# MEGANIESE TEGNOLOGIE: PASWERK EN MASJINERING

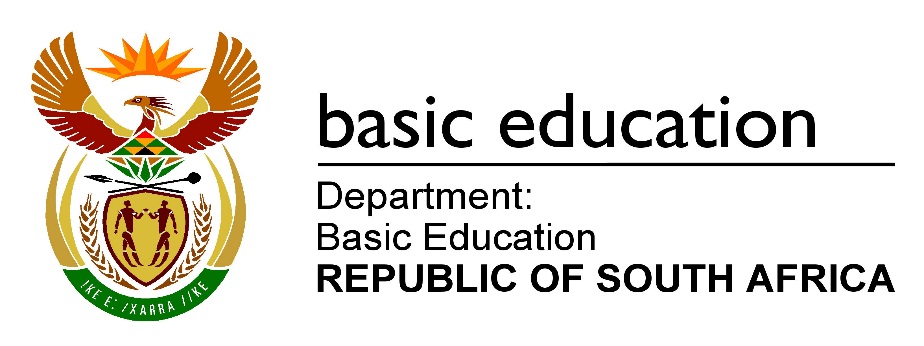
**MODEL 2018**

**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) | |
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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**   |  |  |  |  | | --- | --- | --- | --- | | **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) | | |
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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) | |
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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) |

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

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

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

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

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

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

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