         | 1305 | 1"        | 71,5         | 3820      | 74     | 3225      | 86     |
| NTZ 450*120DT74  | 74                            | 465 | 120                        | 1740 | 1 1/8"    | 71,5         | 4870      | 95     | 4275      | 114    |
| NTZ 450*150DT74  | 74                            | 465 | 150                        | 2176 | 1 1/8"    | 71,5         | 6245      | 122    | 5400      | 144    |
| NTZ 450*180DT74  | 74                            | 465 | 180                        | 2611 | 1 1/8"    | 71,5         | 7295      | 138,8  | 6658      | 175,3  |
| NTZ 450*200DT74  | 74                            | 465 | 200                        | 2900 | 1 1/8"    | 71,5         | 8135      | 157    | 7492      | 198    |
| NTZ 450*240DT74  | 74                            | 465 | 240                        | 3481 | 1 1/8"    | 71,5         | 9395      | 178,8  | 8752      | 232,2  |
| NTZ 450*060DT150 | 150                           | 943 | 60                         | 870  | 1 1/8"    | 71,5         | 4875      | 95     | 4280      | 114    |
| NTZ 450*090DT150 | 150                           | 943 | 90                         | 1305 | 1 1/8"    | 71,5         | 7055      | 138    | 6460      | 173    |
| NTZ 450*120DT150 | 150                           | 943 | 120                        | 1740 | 1 1/8"    | 71,5         | 9155      | 174    | 8762      | 232,2  |
| NTZ 450*150DT150 | 150                           | 943 | 150                        | 2176 | 1 1/8"    | 71,5         | 11585     | 223,4  | 10740     | 290,9  |

sator diameter D2: 114,3 mm; stator thread T2: 4 1/2" EU pin

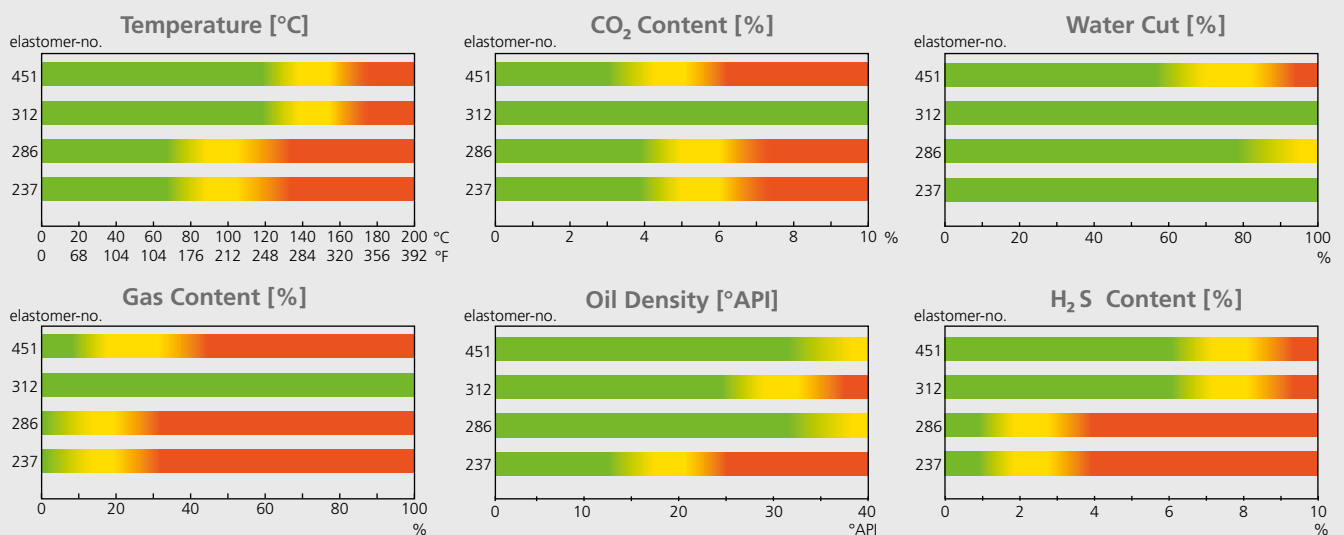
min. tubing: 3 1/2"; min. casing: 6 5/8" – 24 lb/ft; All pump models 4 1/2" are also available with NU thread.

## Model 5"

| pump model       | production rate               |      | max. differential pressure |      | rotor     |              |           |        | stator    |        |
|------------------|-------------------------------|------|----------------------------|------|-----------|--------------|-----------|--------|-----------|--------|
|                  |                               |      |                            |      | thread T1 | dia-meter D1 | length L1 | weight | length L2 | weight |
|                  | m <sup>3</sup> /d/<br>100 rpm | bpd  | bar                        | psi  |           | mm           | mm        | kg     | mm        | kg     |
| NTZ 500*060DT138 | 138                           | 868  | 60                         | 870  | 1 1/8"    | 81           | 3720      | 93     | 3075      | 90     |
| NTZ 500*090DT138 | 138                           | 868  | 90                         | 1305 | 1 1/8"    | 81           | 5220      | 130    | 4575      | 134    |
| NTZ 500*120DT138 | 138                           | 868  | 120                        | 1740 | 1 1/8"    | 81           | 6795      | 170    | 6150      | 180    |
| NTZ 500*150DT138 | 138                           | 868  | 150                        | 2176 | 1 1/8"    | 81           | 8545      | 209    | 7656      | 229    |
| NTZ 500*180DT138 | 138                           | 868  | 180                        | 2611 | 1 1/8"    | 81           | 10045     | 247    | 9150      | 273,1  |
| NTZ 500*200DT138 | 138                           | 868  | 200                        | 2900 | 1 1/8"    | 81           | 11320     | 283    | 10425     | 306    |
| NTZ 500*080DT170 | 170                           | 1069 | 80                         | 1160 | 1 1/8"    | 81           | 5400      | 136    | 4755      | 139    |
| NTZ 500*100DT170 | 170                           | 1069 | 100                        | 1450 | 1 1/8"    | 81           | 6915      | 174    | 6270      | 184    |
| NTZ 500*150DT170 | 170                           | 1069 | 150                        | 2176 | 1 1/8"    | 81           | 10405     | 262    | 9510      | 279    |
| NTZ 500*180DT170 | 170                           | 1069 | 180                        | 2611 | 1 1/8"    | 81           | 11920     | 294,4  | 11031     | 329    |
| NTZ 500*060DT226 | 226                           | 1421 | 60                         | 870  | 1 1/8"    | 81           | 5810      | 145    | 5165      | 151    |
| NTZ 500*090DT226 | 226                           | 1421 | 90                         | 1305 | 1 1/8"    | 81           | 8845      | 212,5  | 8200      | 244,2  |
| NTZ 500*120DT226 | 226                           | 1421 | 120                        | 1740 | 1 1/8"    | 81           | 10885     | 261    | 10240     | 305,5  |

stator diameter D2: 127 mm; stator thread T2: 5" LTC pin; min. tubing: 4 1/2"; min. casing: 6 5/8" – 24 lb/ft

## Elastomer Overview

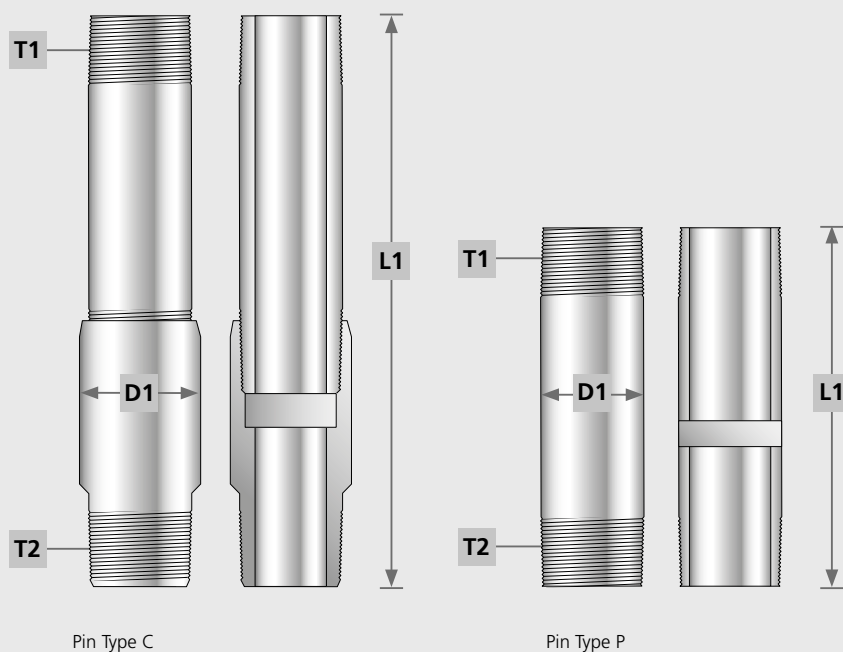


Please take into consideration that the given material limits are a guideline. The final selection has to be based on a detailed analysis (e.g. swelling test).

■ recommended range 
 ■ caution range 
 ■ not recommended

## Pump Equipment – Stop Pin and Gas Separator

| Stop Pin |              |                      |          |          |               |    |               |                  |               |               |                   |                |     |             |       |
|----------|--------------|----------------------|----------|----------|---------------|----|---------------|------------------|---------------|---------------|-------------------|----------------|-----|-------------|-------|
| type     | product type | pressure of the pump |          | Pin Type | connection    |    |               |                  |               |               | dia-meter D1 [mm] | length L1 [mm] |     | weight [kg] |       |
|          |              | ≤120 bar             | >120 bar |          | top thread T1 |    |               | bottom thread T2 |               |               |                   | U              | O   | U           | O     |
| 1.66"    | NPE-SPA      | U                    | O        | P        | 166           | FN | 166" NU box   | 166              | MN            | 166" NU pin   | 42                | 430            | 680 | 3,00        | 6,00  |
| 2 3/8"   |              |                      |          | P        | 238           | FE | 2 3/8" EU box | 238              | ME            | 2 3/8" EU pin | 66                | 430            | 680 | 5,00        | 8,00  |
|          |              |                      |          |          |               | FN | 2 3/8" NU box |                  | MN            | 2 3/8" NU pin |                   |                |     |             |       |
| 2 7/8"   |              |                      |          | P        | 278           | FE | 2 7/8" EU box | 278              | ME            | 2 7/8" EU pin | 79                | 430            | 680 | 6,00        | 9,00  |
|          |              |                      |          |          |               | FN | 2 7/8" NU box |                  | MN            | 2 7/8" NU pin |                   |                |     |             |       |
| 3 1/2"   |              |                      |          | C        | 312           | FE | 3 1/2" EU box | 278              | ME            | 2 7/8" EU pin | 102               | 430            | 680 | 12,00       | 18,00 |
|          |              |                      |          |          |               | MN | 3 1/2" NU pin |                  | MN            | 2 7/8" NU pin |                   |                |     |             |       |
|          |              |                      |          |          |               | FN | 3 1/2" NU box | 312              | ME            | 3 1/2" EU pin |                   |                |     |             |       |
|          |              |                      |          |          |               | ME | 3 1/2" EU pin | 278              | MN            | 2 7/8" NU pin |                   |                |     |             |       |
|          |              |                      |          |          |               | MN | 3 1/2" NU pin | 312              | ME            | 3 1/2" EU pin |                   |                |     |             |       |
|          |              |                      |          |          |               | MN | 3 1/2" NU pin | MN               | 3 1/2" NU pin |               |                   |                |     |             |       |
|          |              |                      |          |          |               |    |               |                  |               |               |                   |                |     |             |       |
|          |              |                      |          |          |               |    |               |                  |               |               |                   |                |     |             |       |



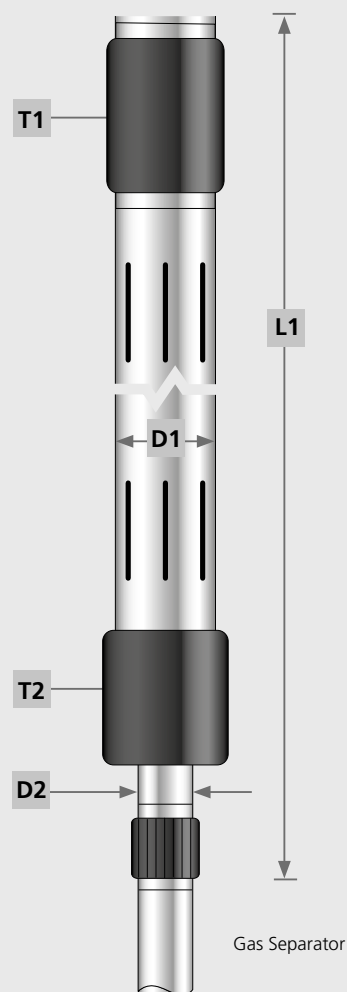
## Gas Separator

| type  | product type | coupling |        |                     |                        | diameter D1 |        | number of stages |   | diameter D2 of suction pipe |     |        | number of suction pipes |   | length L1 [mm] | weight [kg] |
|-------|--------------|----------|--------|---------------------|------------------------|-------------|--------|------------------|---|-----------------------------|-----|--------|-------------------------|---|----------------|-------------|
|       |              | Size     | Thread | Top Thread (box) T1 | Bottom Thread (box) T2 |             | [inch] |                  |   |                             |     |        |                         |   |                |             |
|       |              |          |        |                     |                        |             |        |                  |   |                             |     |        |                         |   |                |             |
| 2 7/8 | NPE-GS-SM    | 278      | FME    | 2 7/8" EU box       | 2 7/8" EU pin          | 278         | 2 7/8" | S                | 5 | p                           | 100 | 1"     | S                       | 2 | 6170           | 109         |
|       |              |          | MME    | 2 7/8" EU pin       | 2 7/8" EU pin          |             |        |                  |   |                             |     |        |                         |   |                |             |
| 3 1/2 | NPE-GS-SM    | 312      | FME    | 3 1/2" EU box       | 3 1/2" EU pin          | 312         | 3 1/2" | S                | 5 | P                           | 112 | 1 1/2" | S                       | 2 | 6170           | 138         |
|       |              |          | MME    | 3 1/2" EU pin       | 3 1/2" EU pin          |             |        |                  |   |                             |     |        |                         |   |                |             |

In principal the NETZSCH gas separator consists of a double-walled tube, with Intake Tube being screwed to the torque anchor.

The oil-gas mixture is drawn through the holes of the gas separator into the gas chamber formed by the intake tube and the suction pipe. The gas, being lighter, rises upwards out of the oil-water mixture and is drawn through the upper holes from the separator within the annulus between the tubing and the casing. The heavier oil/water mixture moves downwards within the gas separator, is forced into the internal suction pipe and rises to the pump.

To optimize the process of the gas removal from fluid, additional tubes are screwed under the gas separator which are for the collecting of hard particles being precipitated from the oil-gas mixture.



## Pump Equipment – Coupling and Pup Joint

| Coupling |              |               |      |                 |                  |    |                      |                          |                |             |
|----------|--------------|---------------|------|-----------------|------------------|----|----------------------|--------------------------|----------------|-------------|
| type     | product type | connection    |      |                 |                  |    |                      | outside diameter D1 [mm] | length L1 [mm] | weight [kg] |
|          |              | top thread T1 |      |                 | bottom thread T2 |    |                      |                          |                |             |
| 1.66"    | NPE-TUC      | 166           | FN   | 1,66" NU box    | 238              | ME | 2 3/8" EU pin        | 55,88                    | 95,25          | 1,0         |
| 2 3/8"   | NPE-TUC      | 238           |      |                 | 238/278          | FE | 2 3/8"/2 7/8" EU box | 77,80                    | 123,83         | 1,5         |
|          |              |               | FE   | 2 3/8" EU box   |                  | FN | 2 3/8"/2 7/8" NU box |                          |                |             |
|          |              |               | (FN) | (2 3/8" NU box) |                  | ME | 2 3/8"/2 7/8" EU pin |                          |                |             |
|          |              |               |      |                 |                  | MN | 2 3/8"/2 7/8" NU pin |                          |                |             |
|          |              |               |      |                 | 238/278          | ME | 2 3/8"/2 7/8" EU pin |                          |                | 1,5         |
|          |              |               | ME   | 2 3/8" EU pin   |                  | MN | 2 3/8"2 7/8" NU pin  |                          |                |             |
|          |              |               | (MN) | (2 3/8" NU pin) | 278              | FE | 2 7/8" EU box        |                          |                |             |
|          |              |               |      |                 |                  | FN | 2 7/8" NU box        |                          |                |             |
| 2 7/8"   | NPE-TUC      | 278           |      |                 | 278/312          | FE | 2 7/8"/3 1/2" EU box | 93,17                    | 133,35         | 2,5         |
|          |              |               | FE   | 2 7/8" EU box   |                  | FN | 2 7/8"/3 1/2" NU box |                          |                |             |
|          |              |               | (FN) | (2 7/8" NU box) |                  | ME | 2 7/8"/3 1/2" EU pin |                          |                |             |
|          |              |               |      |                 |                  | MN | 2 7/8"/3 1/2" NU pin |                          |                |             |
|          |              |               |      |                 | 278/312          | ME | 2 7/8"/3 1/2" EU pin |                          |                | 2,5         |
|          |              |               | ME   | 2 7/8" EU pin   |                  | MN | 2 7/8"/3 1/2" NU pin |                          |                |             |
|          |              |               | (MN) | (2 7/8" NU pin) | 312              | FE | 3 1/2" EU box        |                          |                |             |
|          |              |               |      |                 |                  | FN | 3 1/2" NU box        |                          |                |             |
| 3 1/2"   | NPE-TUC      | 312           |      |                 | 312/4            | FE | 3 1/2"/4" EU box     | 114,30                   | 146,05         | 4,0         |
|          |              |               | FE   | 3 1/2" EU box   |                  | FN | 3 1/2"/4" NU box     |                          |                |             |
|          |              |               | (FN) | (3 1/2" NU box) |                  | ME | 3 1/2"/4" EU pin     |                          |                |             |
|          |              |               |      |                 |                  | MN | 3 1/2"/4" NU pin     |                          |                |             |
|          |              |               |      |                 | 312/4            | ME | 3 1/2"/4" EU pin     |                          |                | 4,0         |
|          |              |               | ME   | 3 1/2" EU pin   |                  | MN | 3 1/2"/4" NU pin     |                          |                |             |
|          |              |               | (MN) | 3 1/2" NU pin   | 4                | FE | 4" EU box            |                          |                |             |
|          |              |               |      |                 |                  | FN | 4" NU box            |                          |                |             |
| 4"       | NPE-TUC      | 4             |      |                 | 4/412            | FE | 4"/4 1/2" EU box     | 127,00                   | 152,40         | 5,0         |
|          |              |               | FE   | 4" EU box       |                  | FN | 4"/4 1/2" NU box     |                          |                |             |
|          |              |               | (FN) | (4" NU box)     |                  | ME | 4"/4 1/2" EU pin     |                          |                |             |
|          |              |               |      |                 |                  | MN | 4"/4 1/2" NU pin     |                          |                |             |
| 4 1/2"   | NPE-TUC      | 4             | FE   | 4 1/2" EU box   | 412              | ME | 4 1/2" EU pin        | 141,30                   | 158,75         | 5,5         |
|          |              |               | (FN) | (4 1/2" NU box) |                  | MN | 4 1/2" NU pin        |                          |                |             |

All coupling threads according to API standard 5B

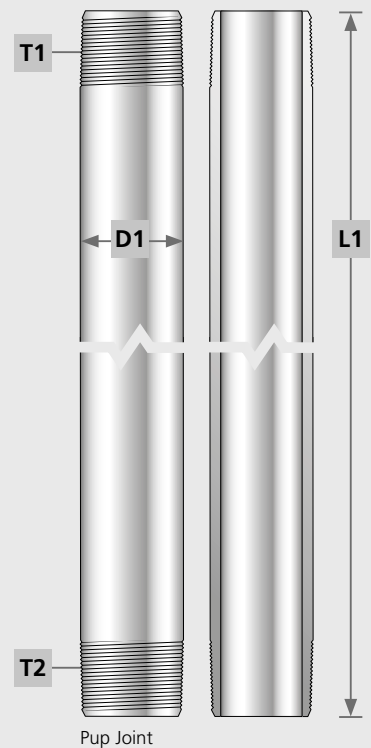
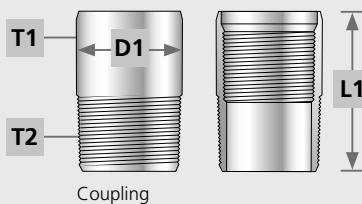
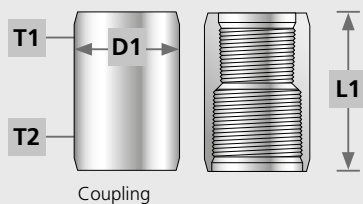
## Pup Joint

| type   | product type | lengh [inch] | connection    |   |               |                  |               | outside dia-<br>meter D1 [mm] | length L1 [mm] | weight [kg] |
|--------|--------------|--------------|---------------|---|---------------|------------------|---------------|-------------------------------|----------------|-------------|
|        |              |              | top thread T1 |   |               | bottom thread T2 |               |                               |                |             |
| 2 7/8" | NPE-PJ       | L06          | 278           | M | 2 7/8" EU pin | ME               | 2 7/8" EU pin | 79                            | 1830           | 22          |
|        |              |              |               |   | 2 7/8" NU pin | MN               | 2 7/8" NU pin |                               |                |             |
| 3 1/2" |              |              | 312           | M | 3 1/2" EU pin | ME               | 3 1/2" EU pin | 95                            | 1830           | 28          |
|        |              |              |               |   | 3 1/2" NU pin | MN               | 3 1/2" NU pin |                               |                |             |
| 4"     |              |              | 4             | M | 4" EU pin     | ME               | 4" EU pin     | 102                           | 1830           | 38          |
|        |              |              |               |   | 4" NU pin     | MN               | 4" NU pin     |                               |                |             |
| 4 1/2" |              |              | 412           | M | 4 1/2" EU pin | ME               | 4 1/2" EU pin | 122                           | 1830           | 48          |
|        |              |              |               |   | 4 1/2" NU pin | MN               | 4 1/2" NU pin |                               |                |             |
| 5"     |              |              | 500           | M | 5" LTC pin    | ML               | 5" LTC pin    | 140                           | 1830           | 51          |

If the stator size is bigger than the tubing size you have to select a suitable pup joint; this is necessary to avoid tubing wear and rotor failure because of the eccentricity of the rotor head.

## Recommended Make-up Torques

| tubing | non-upset [Nm] NU |      |      | upset [Nm] EU |      |      |
|--------|-------------------|------|------|---------------|------|------|
|        | opt               | min  | max  | opt           | min  | max  |
| 2 3/8" | 990               | 750  | 1230 | 1750          | 1320 | 2180 |
| 2 7/8" | 1420              | 1070 | 1780 | 2240          | 1680 | 2790 |
| 3 1/2" | 1680              | 1260 | 2100 | 3090          | 2320 | 3860 |
| 4"     | 1680              | 1260 | 2100 | 3470          | 2600 | 4340 |
| 4 1/2" | 2360              | 1780 | 2960 | 3880          | 2920 | 4310 |



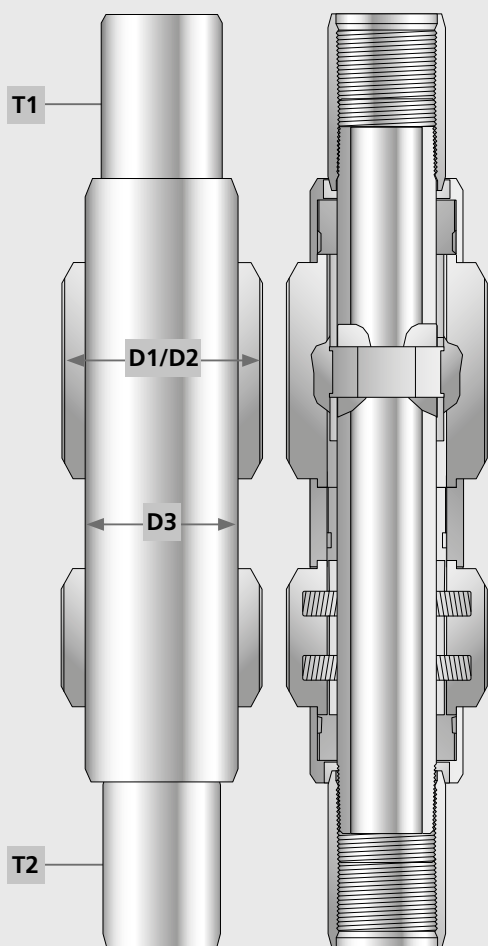
## Pump Equipment – Torque Anchor

### Torque Anchor

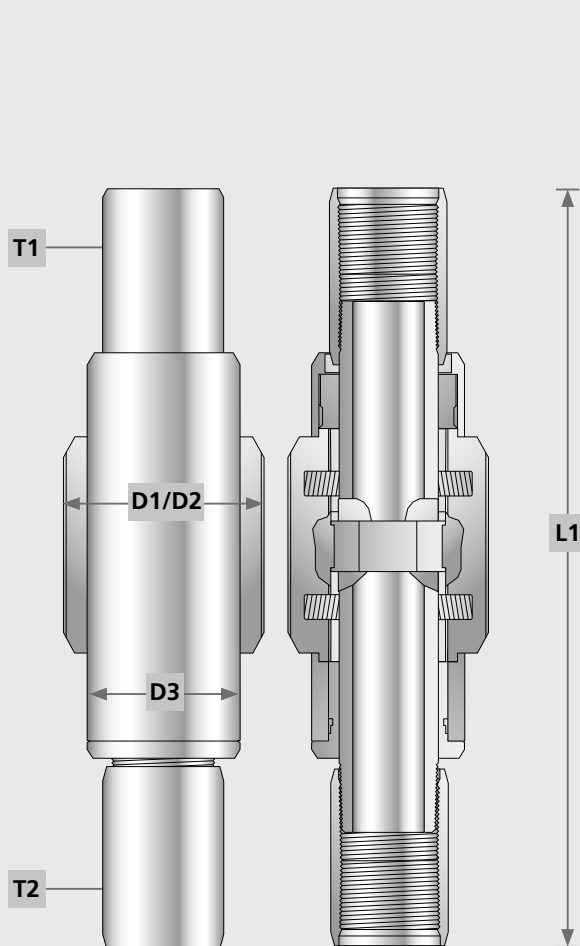
Torque anchor is used to take the reactive torque given by the friction between the rotor and the stator of the helicoidal pump with progressing cavities, to prevent the tubing from unscrewing. It is mounted under the pump.

The blades are permanently pushed and kept in touch with the well casing wall by means of helicoidal springs. The oil pumped is passing through the central hollow shaft on to which the cams are mounted.

When the tubing rotates clockwise, the anchoring blades bite into the casing wall whenever a reactive torque is developed. Disengaging is done by rotating the tubing counter-clockwise from the surface.



Torque Anchor (Type double)



Torque Anchor (Type single)

## Torque Anchor (Type single)

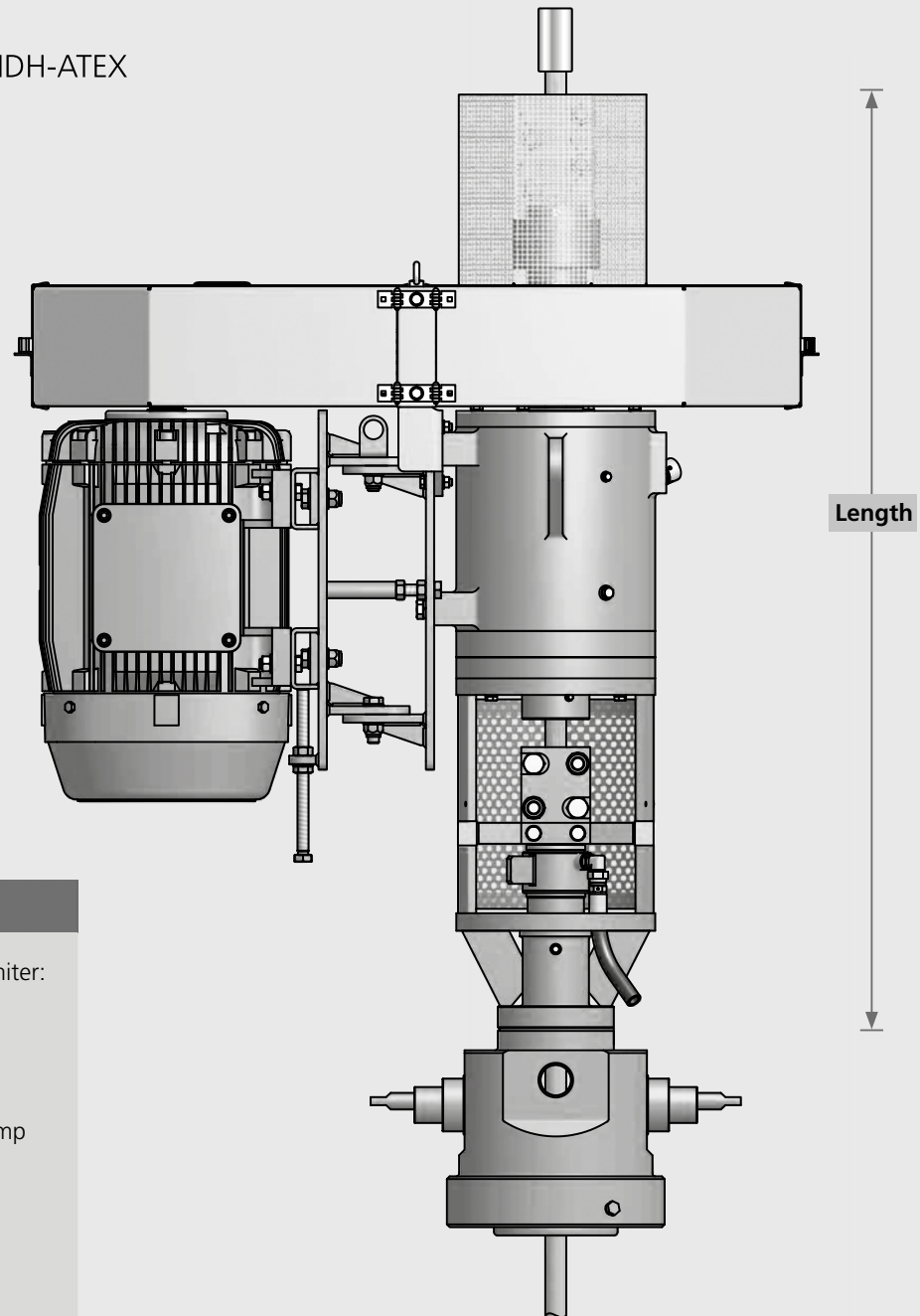
| type   | product type | design | coupling |        |                     |                        | casing size | fasten diameter (min. casing ID) D1 [mm] | fasten diameter (max. casing ID) D2 [mm] | tool outside diameter D3 [mm] | length L1 [mm] | weight [kg] |
|--------|--------------|--------|----------|--------|---------------------|------------------------|-------------|------------------------------------------|------------------------------------------|-------------------------------|----------------|-------------|
|        |              |        | size     | thread | top thread (box) T1 | bottom thread (box) T2 |             |                                          |                                          |                               |                |             |
| 4 1/2" | NPE-TA       | S      | 238      | FFE    | 2 3/8" EU           | 2 3/8" EU              | 412         | 95                                       | 105                                      | 92,2                          | 416,6          | 16,7        |
| 5"     | NPE-TA       | S      | 278      | FFE    | 2 7/8" EU           | 2 7/8" EU              | 500         | 105                                      | 120                                      | 93,2                          | 409            | 18,25       |
| 5 1/2" |              |        |          |        |                     |                        | 512         | 119                                      | 139                                      | 116,8                         | 409            | 18,25       |
| 5 3/4" |              |        |          |        |                     |                        | 534         | 119                                      | 139                                      |                               |                | 18,25       |
| 6 5/8" |              |        |          |        |                     |                        | 658         | 135                                      | 155                                      |                               |                | 18,94       |
| 6 5/8" |              |        |          |        |                     |                        | 658         | 143                                      | 163                                      |                               |                | 19,4        |
| 7"     |              |        |          |        |                     |                        | 700         | 152                                      | 172                                      |                               |                | 19,87       |
| 7"     | NPE-TA       | S      | 312      | FFE    | 3 1/2" EU           | 3 1/2" EU              | 700         | 152                                      | 172                                      | 142 mm                        | 421,7          | 34,23       |
| 7 5/8" |              |        |          |        |                     |                        | 758         | 162                                      | 182                                      |                               |                | 35,1        |
| 8 5/8" |              |        |          |        |                     |                        | 858         | 192                                      | 212                                      |                               |                | 36,14       |
| 9 5/8" |              |        |          |        |                     |                        | 958         | 215                                      | 235                                      |                               |                | 37,19       |
| 9 5/8" |              |        |          |        |                     |                        | 958         | 220                                      | 240                                      |                               |                | 37,31       |

## Torque Anchor (Type double)

| type   | product type | design | coupling |        |                     |                        | casing size | fasten diameter (min. casing ID) D1 [mm] | fasten diameter (max. casing ID) D2 [mm] | tool outside diameter D3 [mm] | length L1 [mm] | weight [kg] |
|--------|--------------|--------|----------|--------|---------------------|------------------------|-------------|------------------------------------------|------------------------------------------|-------------------------------|----------------|-------------|
|        |              |        | size     | thread | top thread (box) T1 | bottom thread (box) T2 |             |                                          |                                          |                               |                |             |
| 5 1/2" | NPE-TA       | D      | 278      | FFE    | 2 7/8" EU           | 2 7/8" EU              | 512         | 116                                      | 130                                      | 110,5                         | 553            | 18,25       |
| 5 3/4" |              |        |          |        | 2 7/8" EU           | 2 7/8" EU              | 534         | 120                                      | 135                                      |                               |                | 18,25       |
| 6 5/8" |              |        |          |        | 2 7/8" EU           | 2 7/8" EU              | 658         | 135                                      | 155                                      | 116,8                         | 550            | 18,94       |

## Drive Head Equipment – Drive Head

### NETZSCH Drive Head – NDH-ATEX



#### Advantages

- special automatic torque limiter:
  - no overloading of the brake system
  - no overloading of the rod string
  - no overloading of the pump
- special automatic hydraulic brake system
- special flanged well head connection:
  - no risk of unscrewing of the drive head
  - no need for motor stand
  - minimized vibrations at the well head

## NETZSCH Drive Head – NDH ATEX

| model              | L1<br>NDH-ATEX-L1     | M1<br>NDH-ATEX-M1     | M2<br>NDH-ATEX-M2     | M3<br>NDH-ATEX-M3     | M4<br>NDH-ATEX-M4     |
|--------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| polished rod       | 1 1/4"                | 1 1/4"                | 1 1/2"                | 1 1/4"                | 1 1/2"                |
| flange             | 3 1/8" - 2000 psi     | 3 1/8" - 2000 psi     | 3 1/8" - 2000 psi     | 3 1/8" - 2000 psi     | 3 1/8" - 2000 psi     |
| drive head pulley  | 630 mm                | 800 mm                | 800 mm                | 800 mm                | 800 mm                |
| oil                | 7,5 l                 | 12 l                  | 12 l                  | 12 l                  | 12 l                  |
| weight             | 370 kg                | 628 kg                | 628 kg                | 628 kg                | 628 kg                |
| length             | 1260 mm               | 1450 mm               | 1450 mm               | 1450 mm               | 1450 mm               |
| nomenclature       | II 2 G EEx c, k II T3 | II 2 G EEx c, k II T3 | II 2 G EEx c, k II T3 | II 2 G EEx c, k II T3 | II 2 G EEx c, k II T3 |
| max. torque        | 1000 Nm               | 1400 Nm               | 2000 Nm               | 1400 Nm               | 2000 Nm               |
| max. axial load    | 6000 kg               | 9000 kg               | 9000 kg               | 15000 kg              | 15000 kg              |
| ring joint         | R31                   | R31                   | R31                   | R31                   | R31                   |
| v-belt             | SPZ-6                 | SPB-6                 | SPB-6                 | SPB-6                 | SPB-6                 |
| frame size (motor) | 132 - 160 - 180       | 160 - 180 - 200       | 160 - 180 - 200 - 225 | 160 - 180 - 200       | 160 - 180 - 200 - 225 |

NETZSCH drive heads are approved in compliance with directive 94/9/EC for use in zone 1 (compare with name plate zone II 2G EEx c, k II T3 classification and the conformity declaration)

The drive head is designed for commercial plant and conforms to the following regulations and norms:

- Machine Directive 2006/42/EC
- ATEX Directive 94/9/EU
- EU Directive 93/68/EEC
- DIN EN 13463-1, 5, 8
- ISO 15136-2:2006
- DIN ISO 12100-1+2
- DIN EN 1127-1

## Drive Head Accessories

Very often small accessories can be decisive for the safety of the service people and for the lifetime of the equipment. Therefore NETZSCH Oilfield Products GmbH offers several special tools based on the service experience since more than 20 years PCP downhole pump installations and start ups.

Besides a special designed safety clamp, we always recommend small accessories like belt tension measurement equipment, packing replacement tools and also complete tool boxes.

## Spare Parts

- screw set
- ring joint
- polished rod clamp
- oil sight glass
- vent valve
- drainage tube
- gland
- v - grooved pulley
- taper bush

## Drive Head Equipment – Drive Head and Accessories

Polished Rod Speed [RPM] at nom. Motor Speed [RPM] different frequencies [Hz]

| v-<br>pulleys<br>[mm] | diameter [drive head pulley] = 630 mm |            |       |           |       |           |       | diameter [drive head pulley] = 800 mm |            |       |           |       |           |       |
|-----------------------|---------------------------------------|------------|-------|-----------|-------|-----------|-------|---------------------------------------|------------|-------|-----------|-------|-----------|-------|
|                       | ratio                                 | 1475 [rpm] |       | 975 [rpm] |       | 725 [rpm] |       | ratio                                 | 1475 [rpm] |       | 975 [rpm] |       | 725 [rpm] |       |
|                       |                                       | 50 Hz      | 20 Hz | 50 Hz     | 20 Hz | 50 Hz     | 20 Hz |                                       | 50 Hz      | 20 Hz | 50 Hz     | 20 Hz | 50 Hz     | 20 Hz |
| 100                   | 6,30 : 1                              | 234        | 94    | 155       | 62    | 115       | 46    |                                       |            |       |           |       |           |       |
| 106                   | 5,94 : 1                              | 248        | 99    | 164       | 66    | 122       | 49    |                                       |            |       |           |       |           |       |
| 112                   | 5,63 : 1                              | 262        | 105   | 173       | 69    | 129       | 52    |                                       |            |       |           |       |           |       |
| 118                   | 5,34 : 1                              | 276        | 110   | 183       | 73    | 136       | 54    |                                       |            |       |           |       |           |       |
| 125                   | 5,04 : 1                              | 293        | 117   | 193       | 77    | 144       | 58    |                                       |            |       |           |       |           |       |
| 130                   |                                       |            |       |           |       |           |       | 6,15 : 1                              | 240        | 96    | 159       | 63    | 118       | 47    |
| 132                   | 4,77 : 1                              | 309        | 124   | 204       | 82    | 152       | 61    |                                       |            |       |           |       |           |       |
| 140                   | 4,50 : 1                              | 328        | 131   | 217       | 87    | 161       | 64    | 5,71 : 1                              | 258        | 103   | 171       | 68    | 127       | 51    |
| 150                   | 4,20 : 1                              | 351        | 140   | 232       | 93    | 173       | 69    | 5,33 : 1                              | 277        | 111   | 183       | 73    | 136       | 54    |
| 160                   | 3,94 : 1                              |            |       | 247       | 99    | 184       | 74    | 5,00 : 1                              | 295        | 118   | 195       | 78    | 145       | 58    |
| 170                   | 3,71 : 1                              |            |       | 263       | 105   | 195       | 78    | 4,71 : 1                              | 313        | 125   | 207       | 83    | 154       | 62    |
| 180                   | 3,50 : 1                              |            |       | 279       | 111   | 207       | 83    | 4,44 : 1                              | 332        | 133   | 220       | 88    | 163       | 65    |
| 190                   | 3,32 : 1                              |            |       | 294       | 117   | 218       | 87    | 4,21 : 1                              | 350        | 140   | 232       | 93    | 172       | 69    |
| 200                   | 3,15 : 1                              |            |       | 310       | 124   | 230       | 92    | 4,00 : 1                              | 369        | 148   | 244       | 98    | 181       | 73    |
| 212                   |                                       |            |       |           |       |           |       | 3,77 : 1                              | 391        | 156   | 259       | 103   | 192       | 77    |
| 224                   | 2,81 : 1                              |            |       | 347       | 139   | 258       | 103   | 3,57 : 1                              |            |       | 273       | 109   | 203       | 81    |
| 236                   |                                       |            |       |           |       |           |       | 3,39 : 1                              |            |       | 288       | 115   | 214       | 86    |
| 250                   | 2,52 : 1                              |            |       |           |       | 288       | 115   | 3,20 : 1                              |            |       | 305       | 122   | 227       | 91    |

Three Phase Motor – Speed Overview

|              | 50 Hz [rpm] | 60 Hz [rpm] |
|--------------|-------------|-------------|
| 4 pole motor | 1475        | 1770        |
| 6 pole motor | 975         | 1170        |
| 8 pole motor | 725         | 870         |



## Accessories for Drive Head: V-Pulleys, Taper bushes\* and Drive belts

| drive head typ I – v-belt profil SPZ - 6 groove |            |            |            | drive head typ m 1-4 – v-belt profil SPB - 6 groove |            |            |            |            |
|-------------------------------------------------|------------|------------|------------|-----------------------------------------------------|------------|------------|------------|------------|
|                                                 | frame size |            |            |                                                     | frame size |            |            |            |
| v-pulleys<br>[mm]                               | 132<br>B38 | 160<br>B42 | 180<br>B48 | v-pulleys<br>[mm]                                   | 160<br>B42 | 180<br>B48 | 200<br>B55 | 225<br>B60 |
| 100                                             | T2012*     |            |            | 140                                                 | T2517*     | T2517*     | T2517*     |            |
| 106                                             |            |            |            | 150                                                 |            |            |            |            |
| 112                                             |            |            |            | T2012*                                              | 160        | T3020*     | T3020*     | T3020*     |
| 118                                             |            | 170        |            |                                                     |            |            |            |            |
| 125                                             | T2517*     |            | 180        |                                                     |            |            |            |            |
| 130                                             |            |            | 190        |                                                     |            |            |            |            |
| 140                                             |            |            | 200        |                                                     |            |            |            |            |
| 150                                             |            |            | 212        | T3535*                                              | T3535*     | T3535*     | T3535*     |            |
| 160                                             |            |            | 224        |                                                     |            |            |            |            |
| 170                                             |            | 236        |            |                                                     |            |            |            |            |
| 180                                             |            | 250        |            |                                                     |            |            |            |            |
| 190                                             |            | T2517*     | T2517*     |                                                     |            |            |            |            |
| 200                                             |            |            |            |                                                     |            |            |            |            |
| 224                                             | T2517*     |            |            |                                                     | v-belt     | DL2500-6   | DL3000-6   |            |
| 250                                             |            |            |            |                                                     |            | DL2650-6   | DL3150-6   |            |



# Drive Head Equipment – Three Phase Motor

## Specification of the Three Phase Motors

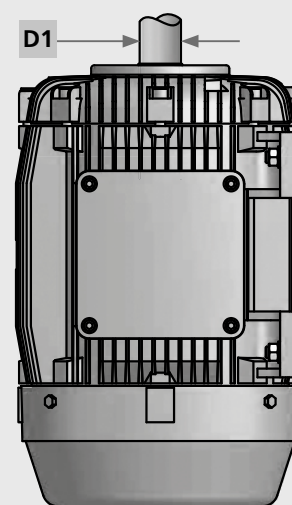
The motors offered in this catalogue comply with standards concerning equipment and protective systems intended for use in potentially explosive atmospheres, in compliance with european directive 94/9/EC dated 23/3/94, otherwise known as the ATEX directive.

### Protection Standard of the Motors: IP 55

The anti-friction bearings of the motors in standard design are filled with anti-friction bearing grease in the factory (or with sealed bearings by the bearing manufacturer).

### Main Characteristics

- explosion-proof motors according to european standard CENELEC EN 50 014, EN 50 018 and EN 50 019 (for terminal box EEx-de)
- european standards are acknowledged and adopted by the member countries of CENELEC (european committee for electrotechnical standardization) and accepted by almost all countries worldwide.
- The motors dimensions comply with IEC 60072 standard.
- noise level within 80 dB (A)
- high protection against corrosion



### Three Phase Motor – Motors with “increased safety” (E)



| type | product type | frame size | mounting position | increased safety | ambient temperature [°C] |     | heater                  | volt | pole |   | rpm | motor power |      | diameter of the shaft D1 |      | weight |
|------|--------------|------------|-------------------|------------------|--------------------------|-----|-------------------------|------|------|---|-----|-------------|------|--------------------------|------|--------|
|      |              |            |                   |                  | min                      | max |                         |      |      |   |     |             | [KW] |                          | [mm] |        |
| 3,5  | DHE-TPM      | 132        | V6                | E                | -40                      | 40  | Z = without<br>S = with | 400  | P    | 6 | 975 | 035         | 3,5  | D                        | 38   | 53,0   |
| 4,8  | DHE-TPM      | 132        | V6                | E                | -40                      | 40  |                         | 400  | P    | 6 | 975 | 048         | 4,8  | D                        | 38   | 70,0   |
| 6,6  | DHE-TPM      | 160        | V6                | E                | -40                      | 40  |                         | 400  | P    | 6 | 975 | 066         | 6,6  | D                        | 42   | 89,0   |
| 9,7  | DHE-TPM      | 160        | V6                | E                | -40                      | 40  |                         | 400  | P    | 6 | 975 | 097         | 9,7  | D                        | 42   | 123,0  |
| 13,2 | DHE-TPM      | 180        | V6                | E                | -40                      | 40  |                         | 400  | P    | 6 | 975 | 132         | 13,2 | D                        | 48   | 190,0  |
| 16,5 | DHE-TPM      | 200        | V6                | E                | -40                      | 40  |                         | 400  | P    | 6 | 975 | 165         | 16,5 | D                        | 55   | 190,0  |
| 20,0 | DHE-TPM      | 200        | V6                | E                | -40                      | 40  |                         | 400  | P    | 6 | 975 | 200         | 20,0 | D                        | 55   | 265,0  |
| 27,0 | DHE-TPM      | 225        | V6                | E                | -40                      | 40  |                         | 400  | P    | 6 | 975 | 270         | 27,0 | D                        | 60   | 360,0  |
| 33,0 | DHE-TPM      | 250        | V6                | E                | -40                      | 40  |                         | 400  | P    | 6 | 975 | 330         | 33,0 | D                        | 65   | 475,0  |
| 6,6  | DHE-TPM      | 160        | V6                | E                | -40                      | 40  | Z = without<br>S = with | 400  | P    | 8 | 725 | 066         | 6,6  | D                        | 42   | 122,0  |
| 9,7  | DHE-TPM      | 180        | V6                | E                | -40                      | 40  |                         | 400  | P    | 8 | 725 | 097         | 9,7  | D                        | 48   | 140,0  |
| 13,2 | DHE-TPM      | 200        | V6                | E                | -40                      | 40  |                         | 400  | P    | 8 | 725 | 132         | 13,2 | D                        | 55   | 195,0  |
| 16,5 | DHE-TPM      | 225        | V6                | E                | -40                      | 40  |                         | 400  | P    | 8 | 725 | 165         | 16,5 | D                        | 60   | 275,0  |
| 20,0 | DHE-TPM      | 225        | V6                | E                | -40                      | 40  |                         | 400  | P    | 8 | 725 | 200         | 20,0 | D                        | 60   | 360,0  |
| 27,0 | DHE-TPM      | 250        | V6                | E                | -40                      | 40  |                         | 400  | P    | 8 | 725 | 270         | 27,0 | D                        | 65   | 472,0  |

E: motors with “increased safety” – “e” (EEx e II T3) type of protection

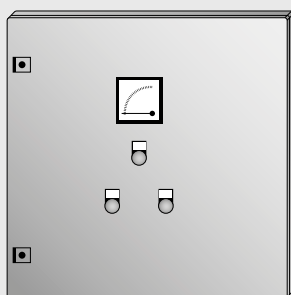
## Three Phase Motor – Motors with flameproof enclosure (D)



| type | product type | frame size | mounting position | flame-proof | ambient temperature [°C] |     | heater                  | voltage | pole |      | rpm  | motor power |      | diameter of the shaft D1 |       | weight |
|------|--------------|------------|-------------------|-------------|--------------------------|-----|-------------------------|---------|------|------|------|-------------|------|--------------------------|-------|--------|
|      |              |            |                   |             | min                      | max |                         |         |      |      |      |             | [KW] |                          | [mm]  | [kg]   |
| 5,5  | DHE-TPM      | 132        | V6                | D           | -20                      | 40  | Z = without<br>S = with | 400     | P    | 4    | 1475 | 055         | 5,5  | D                        | 38    | 95,0   |
| 7,5  | DHE-TPM      | 132        | V6                | D           | -20                      | 40  |                         | 400     | P    | 4    | 1475 | 075         | 7,5  | D                        | 38    | 95,0   |
|      |              |            |                   |             | -50                      | 40  |                         |         |      |      |      |             |      |                          |       |        |
| 11,0 | DHE-TPM      | 160        | V6                | D           | -20                      | 40  |                         | 400     | P    | 4    | 1475 | 110         | 11,0 | D                        | 42    | 180,0  |
|      |              |            |                   |             | -50                      | 40  |                         |         |      |      |      |             |      |                          |       |        |
| 15,0 | DHE-TPM      | 160        | V6                | D           | -20                      | 40  |                         | 400     | P    | 4    | 1475 | 150         | 15,0 | D                        | 42    | 195,0  |
|      |              |            |                   |             | -50                      | 40  |                         |         |      |      |      |             |      |                          |       |        |
| 18,5 | DHE-TPM      | 180        | V6                | D           | -20                      | 40  |                         | 400     | P    | 4    | 1475 | 185         | 18,5 | D                        | 48    | 233,0  |
|      |              |            |                   |             | -50                      | 40  |                         |         |      |      |      |             |      |                          |       |        |
| 22,0 | DHE-TPM      | 180        | V6                | D           | -20                      | 40  |                         | 400     | P    | 4    | 1475 | 220         | 22,0 | D                        | 48    | 245,0  |
|      |              |            |                   |             | -50                      | 40  |                         |         |      |      |      |             |      |                          |       |        |
| 30,0 | DHE-TPM      | 200        | V6                | D           | -20                      | 40  | 400                     | P       | 4    | 1475 | 300  | 30,0        | D    | 55                       | 315,0 |        |
|      |              |            |                   |             | -50                      | 40  |                         |         |      |      |      |             |      |                          |       |        |
| 37,0 | DHE-TPM      | 225        | V6                | D           | -20                      | 40  | 400                     | P       | 4    | 1475 | 370  | 37,0        | D    | 60                       | 358,0 |        |
|      |              |            |                   |             | -50                      | 40  |                         |         |      |      |      |             |      |                          |       |        |
| 45,0 | DHE-TPM      | 225        | V6                | D           | -20                      | 40  | 400                     | P       | 4    | 1475 | 450  | 45,0        | D    | 60                       | 383,0 |        |
|      |              |            |                   |             | -50                      | 40  |                         |         |      |      |      |             |      |                          |       |        |
| 5,5  | DHE-TPM      | 132        | V6                | D           | -20                      | 40  | Z = without<br>S = with | 400     | P    | 6    | 975  | 055         | 5,5  | D                        | 38    | 105,0  |
|      |              |            |                   |             | -50                      | 40  |                         |         |      |      |      |             |      |                          |       |        |
| 7,5  | DHE-TPM      | 160        | V6                | D           | -20                      | 40  |                         | 400     | P    | 6    | 975  | 075         | 7,5  | D                        | 42    | 180,0  |
|      |              |            |                   |             | -50                      | 40  |                         |         |      |      |      |             |      |                          |       |        |
| 11,0 | DHE-TPM      | 160        | V6                | D           | -20                      | 40  |                         | 400     | P    | 6    | 975  | 110         | 11,0 | D                        | 42    | 195,0  |
|      |              |            |                   |             | -50                      | 40  |                         |         |      |      |      |             |      |                          |       |        |
| 15,0 | DHE-TPM      | 180        | V6                | D           | -20                      | 40  |                         | 400     | P    | 6    | 975  | 150         | 15,0 | D                        | 48    | 245,0  |
|      |              |            |                   |             | -50                      | 40  |                         |         |      |      |      |             |      |                          |       |        |
| 18,5 | DHE-TPM      | 200        | V6                | D           | -20                      | 40  |                         | 400     | P    | 6    | 975  | 185         | 18,5 | D                        | 55    | 295,0  |
|      |              |            |                   |             | -50                      | 40  |                         |         |      |      |      |             |      |                          |       |        |
| 22,0 | DHE-TPM      | 200        | V6                | D           | -20                      | 40  | 400                     | P       | 6    | 975  | 220  | 22,0        | D    | 55                       | 315,0 |        |
|      |              |            |                   |             | -50                      | 40  |                         |         |      |      |      |             |      |                          |       |        |
| 30,0 | DHE-TPM      | 225        | V6                | D           | -20                      | 40  | 400                     | P       | 6    | 975  | 300  | 30,0        | D    | 60                       | 380,0 |        |
|      |              |            |                   |             | -50                      | 40  |                         |         |      |      |      |             |      |                          |       |        |
| 37,0 | DHE-TPM      | 250        | V6                | D           | -20                      | 40  | 400                     | P       | 6    | 975  | 370  | 37,0        | D    | 65                       | 450,0 |        |
|      |              |            |                   |             | -50                      | 40  |                         |         |      |      |      |             |      |                          |       |        |

D: motors with flameproof enclosure – “d” (Ex de IIC T4) type of protection

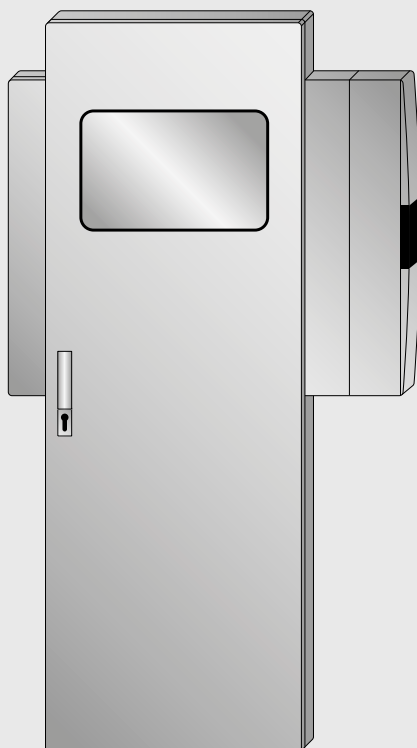
## Drive Head Equipment – Control Panel



Standard control panels are with heater and fan; standard ambient temperature range is -40°C (-40°F) to 40°C (104°F); Alternative control panel designs are possible (e.g. without heater) and have to be requested separately.

Control Panel – Standard

| type | product type | execution: standard | ambient temperature [°C] |     |     | voltage | motor power |      |
|------|--------------|---------------------|--------------------------|-----|-----|---------|-------------|------|
|      |              |                     |                          | min | max |         |             |      |
| 3,5  | DHE-CP       | S                   | 4040                     | -40 | 40  | 400     | 035         | 3,5  |
| 4,8  | DHE-CP       | S                   | 4040                     | -40 | 40  | 400     | 048         | 4,8  |
| 6,6  | DHE-CP       | S                   | 4040                     | -40 | 40  | 400     | 066         | 6,6  |
| 9,7  | DHE-CP       | S                   | 4040                     | -40 | 40  | 400     | 097         | 9,7  |
| 13,2 | DHE-CP       | S                   | 4040                     | -40 | 40  | 400     | 132         | 13,2 |
| 16,5 | DHE-CP       | S                   | 4040                     | -40 | 40  | 400     | 165         | 16,5 |
| 20,0 | DHE-CP       | S                   | 4040                     | -40 | 40  | 400     | 200         | 20,0 |
| 27,0 | DHE-CP       | S                   | 4040                     | -40 | 40  | 400     | 270         | 27,0 |
| 33,0 | DHE-CP       | S                   | 4040                     | -40 | 40  | 400     | 330         | 33,0 |



Control Panel – Frequency Converter

| type | product type | execution: frequency converter | ambient temperature [°C] |     |     | voltage | motor power |      |
|------|--------------|--------------------------------|--------------------------|-----|-----|---------|-------------|------|
|      |              |                                |                          | min | max |         |             |      |
| 5,5  | DHE-CP       | F                              | 4040                     | -40 | 40  | 400     | 055         | 5,5  |
|      |              |                                | 4055                     | -40 | 55  |         |             |      |
| 7,5  | DHE-CP       | F                              | 4040                     | -40 | 40  | 400     | 075         | 7,5  |
|      |              |                                | 4055                     | -40 | 55  |         |             |      |
| 11,0 | DHE-CP       | F                              | 4040                     | -40 | 40  | 400     | 110         | 11,0 |
|      |              |                                | 4055                     | -40 | 55  |         |             |      |
| 15,0 | DHE-CP       | F                              | 4040                     | -40 | 40  | 400     | 150         | 15,0 |
|      |              |                                | 4055                     | -40 | 55  |         |             |      |
| 18,5 | DHE-CP       | F                              | 4040                     | -40 | 40  | 400     | 185         | 18,5 |
|      |              |                                | 4055                     | -40 | 55  |         |             |      |
| 22,0 | DHE-CP       | F                              | 4040                     | -40 | 40  | 400     | 220         | 22,0 |
|      |              |                                | 4055                     | -40 | 55  |         |             |      |
| 30,0 | DHE-CP       | F                              | 4040                     | -40 | 40  | 400     | 300         | 30,0 |
|      |              |                                | 4055                     | -40 | 55  |         |             |      |
| 37,0 | DHE-CP       | F                              | 4040                     | -40 | 40  | 400     | 370         | 37,0 |
|      |              |                                | 4055                     | -40 | 55  |         |             |      |
| 45,0 | DHE-CP       | F                              | 4040                     | -40 | 40  | 400     | 450         | 45,0 |
|      |              |                                | 4055                     | -40 | 55  |         |             |      |

Control panel with frequency converter are with heater and fan; standard ambient temperature range is -40°C (-40°F) to 40°C (104°F). The control panels with air conditioner are designed for an ambient temperature range of -40°C (-40°F) to 55°C (131°F). Alternative control panel designs are possible (e.g. with remote control) and have to be requested separately. All control panels are also available as a container version.

## Power Cable – Standard

| product type | execution: standard | length [m] | power |      | wire cross section |      |
|--------------|---------------------|------------|-------|------|--------------------|------|
|              |                     |            |       | [KW] |                    | [mm] |
| DHE-PC       | ST                  | 15M        | 035   | 3,5  | A012               | 1,2  |
| DHE-PC       | ST                  | 15M        | 048   | 4,8  | A025               | 2,5  |
| DHE-PC       | ST                  | 15M        | 066   | 6,6  | A040               | 4,0  |
| DHE-PC       | ST                  | 15M        | 097   | 9,7  | A040               | 4,0  |
| DHE-PC       | ST                  | 15M        | 132   | 13,2 | A060               | 6,0  |
| DHE-PC       | ST                  | 15M        | 165   | 16,5 | A160               | 16,0 |
| DHE-PC       | ST                  | 15M        | 200   | 20,0 | A160               | 16,0 |
| DHE-PC       | ST                  | 15M        | 270   | 27,0 | A250               | 25,0 |
| DHE-PC       | ST                  | 15M        | 330   | 33,0 | A250               | 25,0 |

## Power Cable – Screened

| product type | execution: screened | length [m] | power |      | wire cross section |      |
|--------------|---------------------|------------|-------|------|--------------------|------|
|              |                     |            |       | [KW] |                    | [mm] |
| DHE-PC       | SC                  | 15M        | 055   | 5,5  | A025               | 2,5  |
| DHE-PC       | SC                  | 15M        | 075   | 7,5  | A040               | 4,0  |
| DHE-PC       | SC                  | 15M        | 110   | 11,0 | A060               | 6,0  |
| DHE-PC       | SC                  | 15M        | 150   | 15,0 | A100               | 10,0 |
| DHE-PC       | SC                  | 15M        | 185   | 18,5 | A100               | 10,0 |
| DHE-PC       | SC                  | 15M        | 220   | 22,0 | A160               | 16,0 |
| DHE-PC       | SC                  | 15M        | 300   | 30,0 | A250               | 25,0 |
| DHE-PC       | SC                  | 15M        | 370   | 37,0 | A250               | 25,0 |
| DHE-PC       | SC                  | 15M        | 450   | 45,0 | A350               | 35,0 |

## Signal Cable PTC Resistor

| product type | length [m] | execution  |
|--------------|------------|------------|
| DHE-SI       | 15M        | YSLY-OZ201 |

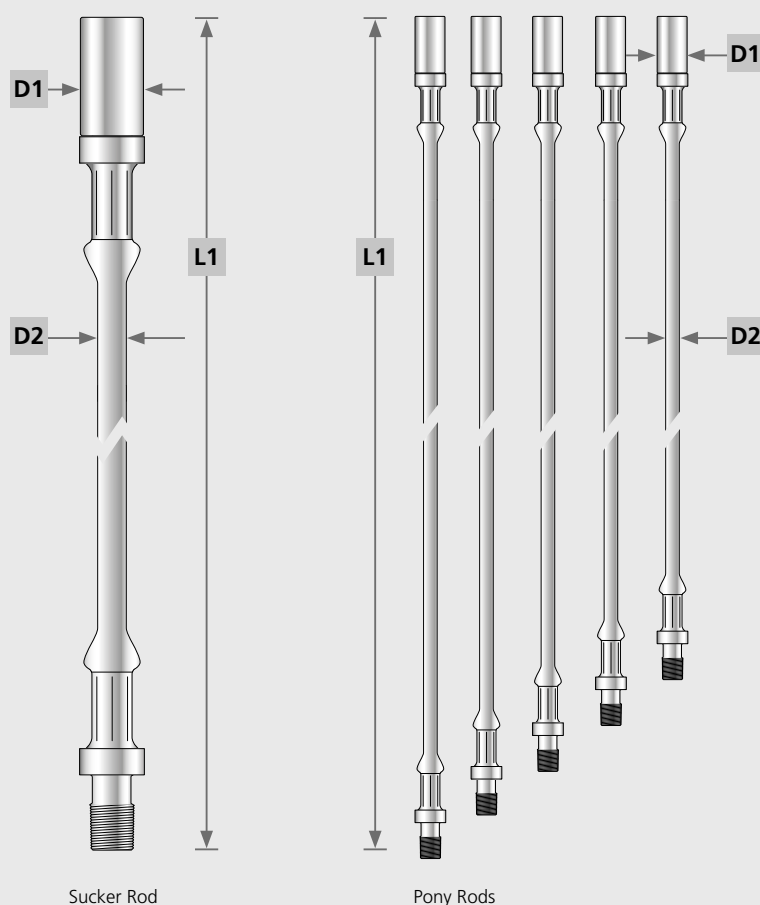
## Cable for Stand-by Heater

| product type | length [m] | execution |
|--------------|------------|-----------|
| DHE-HC       | 15M        | 2P230V    |

## Rod String Equipment – Sucker Rod, Pony Rod and Polished Rod

| Sucker Rod |              |          |               |            |          |    |            |             |           |      |        |  |  |  |
|------------|--------------|----------|---------------|------------|----------|----|------------|-------------|-----------|------|--------|--|--|--|
| type       | product type | material |               | t-coupling |          |    | OD D1 [mm] | diameter D2 | length L1 |      | weight |  |  |  |
|            |              |          |               |            |          |    |            |             | [ft]      | [m]  |        |  |  |  |
| 3/4        | RSE-SUC      | D        | Grade D       | F          | Fullsize | CT | 38.1       | 034         | 25        | 7,62 | 19,0   |  |  |  |
| 7/8        |              |          |               |            |          |    | 41.3       | 078         | 25        | 7,62 | 24,2   |  |  |  |
| 1          |              |          |               |            |          |    | 46.0       | 100         | 25        | 7,62 | 32,3   |  |  |  |
| 7/8        |              | H        | High Strength |            |          |    | 55.6       | 078         | 25        | 7,62 | 24,2   |  |  |  |
| 1          |              |          |               |            |          |    | 60.3       | 100         | 25        | 7,62 | 32,3   |  |  |  |

### Sucker Rod



Sucker rods and their couplings are used in Oil E&P – exploration and production – industry for all kind of wells independent of their type of oil.

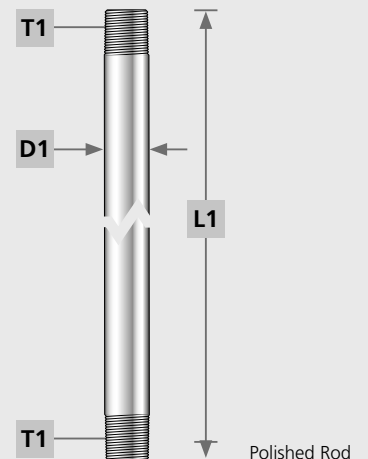
They are designed to transmit torque from the surface to the rotor of the pump when using progressing cavity pumps. The dimensions and technical conditions for manufacturing the rods are in full compliance with API spec. 11B. Sucker rod materials and their physical-mechanical characteristics are according to API spec. 11B. Coupling materials and their physical-mechanical characteristics are according to API spec. 11B. Sucker rods are usually delivered as fitted with full size class t couplings with normal outer diameter and without wrench flats. By request sucker rods can be fitted with other types of couplings.

General dimensions and tolerances for steel sucker Rods and pony rods and according to API specification 11B 26-th edition

length of sucker rods  
tolerance:  $\pm 2.0$  inch ( $\pm 51$  mm)  
length of pony rods  
tolerance:  $\pm 2.0$  inch ( $\pm 51$  mm)

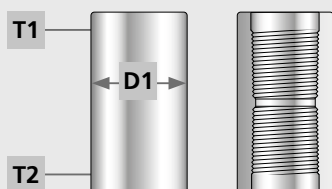
| Pony Rod |              |          |               |            |           |    |            |             |           |      |             |
|----------|--------------|----------|---------------|------------|-----------|----|------------|-------------|-----------|------|-------------|
| type     | product type | material |               | t-coupling |           |    |            | diameter D2 | length L1 |      | weight [kg] |
|          |              |          |               |            |           |    | OD D1 [mm] |             | [ft]      | [m]  |             |
| 3/4      | RSE-PON      | D        | Grade D       | F          | Full Size | CT | 38,1       | 034         | 02        | 0.61 | 1,6         |
|          |              |          |               |            |           |    |            |             | 04        | 1.22 | 3,3         |
|          |              |          |               |            |           |    |            |             | 06        | 1.83 | 4,9         |
|          |              |          |               |            |           |    |            |             | 08        | 2.44 | 6,6         |
|          |              |          |               |            |           |    |            |             | 10        | 3.05 | 8,3         |
| 7/8      |              |          |               |            |           |    | 41,3       | 078         | 02        | 0.61 | 2,3         |
|          |              |          |               |            |           |    |            |             | 04        | 1.22 | 4,6         |
|          |              |          |               |            |           |    |            |             | 06        | 1.83 | 6,9         |
|          |              |          |               |            |           |    |            |             | 08        | 2.44 | 9,3         |
|          |              |          |               |            |           |    |            |             | 10        | 3.05 | 11,6        |
| 1        |              | 46,0     | 100           |            |           |    | 02         | 0.61        | 3,2       |      |             |
|          |              |          |               |            |           |    | 04         | 1.22        | 6,5       |      |             |
|          |              |          |               |            |           |    | 06         | 1.83        | 9,7       |      |             |
|          |              |          |               |            |           |    | 08         | 2.44        | 13,0      |      |             |
|          |              |          |               |            |           |    | 10         | 3.05        | 16,3      |      |             |
| 7/8      |              | H        | High Strength |            |           |    | 55,6       | 078         | 02        | 0.61 | 2,3         |
|          |              |          |               |            |           |    |            |             | 04        | 1.22 | 4,6         |
|          |              |          |               |            |           |    |            |             | 06        | 1.83 | 6,9         |
|          |              |          |               |            |           |    |            |             | 08        | 2.44 | 9,3         |
|          |              |          |               |            |           |    |            |             | 10        | 3.05 | 11,6        |
| 1        |              |          |               |            |           |    | 60,3       | 100         | 02        | 0.61 | 3,2         |
|          |              |          |               |            |           |    |            |             | 04        | 1.22 | 6,5         |
|          |              |          |               |            |           |    |            |             | 06        | 1.83 | 9,7         |
|          |              |          |               |            |           |    |            |             | 08        | 2.44 | 13,0        |
|          |              |          |               |            |           |    |            |             | 10        | 3.05 | 16,3        |

| Polished Rod |              |          |             |           |           |      |             |
|--------------|--------------|----------|-------------|-----------|-----------|------|-------------|
| type         | product type | material | diameter D1 | thread T1 | length L1 |      | weight [kg] |
|              |              |          |             |           | [ft]      | [m]  |             |
| 1 1/2        | RSE-POL      | 17225    | 112         | 100       | 08        | 2,4  | 21,6        |
|              |              |          |             |           | 22        | 6,7  | 59,4        |
|              |              |          |             |           | 26        | 7,9  | 70,2        |
|              |              |          |             |           | 36        | 11,0 | 97,2        |
| 1 1/4        | RSE-POL      |          | 114         | 078       | 08        | 2,4  | 15,2        |
|              |              |          |             |           | 22        | 6,7  | 41,8        |
|              |              |          |             |           | 26        | 7,9  | 49,4        |
|              |              |          |             |           | 36        | 11,0 | 68,4        |



# Rod String Equipment – Sucker Rod Coupling and Non Rotating Centralizer

| Sucker Rod Coupling |              |           |             |                                 |    |                  |                 |                 |                 |                 |             |     |     |
|---------------------|--------------|-----------|-------------|---------------------------------|----|------------------|-----------------|-----------------|-----------------|-----------------|-------------|-----|-----|
| type                | product type | material  | version     |                                 |    |                  | thread T1 (box) |                 | thread T2 (box) |                 | weight [kg] |     |     |
|                     |              |           |             |                                 |    | diameter D1 [mm] |                 | rod size [inch] |                 | rod size [inch] |             |     |     |
| 1/2                 | RSE-SRC      | class - T | S (F)       | S = slimhole<br>(F = full size) | CT | 25,4             | 012             | 1/2"            | 012             | 1/2"            | 0,5         |     |     |
|                     |              |           |             |                                 |    |                  |                 |                 | 034             | 3/4"            |             |     |     |
| 3/4                 |              |           |             |                                 |    | 38.1 (41,3)      | 034             | 3/4"            | 034             | 3/4"            |             |     |     |
|                     |              |           |             |                                 |    |                  |                 |                 | 058             | 5/8"            |             |     |     |
| 5/8                 |              |           |             |                                 |    | 31,8 (38.1)      | 058             | 5/8"            | 012             | 1/2"            |             |     |     |
|                     |              |           |             |                                 |    |                  |                 |                 | 058             | 5/8"            |             |     |     |
| 7/8                 |              |           | 41,3 (46,0) |                                 |    | 078              | 7/8"            | 034             | 3/4"            | 058             | 5/8"        | 1,0 |     |
|                     |              |           |             |                                 |    |                  |                 | 078             | 7/8"            |                 |             |     |     |
| 1                   |              |           | 50,8 (55,6) |                                 |    | 100              | 1"              | 034             | 3/4"            | 078             | 7/8"        |     |     |
|                     |              |           |             |                                 |    |                  |                 | 100             | 1"              |                 |             |     |     |
| 1 1/8               |              |           | (60,3)      |                                 |    | 118              | 1 1/8"          | 078             | 7/8"            | 100             | 1"          |     | 1,5 |
|                     |              |           |             |                                 |    |                  |                 | 118             | 1 1/8"          |                 |             |     |     |



Sucker Rod Coupling



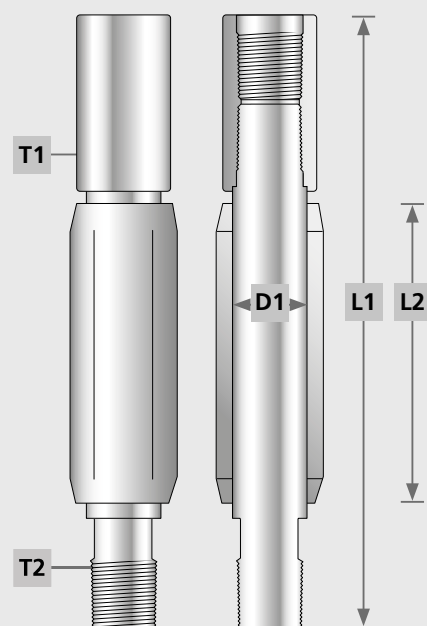
## Non Rotating Centralizer - Shaft

| type | product type  | material    | sucker rod size | thread T1 (box) | thread T2 (pin) | shaft diameter D1 |        | length L1 [mm] | weight [kg] |
|------|---------------|-------------|-----------------|-----------------|-----------------|-------------------|--------|----------------|-------------|
|      |               |             |                 |                 |                 |                   | [ mm ] |                |             |
| 3/4  | RSE-NRC-SHA-S | 42Mo-Cr11X3 | T034            | 3/4"            | 3/4"            | D032              | 32     | 280            | 3,0         |
| 7/8  | RSE-NRC-SHA-S |             | T078            | 7/8"            | 7/8"            | D032              | 32     |                |             |
| 7/8  | RSE-NRC-SHA-S |             | T078            | 7/8"            | 7/8"            | D038              | 38     |                |             |
| 1    | RSE-NRC-SHA-S |             | T100            | 1"              | 1"              | D038              | 38     |                |             |

## Non Rotating Centralizer - Sleeve

| type  | product type  | material           | tubing size | shaft diameter D1 |        | length L2 [mm] | weight [kg] |
|-------|---------------|--------------------|-------------|-------------------|--------|----------------|-------------|
|       |               |                    |             |                   | [ mm ] |                |             |
| 2 7/8 | RSE-NRC-SLE-E | modified polyamide | 278         | D032              | 32     | 120            | 0,5         |
| 3 1/2 | RSE-NRC-SLE-E |                    | 312         | D038              | 38     |                |             |

Use of the NETZSCH centralizer minimizes the rod and tubing wear considerably. This special non-rotating centralizer acts like a bearing and centralizes the rod string inside the tubing. The centralizer consists of two pieces: polished shaft rotating in the fixed non-rotating sleeve.



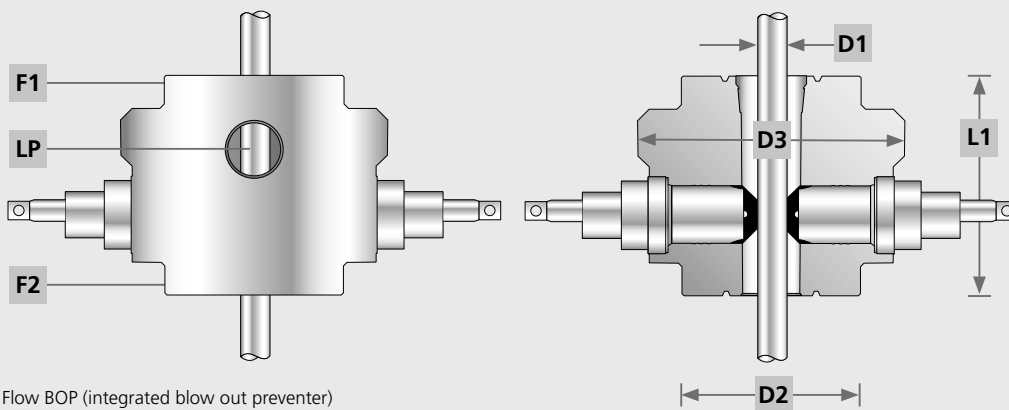
Non Rotating Centralizer



## Well Head Equipment – Flow Tee-Blow Out Preventer and Blow Out Preventer

**FBOP (Flow Tee-Blow Out Preventer)**

| type      | product type | polished rod D1 |        | material | top flange F1 |        | bottom flange F2 |        | line pipe LP |        | pressure |       |    |       |
|-----------|--------------|-----------------|--------|----------|---------------|--------|------------------|--------|--------------|--------|----------|-------|----|-------|
|           |              |                 | [inch] |          |               | [inch] |                  | [inch] |              | [inch] |          | [psi] |    | [psi] |
| 1 1/2"-2" | WHE-FBOP     | 112             | 1 1/2  | N        | 3180          | 3 1/8  | 3180             | 3 1/8  | 2 LP         | 2 " LP | 20       | 2000  | 20 | 2000  |
|           | WHE-FBOP     | 112             | 1 1/2  | N        | 3180          | 3 1/8  | 3180             | 3 1/8  | 2 LP         | 2 " LP | 20       | 2000  | 30 | 3000  |
|           | WHE-FBOP     | 112             | 1 1/2  | N        | 3180          | 3 1/8  | 3180             | 3 1/8  | 2 LP         | 2 " LP | 30       | 3000  | 30 | 3000  |
| 1 1/2"-3" | WHE-FBOP     | 112             | 1 1/2  | N        | 3180          | 3 1/8  | 3180             | 3 1/8  | 3 LP         | 3 " LP | 20       | 2000  | 20 | 2000  |
|           | WHE-FBOP     | 112             | 1 1/2  | N        | 3180          | 3 1/8  | 3180             | 3 1/8  | 3 LP         | 3 " LP | 20       | 2000  | 30 | 3000  |
|           | WHE-FBOP     | 112             | 1 1/2  | N        | 3180          | 3 1/8  | 3180             | 3 1/8  | 3 LP         | 3 " LP | 30       | 3000  | 30 | 3000  |
| 1 1/4"-2" | WHE-FBOP     | 114             | 1 1/4  | N        | 3180          | 3 1/8  | 3180             | 3 1/8  | 2 LP         | 2 " LP | 20       | 2000  | 20 | 2000  |
|           | WHE-FBOP     | 114             | 1 1/4  | N        | 3180          | 3 1/8  | 3180             | 3 1/8  | 2 LP         | 2 " LP | 20       | 2000  | 30 | 3000  |
|           | WHE-FBOP     | 114             | 1 1/4  | N        | 3180          | 3 1/8  | 3180             | 3 1/8  | 2 LP         | 2 " LP | 30       | 3000  | 30 | 3000  |
| 1 1/4"-3" | WHE-FBOP     | 114             | 1 1/4  | N        | 3180          | 3 1/8  | 3180             | 3 1/8  | 3 LP         | 3 " LP | 20       | 2000  | 20 | 2000  |
|           | WHE-FBOP     | 114             | 1 1/4  | N        | 3180          | 3 1/8  | 3180             | 3 1/8  | 3 LP         | 3 " LP | 20       | 2000  | 30 | 3000  |
|           | WHE-FBOP     | 114             | 1 1/4  | N        | 3180          | 3 1/8  | 3180             | 3 1/8  | 3 LP         | 3 " LP | 30       | 3000  | 30 | 3000  |



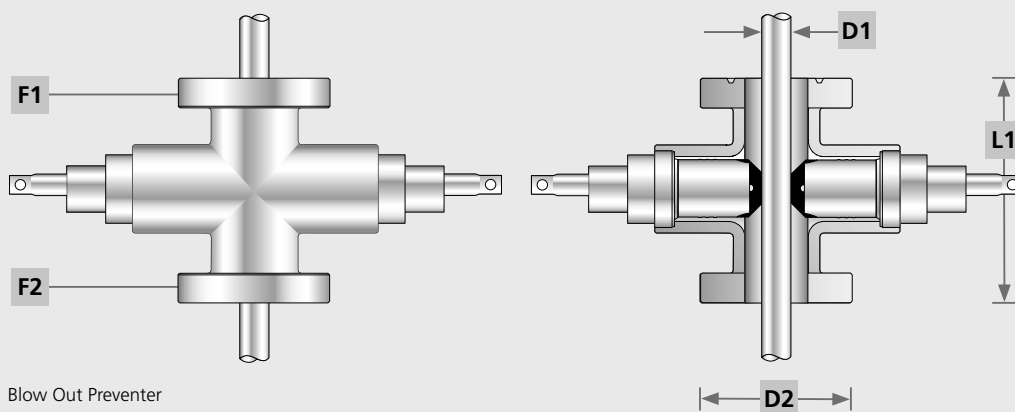
Protects solid foundation for progressing cavity pump drive. Protects the system from the "blow out" of the well. Reduces the height of the installation of the head. The solid compact design minimize vibration of the tree associated with PCP drive units. Combines the flow tee, blow out preventer and tubing head adapter.

### Technical Information

- diameter D2: 210mm
- diameter D3: 360mm
- length L1: 305mm
- weight: 160kg
- ring joint: R31

## SBOP (Blow Out Preventer)

| type      | product type | polished rod D1 |        | material | top flange F1 |        | bottom flange F2 |        | pressure |       |    |       |
|-----------|--------------|-----------------|--------|----------|---------------|--------|------------------|--------|----------|-------|----|-------|
|           |              |                 | [inch] |          |               | [inch] |                  | [inch] |          | [psi] |    | [psi] |
| 1 1/2"-2" | WHE-SBOP     | 112             | 1 1/2  | N        | 318XX         | 3 1/8  | 318XX            | 3 1/8  | 20       | 2000  | 20 | 2000  |
|           | WHE-SBOP     | 112             | 1 1/2  | N        | 318XX         | 3 1/8  | 318XX            | 3 1/8  | 20       | 2000  | 30 | 3000  |
|           | WHE-SBOP     | 112             | 1 1/2  | N        | 318XX         | 3 1/8  | 318XX            | 3 1/8  | 30       | 3000  | 30 | 3000  |
| 1 1/2"-3" | WHE-SBOP     | 112             | 1 1/2  | N        | 318XX         | 3 1/8  | 318XX            | 3 1/8  | 20       | 2000  | 20 | 2000  |
|           | WHE-SBOP     | 112             | 1 1/2  | N        | 318XX         | 3 1/8  | 318XX            | 3 1/8  | 20       | 2000  | 30 | 3000  |
|           | WHE-SBOP     | 112             | 1 1/2  | N        | 318XX         | 3 1/8  | 318XX            | 3 1/8  | 30       | 3000  | 30 | 3000  |
| 1 1/4"-2" | WHE-SBOP     | 114             | 1 1/4  | N        | 318XX         | 3 1/8  | 318XX            | 3 1/8  | 20       | 2000  | 20 | 2000  |
|           | WHE-SBOP     | 114             | 1 1/4  | N        | 318XX         | 3 1/8  | 318XX            | 3 1/8  | 20       | 2000  | 30 | 3000  |
|           | WHE-SBOP     | 114             | 1 1/4  | N        | 318XX         | 3 1/8  | 318XX            | 3 1/8  | 30       | 3000  | 30 | 3000  |
| 1 1/4"-3" | WHE-SBOP     | 114             | 1 1/4  | N        | 318XX         | 3 1/8  | 318XX            | 3 1/8  | 20       | 2000  | 20 | 2000  |
|           | WHE-SBOP     | 114             | 1 1/4  | N        | 318XX         | 3 1/8  | 318XX            | 3 1/8  | 20       | 2000  | 30 | 3000  |
|           | WHE-SBOP     | 114             | 1 1/4  | N        | 318XX         | 3 1/8  | 318XX            | 3 1/8  | 30       | 3000  | 30 | 3000  |



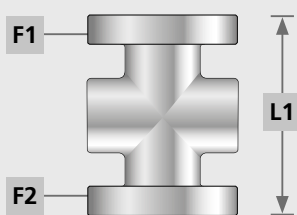
### Technical Information

- diameter D2: 210mm
- diameter D3: 360mm
- length L1: 305mm
- weight: 60kg
- ring joint: R31

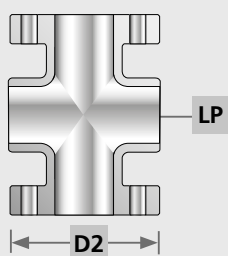
## Well Head Equipment – Flow Tee and Spool

### Flow Tee

| type | product type | material | top flange F1 |        | bottom flange F2 |        | line pipe LP |        | pressure |       |    |       |
|------|--------------|----------|---------------|--------|------------------|--------|--------------|--------|----------|-------|----|-------|
|      |              |          |               | [inch] |                  | [inch] |              | [inch] |          | [psi] |    | [psi] |
| 2 "  | WHE-FT       | N        | 318XX         | 3 1/8  | 318XX            | 3 1/8  | 2 LP         | 2 " LP | 20       | 2000  | 20 | 2000  |
| 2 "  | WHE-FT       | N        | 318XX         | 3 1/8  | 318XX            | 3 1/8  | 2 LP         | 2 " LP | 20       | 2000  | 30 | 3000  |
| 2 "  | WHE-FT       | N        | 318XX         | 3 1/8  | 318XX            | 3 1/8  | 2 LP         | 2 " LP | 30       | 3000  | 30 | 3000  |
| 3 "  | WHE-FT       | N        | 318XX         | 3 1/8  | 318XX            | 3 1/8  | 3 LP         | 3 " LP | 20       | 2000  | 20 | 2000  |
| 3 "  | WHE-FT       | N        | 318XX         | 3 1/8  | 318XX            | 3 1/8  | 3 LP         | 3 " LP | 20       | 2000  | 30 | 3000  |
| 3 "  | WHE-FT       | N        | 318XX         | 3 1/8  | 318XX            | 3 1/8  | 3 LP         | 3 " LP | 30       | 3000  | 30 | 3000  |



Flow Tee

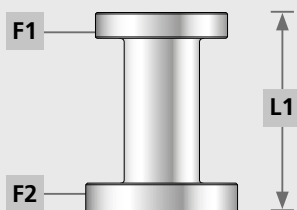


#### Technical Information

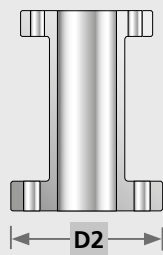
- diameter D2: 210mm
- length L1: 305mm
- weight: 30kg
- ring joint: R31

### Spool

| type    | product type | material | top flange F1 |        | bottom flange F2 |        | pressure |       |    |       |
|---------|--------------|----------|---------------|--------|------------------|--------|----------|-------|----|-------|
|         |              |          |               | [inch] |                  | [inch] |          | [psi] |    | [psi] |
| 3 1/8 " | WHE-F        | N        | 318XX         | 3 1/8  | 318XX            | 3 1/8  | 20       | 2000  | 30 | 3000  |
| 3 1/8 " | WHE-F        | N        | 318XX         | 3 1/8  | 318XX            | 3 1/8  | 20       | 2000  | 20 | 3000  |
| 3 1/8 " | WHE-F        | N        | 318XX         | 3 1/8  | 318XX            | 3 1/8  | 30       | 2000  | 30 | 3000  |



Spool

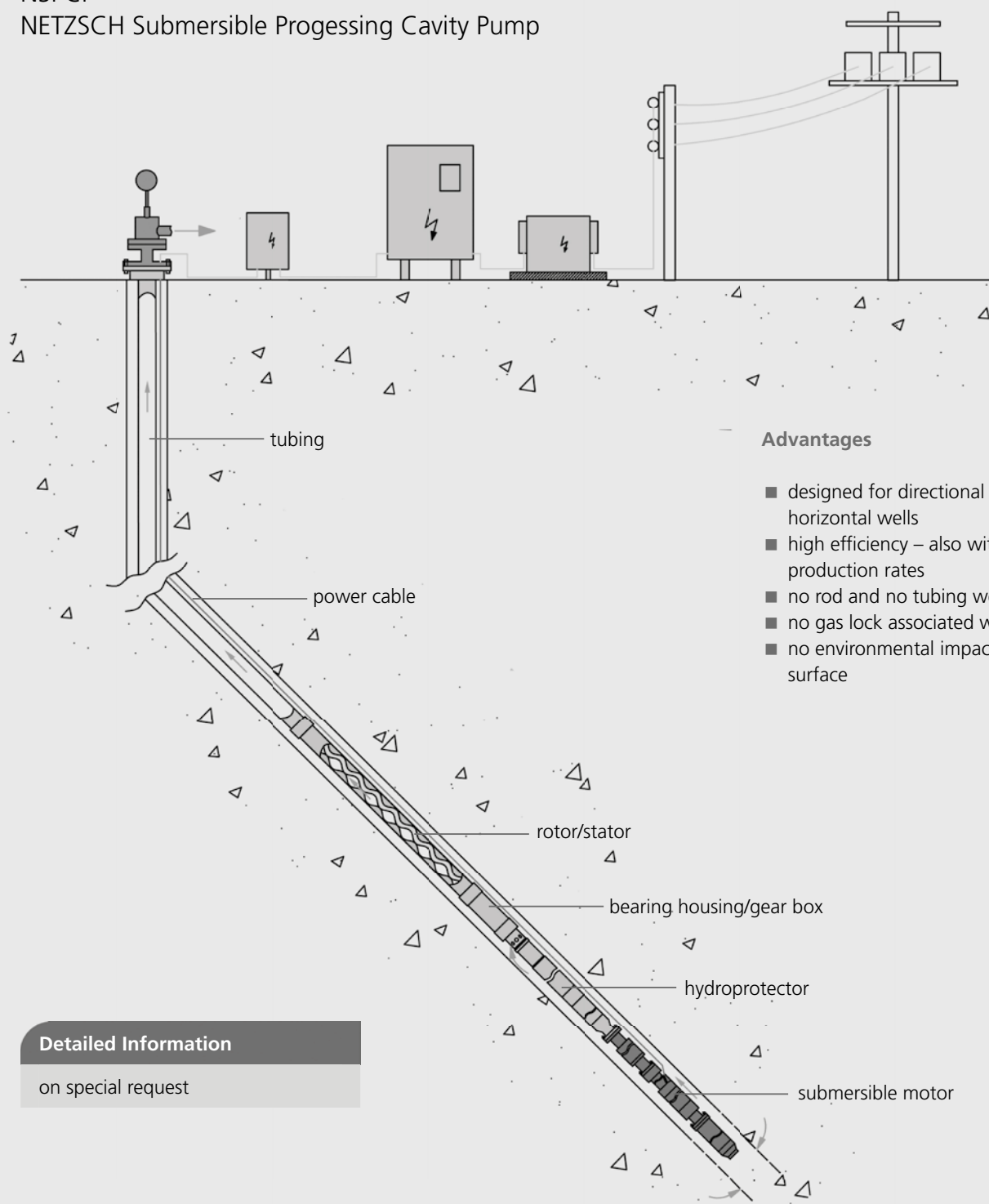


#### Technical Information

- diameter D2: 210mm
- length L1: 310mm
- weight: 30kg
- ring joint: R31

additional flange sizes on request and based on detailed technical description from the operator/user (drawing is preferred)

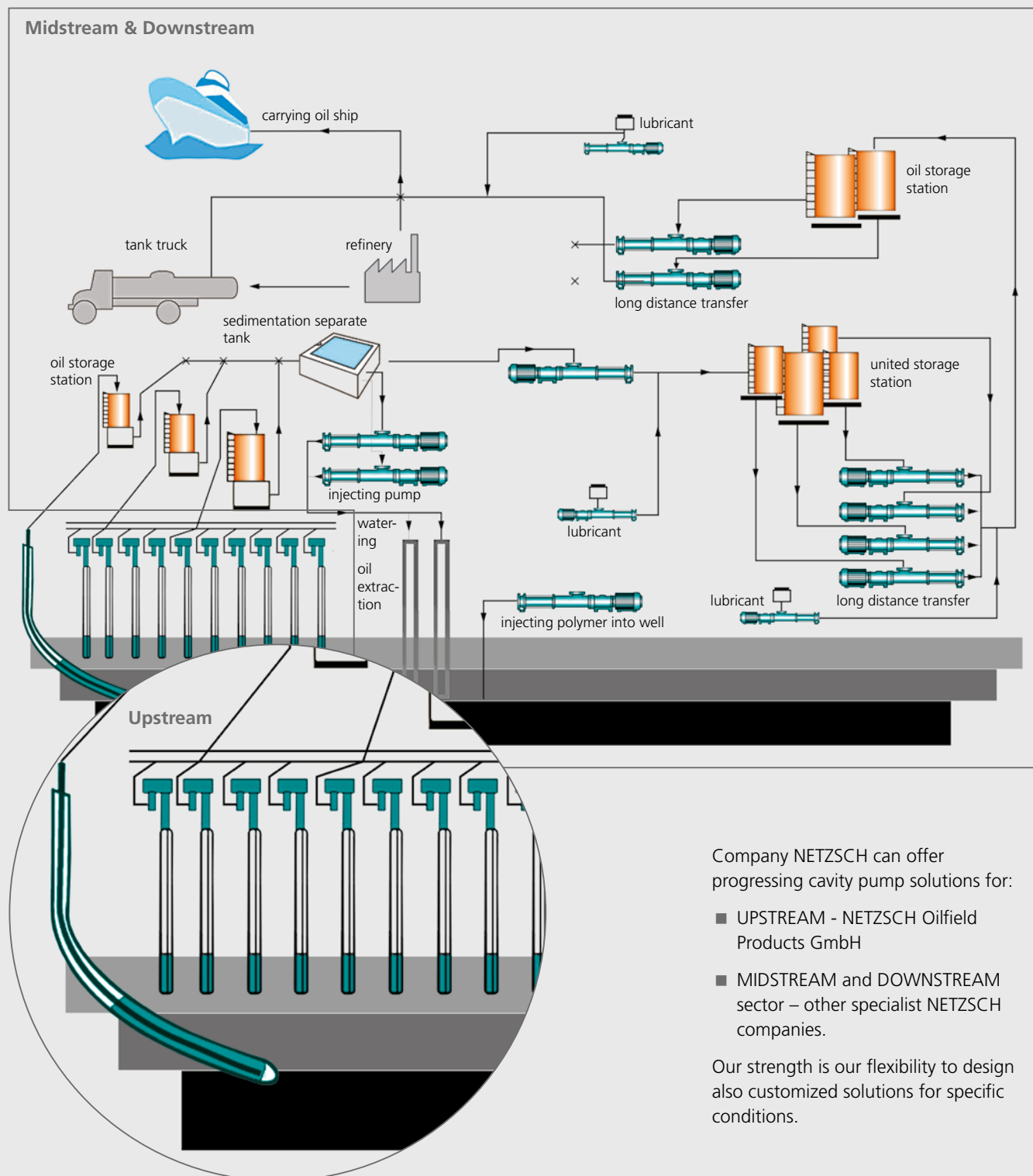
## NSPCP® – NETZSCH Submersible Progressing Cavity Pump



### Detailed Information

on special request

# PCP Application in the Oilfield



## The Transfer Pump

We offer both high-pressure and low-pressure pumps for conveying crude oil to its destination. Heated versions of our pumps are also available if necessary, allowing round-the-clock operation even at sub-freezing temperatures.

NEMO® high flow transfer pump: up to 500 m<sup>3</sup>/h (60,000 bpd) maximum flow capacity, up to 24 bar (350 psi) maximum differential pressure.

NEMO® high pressure transfer pump: up to 120 m<sup>3</sup>/h (18,000 bpd) maximum flow capacity, up to 72 bar (1,050 psi) maximum differential pressure.



## The Multiphase Pump

The multiphase pump was specially developed for conveying oil/gas/water mixtures. This pump provides dependable operation even at a gas proportion

up to 90%, in special execution up to 100%. Capacities up to 500 m<sup>3</sup>/h (60,000 bpd), pressure up to 24 bar (350 psi).



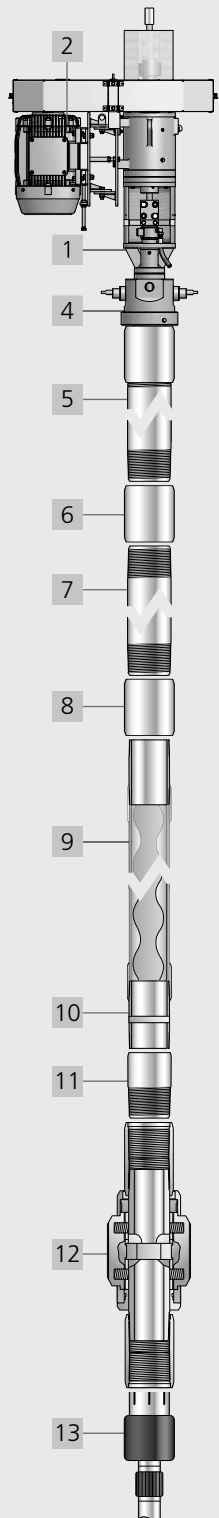
## The Water-Injection-Pump

Crude oil must often be pressed out of the rock. This necessitates the use of pumps which are capable of maintaining high conveying pressure at the best degrees of efficiency.

Up to 500 m<sup>3</sup>/d (3,100 bpd) maximum flow capacity, up to 240 bar (3,500 psi) maximum differential pressure.

### Contact

For these application we will arrange for a specialist from Mid- and Downstream NETZSCH companies to contact you.



## Drive Head Equipment

NDH- [ ] [ ] [ ] [ ] - [ ] [ ]

1 Drive Head (page 20)

DHE-TPM- [ ] [ ] [ ] [ ] - [ ] [ ]

2 Three Phase Motor (page 24)

DHE-CP- [ ] [ ] [ ] [ ] - [ ] [ ]

3 Control Panel (page 26)



## Pump Equipment

NPE-TUC- [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

6 Coupling (page 16)

NPE-PJ- [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

7 Pup Joint (page 17)

NPE-TUC- [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

8 Coupling (page 16)

NTZ- [ ] [ ] [ ] \* [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

9 Pump (page 6-13)

NPE-SPA- [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

10 Stop Pin (page 14)

NPE-TUC- [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

11 Coupling (page 16)

NPE-TA- [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

12 Torque Anchor (page 18)

NPE-GS-SM- [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

13 Gas Separator (page 15)

## Well Head Equipment

WHE-FBOP- [ ] [ ] [ ] [ ] - [ ] [ ] [ ] [ ]

4 Flow Tee-Blow Out Preventer (page 32)

5 Tubing Size and Thread

## Rod String Equipment

RSE-SRC- [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

14 Sucker Rod Coupling (page 30)

RSE-POL- [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

15 Polished Rod (page 29)

RSE-PON- [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

16 Pony Rod (page 29)

RSE-SUC- [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

17 Sucker Rod (page 28)

RSE-NRC-SHA- [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

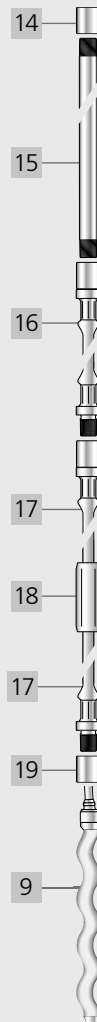
18 Non Rot. Centralizer – Shaft (page 31)

RSE-NRC-SLE- [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

18 Non Rot. Centralizer – Sleeve (page 31)

RSE-SRC- [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

19 Sucker Rod Coupling (page 30)



# Questionnaire



## Contact

|                |  |                |  |
|----------------|--|----------------|--|
| <b>company</b> |  | <b>address</b> |  |
| <b>name</b>    |  | <b>phone</b>   |  |
| <b>telefax</b> |  | <b>e-mail</b>  |  |

## Well Completion Data

|                              |                                                                                                                                   |                           |                                                                                                           |                                                             |                                                                                                          |                                                            |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|---------------------------|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| <b>well no.</b>              |                                                                                                                                   | <b>field name</b>         |                                                                                                           |                                                             |                                                                                                          |                                                            |
| <b>vertical depth*</b>       | <input type="checkbox"/> [m] <input type="checkbox"/> [ft]                                                                        | <b>perforation depth</b>  | from                                                                                                      | <input type="checkbox"/> [m] <input type="checkbox"/> [ft]  | to                                                                                                       | <input type="checkbox"/> [m] <input type="checkbox"/> [ft] |
| <b>well information</b>      | <input type="checkbox"/> vertical <input type="checkbox"/> deviated <sup>1</sup> <input type="checkbox"/> horizontal <sup>1</sup> |                           | <input type="checkbox"/> existing <input type="checkbox"/> newly drilled <input type="checkbox"/> planned |                                                             |                                                                                                          |                                                            |
| <b>well head information</b> | <input type="checkbox"/> 3 1/8" x 2000 psi <input type="checkbox"/> 3 1/8" x 3000 psi <input type="checkbox"/> other <sup>3</sup> |                           |                                                                                                           |                                                             |                                                                                                          |                                                            |
| <b>electrical power</b>      | <input type="text"/> [Volts]                                                                                                      | <input type="text"/> [Hz] | <b>ambient temperature</b>                                                                                | <input type="checkbox"/> [°C] <input type="checkbox"/> [°F] |                                                                                                          |                                                            |
| <b>casing<sup>2</sup></b>    | <b>tubing<sup>2</sup></b>                                                                                                         |                           | <b>sucker rod</b>                                                                                         |                                                             |                                                                                                          |                                                            |
| <b>size</b>                  | <input type="checkbox"/> [inch] <input type="checkbox"/> [mm]                                                                     | <b>size</b>               | <input type="checkbox"/> [inch] <input type="checkbox"/> [mm]                                             | <b>size</b>                                                 | <input type="checkbox"/> [inch] <input type="checkbox"/> [mm]                                            |                                                            |
| <b>inside dia</b>            | <input type="checkbox"/> [inch] <input type="checkbox"/> [mm]                                                                     | <b>inside dia</b>         | <input type="checkbox"/> [inch] <input type="checkbox"/> [mm]                                             | <b>material</b>                                             | <input type="checkbox"/> grade D<br><input type="checkbox"/> grade K<br><input type="checkbox"/> special |                                                            |
| <b>weight</b>                | <input type="text"/> [lbs]                                                                                                        | <b>weight</b>             | <input type="text"/> [lbs]                                                                                | <b>thread</b>                                               | <input type="checkbox"/> EU <input type="checkbox"/> NU                                                  |                                                            |

## Production Data

|                               |                                                               |                                                        |                           |                                                                |                            |                                                    |
|-------------------------------|---------------------------------------------------------------|--------------------------------------------------------|---------------------------|----------------------------------------------------------------|----------------------------|----------------------------------------------------|
| <b>current lift method</b>    |                                                               |                                                        |                           |                                                                |                            |                                                    |
| <b>production rate</b>        | current                                                       | <input type="text"/> [bpd] <input type="text"/> [m³/d] | planned                   | <input type="text"/> [bpd] <input type="text"/> [m³/d]         | <b>water cut</b>           | <input type="text"/> [%]                           |
| <b>pump setting depth*</b>    | current                                                       | <input type="text"/> [m] <input type="text"/> [ft]     | planned                   | <input type="text"/> [m] <input type="text"/> [ft]             | <b>sand cut</b>            | <input type="text"/> [%]                           |
| <b>dynamic fluid level*</b>   | current                                                       | <input type="text"/> [m] <input type="text"/> [ft]     | planned                   | <input type="text"/> [m] <input type="text"/> [ft]             | <b>static fluid level*</b> | <input type="text"/> [m] <input type="text"/> [ft] |
| <b>static BHP (at perf.)</b>  | <input type="text"/> [bar] <input type="text"/> [psi]         |                                                        | <b>productivity index</b> | <input type="text"/> [b/d/psi] <input type="text"/> [m³/d/psi] |                            |                                                    |
| <b>dynamic BHP (at perf.)</b> | <input type="text"/> [bar] <input type="text"/> [psi]         |                                                        | <b>casing pressure</b>    | <input type="text"/> [bar] <input type="text"/> [psi]          |                            |                                                    |
| <b>GOR</b>                    | <input type="text"/> [m³/ m³] <input type="text"/> [cuft/bbl] |                                                        | <b>flow line pressure</b> | <input type="text"/> [bar] <input type="text"/> [psi]          |                            |                                                    |

## Fluid Data

|                                 |                                                          |                                         |                                                           |
|---------------------------------|----------------------------------------------------------|-----------------------------------------|-----------------------------------------------------------|
| <b>chemical treatment</b>       | <input type="checkbox"/> yes <input type="checkbox"/> no | <b>bubble point pressure</b>            | <input type="text"/> [bar] <input type="text"/> [psi]     |
| <b>paraffin production</b>      | <input type="checkbox"/> yes <input type="checkbox"/> no | <b>CO<sub>2</sub> content</b>           | <input type="text"/> [%] <input type="text"/> [ppm]       |
| <b>oil viscosity at surface</b> | <input type="text"/> [cP]                                | <b>H<sub>2</sub>S content</b>           | <input type="text"/> [%] <input type="text"/> [ppm]       |
| <b>oil viscosity at pump</b>    | <input type="text"/> [cP]                                | <b>aromatics<sup>4</sup></b>            | <input type="text"/> [%]                                  |
| <b>chloride content</b>         | <input type="text"/> [%]                                 | <b>specific oil density<sup>4</sup></b> | <input type="text"/> [°API] <input type="text"/> [kg/dm³] |
| <b>temperature at surface</b>   | <input type="text"/> [°C] <input type="text"/> [°F]      | <b>temperature at pump</b>              | <input type="text"/> [°C] <input type="text"/> [°F]       |

## Attachments and Comments

|                                                          |                                                          |                                                        |                                                      |                                |               |
|----------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------|------------------------------------------------------|--------------------------------|---------------|
| <input type="checkbox"/> <sup>1</sup> well bore geometry | <input type="checkbox"/> <sup>2</sup> completion details | <input type="checkbox"/> <sup>3</sup> wellhead drawing | <input type="checkbox"/> <sup>4</sup> fluid analysis | <input type="checkbox"/> other | *from surface |
|----------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------|------------------------------------------------------|--------------------------------|---------------|

## NETZSCH Oilfield Products GmbH – the Reliable Partner for the Oil Upstream/E&P Industry

At NETZSCH we strive to use our expanding global technological and market leadership for our customers' benefit. We see ourselves as far more than just a developer and producer; it is our aim to be your partner for everything from project planning to process consulting to integral service. Consultation services, technical product servicing and product quality are our core strengths.

We of course want to ensure the continued high performance and quality of your downhole pump system and will therefore always be there to assist you with whatever needs you may have post-purchase and down the line as well. Our highly skilled sales and service staff and our local service partners are always available.

The NETZSCH Group is an owner-managed, internationally operating technology company headquartered in Germany. Our three Business Units – Analyzing & Testing, Grinding & Dispersing, and Pumps – provide tailored solutions for highest-level needs.

Our over 2200 employees at 125 sales and production centers in 23 countries across the globe guarantee that expert service is never far from our customers.

NETZSCH Oilfield Products GmbH  
Gebrüder-Netzsch-Straße 19  
95100 Selb  
Germany  
Tel.: +49 9287 75-424  
Fax: +49 9287 75-427  
nop@netzsch.com

[www.netzsch.com](http://www.netzsch.com)