# MEGANIESE TEGNOLOGIE: PASWERK EN MASJINERING

**MODEL 2018**

**NASIENRIGLYNE**

# NASIONALE

# SENIOR SERTIFIKAAT

# GRAAD 12


# GRAAD 12

**PUNTE: 200**

**Hierdie nasienriglyne bestaan uit 20 bladsye.**

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| **VRAAG 1: MEERVOUDIGEKEUSE-VRAE (GENERIES)** |  |  |

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| 1.1 | A ✓ |  | (1) |

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| 1.2 | B ✓ |  | (1) |

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| 1.3 | B ✓ |  | (1) |

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| 1.4 | B ✓ |  | (1) |

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| 1.5 | C ✓ |  | (1) |

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| 1.6 | C ✓ |  | (1) |
|  |  | **[6]** |

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| **VRAAG 2: VEILIGHEID (GENERIES)** |  |  |

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| 2.1 | **Masjienveiligheidsreël:**Skakel masjien na gebruik af. ✓ |  | (1) |

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| 2.2 | **Staanboorveiligheidsmaatreël:**Klamp die werkstuk stewig aan die tafel en moenie met die hand vashou nie. ✓  |  | (1) |

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| 2.3 | **Hidrouliesepers-veiligheidsmaatreëls:*** Voorafbepaalde druk moet nie oorskry word nie. ✓
* Drukmeter moet gereeld getoets en vervang word indien wanfunksionering voorkom. ✓
* Die platform moet stewig en haaks met die silinder wees. ✓
* Voorwerpe wat gepers word, moet in geskikte setmate geplaas word. ✓
* Verseker dat die rigting van die druk altyd 90° is. ✓
* Slegs voorgeskrewe toerusting moet gebruik word. ✓ **(Enige 2 x 1)**
 |  | (2) |

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| 2.4 | **Redes vir die dra van chirurgiese handskoene:*** Voorkom MIV/Vigs of enige bloedverwante infeksies. ✓
* Voorkom besmetting van die oop wonde. ✓
 |  | (2) |

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| 2.5 | **Gassilinderveiligheidsmaatreëls:*** Stoor en gebruik gassilinders altyd in 'n regop posisie. ✓
* Moet nooit silinders op mekaar stapel nie. ✓
* Moenie op silinder kap of werk nie. ✓
* Moenie silinders laat val nie. ✓
* Geen olie of ghries mag met silinders of passtukke in aanraking kom nie. ✓
* Hou die koppe op die silinders vir beskerming. ✓ **(Enige 2 x 1)**
 |  | (2) |

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| 2.6 | **Verantwoordelikheid van werkgewer:** * Verskaf en onderhou werkstelsels, werksareas, toerusting en gereedskap in 'n veilige toestand. ✓
* Elimineer of verminder enige gevaar of potensiële gevare. ✓
* Produseer, hanteer, stoor en vervoer goedere veilig. ✓
* Verseker dat elke werkende persoon aan die vereistes van hierdie Wet voldoen. ✓
* Indien nodig, pas maatreëls toe in belang van gesondheid en veiligheid. ✓
* Stel 'n opgeleide persoon aan wat die outoriteit het om te verseker dat werknemers voorkomende maatreëls nakom. ✓ **(Enige 1 x 1)**
 |  | (1) |

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| 2.7 | **Verantwoordelikheid van werknemer:*** Gee aandag aan eie en ander persone se gesondheid en veiligheid. ✓
* Werk saam met die werkgewer ten opsigte van die Wet. ✓
* Kom die wetlike opdrag aan hulle gegee na. ✓
* Rapporteer enige situasie wat onveilig of ongesond is. ✓
* Rapporteer alle insidente en ongelukke. ✓
* Moenie met enige veiligheidstoerusting inmeng of sulke toerusting misbruik nie. ✓
* Kom alle veiligheidsreëls na. ✓ **(Enige 1 x 1)**
 |  | (1) |
|  |  | **[10]** |

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| **VRAAG 3: MATERIAAL (GENERIES)** |  |  |

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| 3.1 | **Metaaltoetse:**  |  |  |

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|  | 3.1.1 | **Vyltoets:**Vyl naby die punt of naby die kant ✓ om relatiewe hardheid vas te stel. ✓ |  | (2) |

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|  | 3.1.2 | **Masjineringstoets:**Die toets word uitgevoer op twee onbekende toetsstukke, met identiese voorkoms en grootte en met masjiengereedskap teen dieselfde spoed en toevoer ✓ gesny. Hoe maklik dit sny moet vergelyk word en die snysels moet vir verwarmingskleure en krul ondersoek word. ✓ |  | (2) |

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| 3.2 | **Klanktoets op staal:**  |  |  |

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|  | 3.2.1 | **Hoë-koolstofstaal (Hard):**Hard en helder ✓✓ |  | (2) |

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|  | 3.2.2 | **Lae-koolstofstaal (Sag):**Dowwe klank ✓✓ |  | (2) |

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| 3.3 | **Hittebehandelingsprosesse op staal:** |  |  |

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|  | 3.3.2 | **Dopverharding:**Om 'n harde dop ✓ eerder as 'n taai kern te produseer. ✓ |  | (2) |

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|  | 3.3.3 | **Verharding:**Om die staal in staat te stel om slytasie ✓ en induiking ✓ te weerstaan.  |  | (2) |

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|  | 3.3.5 | **Normalisering:**Om interne spanning ✓ wat deur masjinering veroorsaak word, te verlig. ✓ |  | (2) |
|  |  | **[14]** |

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| **VRAAG 4: MEERVOUDIGEKEUSE-VRAE (SPESIFIEK)** |  |  |

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| 4.1 | A ✓ |  | (1) |

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| 4.2 | D ✓ |  | (1) |

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| 4.3 | A ✓ |  | (1) |

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| 4.4 | C ✓ |  | (1) |

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| 4.5 | B ✓ |  | (1) |

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| 4.6 | B ✓ |  | (1) |

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| 4.7 | C ✓ |  | (1) |

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| 4.8 | A ✓ |  | (1) |

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| 4.9 | C ✓ |  | (1) |

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| 4.10 | B ✓ |  | (1) |

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| 4.11 | B ✓ |  | (1) |

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| 4.12 | B ✓ |  | (1) |

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| 4.13 | A ✓ |  | (1) |

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| 4.14 | A ✓ |  | (1) |
|  |  | **[14]** |

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| **VRAAG 5: TERMINOLOGIE (DRAAIBANK EN FREESMASJIEN) (SPESIFIEK)** |  |  |

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| 5.1 | **Bereken die loskopverplasing:** **8°****X****300**✓✓✓ |  | (3) |

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| 5.2 | **Metode om meervoudige skroefdraad te sny:*** Beweeg die snygereedskap saam met die saamgesteldebeitelslee ✓
* Draai die wisselratte ✓
* Gebruik die dryfplaat met akkuraat gesnyde gleuwe ✓
* Gebruik 'n gegradeerde dryfplaat ✓ **(Enige 3 x 1)**
 |  | (3) |

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| 5.3 | **Parallelle spy:** |  |  |

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|  | 5.3.1 | **Wydte:**✓✓ |  | (2) |

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|  | 5.3.2 | **Dikte:**✓✓ |  | (2) |

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| 5.4 | **Voordele om die saamgesteldebeitelsleemetode te gebruik om 'n eksterne V-skroefdraad op die senterdraaibank te sny:*** Linkerkant van die gereedskap sny die draad en die regterkant gee 'n gladde afwerking ✓
* Die krag op die gereedskap word eweredig oor die snyvlak versprei ✓
* Die snysels krul weg van die draad ✓
* Indien die gereedskap verwyder moet word, kan die draad weer maklik met die nuwe gereedskap opgetel word ✓ **(Enige 2 x 1)**
 |  | (2) |

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| 5.5 | **Voordele van klimfreeswerk:*** Gladde snywerk deur dun pype en buise ✓
* Koelmiddel word na die tande afgevoer, waar dit benodig word ✓
* Beter afwerking word verkry omdat die snit van maksimum na minimum plaasvind ✓
* Neig om die werkstuk op die tafel vas te druk **(Enige 3 x 1)**
 |  | (3) |

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| 5.6 | **Faktore wat verantwoordelik is vir trillingsmerke (vibrasies) op die freesmasjien:*** Verkeerde snyer vir die proses ✓
* 'n Stomp snyer ✓
* Verkeerde snyspoed ✓
* Verkeerde voertempo ✓
* Onvoldoende masjienkapasiteit vir die proses ✓ **(Enige 3 x 1)**
 |  | (3) |
|  |  | **[18]** |

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| **VRAAG 6: TERMINOLOGIE (INDEKSERING) (SPESIFIEK)** |  |  |

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| 6.1 | **Reguittandrat:** |  |  |

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|  | 6.1.1 | **Aantal tande:**✓✓ |  | (2) |

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|  | 6.1.2 | **Buitediameter:**✓✓ |  | (2) |

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|  | 6.1.3 | **Snydiepte:**✓✓ |  | (2) |

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|  | 6.1.4 | **Addendum:** ✓ |  | (1) |

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|  | 6.1.5 | **Dedendum:**✓ |  | (1) |

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|  | 6.1.6 | **Sirkelsteek:**✓✓ |  | (2) |

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| 6.2 | **Hoekindeksering:**✓✓✓✓✓✓✓ |  | (4) |

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| 6.3 | **Differensiële indeksering:**✓✓✓✓✓✓ |  | (6) |

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| 6.4 | **Bereken afstand X oor rollers:****B****A****C****30°****12,5**✓✓**E****30°****32****D**✓✓**A**✓✓✓✓ |  | (8) |
|  |  | **[28]** |

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| **VRAAG 7: GEREEDSKAP EN TOERUSTING (SPESIFIEK)** |  |  |

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| 7.1 | **Brinell-hardheidstoetser:** **LAS****STAALBAL**✓**INDUIKING**✓**Rockwell-hardheidstoetser:****LAS****DIAMANTKEËL****INDUIKING**✓✓ |  | (4) |

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| 7.2 | **Kragtoetser:**Apparaat om die driehoek en die konsep van die parallelogram van kragte ✓ te illustreer ✓  |  | (2) |

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| 7.3 | **Trektoetser:*** Treksterkte ✓
* Elastisiteit ✓
* Rekbaarheid ✓
* Plastisiteit ✓ **(Enige 2 x 1)**
 |  | (2) |

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| 7.4 | **Dieptemikrometer:**50 ✓ + 16,00 + 0,5 ✓ + 0,11 = 66,61 mm ✓ |  | (3) |

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| 7.5 | Skroefdraad ✓ mikrometer ✓ |  | (2) |
|  |  | **[13]** |

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| **VRAAG 8: KRAGTE (SPESIFIEK)** |  |  |

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| 8.1 | **Resultant****250cos50°****250 N**✓**250sin50°**✓**300cos30°****300 N****300sin30°****50°****30°****350 N****150 N**✓✓✓✓✓✓**OF**

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| --- | --- | --- | --- |
| **Horisontale komponente** | **Groottes** | **Vertikale komponente** | **Groottes** |
| -300Cos30° | -259,81 N ✓ | 300Sin30° | 150 N ✓ |
| 250Cos50° | 160,97 N ✓ | 250Sin50° | 191,51 N ✓ |
| 350  | 350 N  | -150  | -150 N |
| **TOTAAL** | **251,16 N** ✓ | **TOTAAL** | **191,51 N** ✓ |

✓✓✓✓✓✓**Ɵ****R****HC****VC** |  | (14) |

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| 8.2 | **Momente:** |  |  |

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|  | **308 N****800 N****300 N****1 m****1,4 m****1,2 m****0,8 m****4,4 m****B****A** |  |  |

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|  | **Enkelwerkende krag:**✓**Bereken A:****Momente om B.**✓✓✓**Bereken B:****Momente om A.**✓✓✓ |  | (7) |

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| 8.3 | **Spanning en Vormverandering:**  |  |  |

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|  | 8.3.1  | **Spanning:**✓✓✓✓✓ |  | (5) |

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|  | 8.3.2 | **Vormverandering:**✓✓✓✓ |  | (4) |

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|  | 8.3.3 | **Veilige werkspanning:**✓✓✓ |  | (3) |
| **(A)(B)** |  | **[33]** |

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| **VRAAG 9: INSTANDHOUDING (SPESIFIEK)** |  |  |

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| 9.1 | **Voorkomende instandhouding:*** Risiko van besering of dood ✓
* Finansiële verlies weens skade gelei as gevolg van onderdeel ontklaar- raking ✓
* Verlies aan kosbare produksietyd ✓
 |  | (3) |

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| 9.2 | **Wanfunksionering van kettingaandrywing:*** Gebrek aan smering ✓
* Ratte nie behoorlik vas aan asse nie ✓
* Gebrekkige ratbelyning ✓
* Oorlading ✓
* Verkeerde spanning ✓ **(Enige 2 x 1)**
 |  | (2) |

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| 9.3 | **Slytasie op 'n bandaandrywingstelsel:*** Gaan na vir slytasie ✓
* Gaan band/katrolbelyning na ✓
* Gaan spanning verstelling na ✓
* Gaan spanning meganisme na, bv. tussenrat (jockey) ✓ **(Enige 2 x 1)**
 |  | (2) |

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| 9.4 | **Vervang 'n band op 'n bandaandrywingstelsel:*** Verlig die spanning in die band en verwyder van die katrolle ✓
* Gaan die toestand en die belyning van die katrolle na ✓
* Pas die spesifieke band ✓
* Pas genoegsame spanning op die band toe ✓
* Toets vir behoorlike werking ✓
 |  | (5) |

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| 9.5 | **Materiaal:** |  |  |

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|  | 9.5.1  | **Polivinielchloried (PVC):*** Dit is 'n termoplastiese samestelling ✓
* Buigbaar ✓
* Gee 'n dowwe klank ✓
* Dit is 'n taai materiaal ✓
* Dit kan gesweis of gebind word met kleefmiddels ✓
* Goeie elektriese isolasie ✓ **(Enige 1 x 1)**
 |  | (1) |

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|  | 9.5.2 | **Koolstofvesel:*** Dit is 'n termoverhardende samestelling ✓
* Dit is 'n sterk en taai materiaal ✓
* Dit is 'n liggewig materiaal ✓
* Dit is waterbestand ✓
* Dit is UV bestand ✓
* Dit is 'n goeie elektriese isolasie ✓ **(Enige 1 x 1)**
 |  | (1) |

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| 9.6 | **Termoplastiese- of Termoverhardende samestellings:** |  |  |

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|  | 9.6.1  | **Teflon:**Termoplasties ✓ |  | (1) |

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|  | 9.6.2 | **Vesconite:**Termoplasties ✓ |  | (1) |

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|  | 9.6.3 | **Bakeliet:**Termoverhardende ✓ |  | (1) |

**(A)(B)**

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| 9.7 | **Wrywingskoëffisiënt:**Termosamestellings ✓ |  | (1) |
|  |  | **[18]** |

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| **VRAAG 10: HEGTINGSMETODES (SPESIFIEK)**  |  |  |

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| 10.1 | **Vierkantige skroefdraad:** |  |  |

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|  | 10.1.1 | **Skroefdraadstyging:**✓✓ |  | (2) |

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|  | 10.1.2 | **Helikshoek:**✓✓✓✓✓✓ |  | (6) |

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|  | 10.1.3 | **Ingryphoek:**✓✓✓ |  | (2) |

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|  | 10.1.4 | **Sleephoek:**✓✓✓ |  | (2) |

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| 10.2 | **Diameter van boor:**✓✓ |  | (2) |

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| 10.3 | **Skroefdraadterme:** |  |  |

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|  | **10.3.4****10.3.2****10.3.1****10.3.3** |  |  |

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|  | 10.3.1 | Worteldiameter ✓ |  | (1) |

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|  | 10.3.2 | Kruindiameter ✓ |  | (1) |

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|  | 10.3.3 | Effektiewe diameter ✓ |  | (1) |

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|  | 10.3.4 | Steek ✓ |  | (1) |
|  |  | **[18]** |

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| **VRAAG 11: STELSELS EN BEHEER (AANDRYWINGSTELSELS) (SPESIFIEK)** |  |  |

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| 11.1 | **Voordele van 'n bandaandrywing:*** Benodig geen smering nie✓
* Stil werking ✓
* Goedkoperonderdele ✓
* Kan van rigting verander, sonder addisionele komponente ✓
* Maklik om te vervang ✓
* Dra drywing oor 'n langer afstand oor ✓ **(Enige 3 x 1)**
 |  | (3) |

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| 11.2 | **Hidroulika:**✓✓✓✓✓✓✓ |  | (7) |

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| 11.3 | **Hidroulikasimbole:** |  |  |

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|  | 11.3.1 | **Elektriese motor:****M**✓✓ |  | (2) |

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|  | 11.3.2 | **Drukmeter:**✓✓ |  | (2) |

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| 11.4 | **Bandaandrywingstelsel:** |  |  |

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|  | 11.4.1 | **Bandspoed:**✓✓✓ |  | (3) |

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|  | 11.4.2 | **Drywing oorgebring:**✓✓✓ |  | (3) |

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| 11.5 | **Rataandrywingstelsel:** |  |  |

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| --- | --- | --- | --- | --- |
|  | 11.5.1 | Gedrewe rat C sal in dieselfde rigting roteer (kloksgewys) ✓ |  | (1) |

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|  | 11.5.2 | **Aantal tande op rat C:**✓✓✓✓ |  | (4) |

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| 11.6 | **Kettingaandrywingstelsel:** |  |  |

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|  | **Ratverhouding:** **OF** ✓✓✓✓✓✓ |  | (3) |
|  |  | **[28]** |

|  |  |  |
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| **TOTAAL:** |  | **200** |