# KIM for assessing and designing physical workloads during Manual Handling Operations (KIM-MHO)

| | | | |
|---|---|---|---|
| Workplace/sub-activity: | | | |
| Duration of the working day: | | Evaluator: | |
| Duration of the sub-activity: | | Date: | |

## 1st step: Determination of time rating points

| Total duration of this sub-activity per working day [up to … hours] | up to 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Time rating points:** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |

## 2nd step: Determination of the rating points for other indicators

**Type of force exertion in the finger/hand area within a "standard minute"**

| Level | Description, typical examples |
|---|---|
| low | **Very low / low forces** (up to 15% $F_{max}M$)<br>e.g. button actuation / shifting / ordering / material guidance / insertion of small parts |
| | **Moderate forces** (up to 30% $F_{max}M$)<br>e.g. gripping / joining small work pieces by hand or with small tools |
| | **High forces** (up to 50% $F_{max}M$)<br>e.g. turning / winding / packaging / grasping / holding or joining parts / pressing in / cutting / working with small powered hand tools |
| | **Very high forces** (up to 80% $F_{max}M$)<br>e.g. cutting involving major element of force / working with small staple guns / moving or holding parts or tools |
| | **Peak forces**[2] (more than 80% $F_{max}M$)<br>e.g. tightening, loosening bolts / separating / pressing in |
| high | **Powerful hitting**[2] with ball of the thumb, palm of the hand or fist |

*The work cycle must be observed and the rating points for the force categories marked. Added (left and right hands separately), these produce the force rating point. To calculate the total score (step 3), the higher value must be used.*

| Holding[1] | | | Moving | | | | |
|---|---|---|---|---|---|---|---|
| average holding time [sec. per minute] | | | average movement frequencies [number per minute] | | | | |
| 31-60 | 16-30 | ≤ 15 | < 5 | 5-15 | 16-30 | 31-60 | 61-90[3] |
| Rating points | | | Rating points | | | | |
| 5.5 | 3 | 1.5 | 0.5 | 1 | 2.5 | 5 | 7 |
| 9 | 4.5 | 2.5 | 0.5 | 2 | 4 | 7.5 | 11 |
| 14 | 7 | 3.5 | 1 | 3 | 6 | 12 | 18 |
| 22 | 11 | 5.5 | 1.5 | 5 | 10 | 19 | |
| 100 | | 35 | 8 | 30 | 100 | | |
| | | | 8 | 30 | | | |

| Rating points of force exertion: | Left hand | Right hand |
|---|---|---|
| | | |

[1] *The amount of time of holding work is only considered as such in the assessment if one arm is held continuously statically for at least 4 seconds!*
[2] *Please note: If one of these categories was chosen, it is recommended to evaluate this sub-activity also using the KIM-BF! These forces might not be exerted at all or might no longer be exerted reliably. This applies to women in particular.*
[3] *In case of even higher frequencies, the resulting risk score must be extrapolated linearly or the E version (KIM-MHO-E) must be applied.*

| Force transfer / gripping conditions | Rating |
|---|---|
| **Optimum force transfer/application** / working objects are easy to grip (e.g. bar-shaped, gripping grooves) / good ergonomic gripping design (grips, buttons, tools) | **0** × |
| **Restricted force transfer/application** / greater holding forces required / no shaped grips | **2** |
| **Force transfer/application considerably hindered** / working objects hardly possible to grip (slippery, soft, sharp edges) / no or only unsuitable grips | **4** |

| Hand/arm position and movement[4] | | Rating points |
|---|---|---|
|  | **Good**: position or movements of joints in the middle (relaxed) range, only rare deviations / no continuous static arm posture / hand-arm rest possible as required | **0** × |
|  | **Restricted**: occasional positions or movements of the joints at the limit of the movement ranges / occasional long continuous static arm posture | **1** |
| | **Unfavourable**: frequent positions or movements of the joints at the limit of the movement ranges / frequent long continuous static arm posture | **2** |
| | **Poor**: constant positions or movements of the joints at the limit of the movement ranges / constant long continuous static arm posture | **3** |

[4] *Typical positions are to be considered. Rare deviations can be ignored.*

| Unfavourable working conditions (specify only where applicable) | Rating points |
|---|---|
| **Good**: there are no unfavourable working conditions, i.e. reliable recognition of detail / no dazzle / good climatic conditions | **0** × |
| **Restricted**: occasionally impaired detail recognition due to dazzle or excessively small details difficult conditions such as draught, cold, moisture and/or disturbed concentration due to noise | **1** |
| **Unfavourable**: frequently impaired detail recognition due to dazzle or excessively small details frequently difficult conditions such as draught, cold, moisture and/or disturbed concentration due to noise | **2** |

*Indicators not mentioned in the table are to be taken into account accordingly.*

| Body posture/movement[5) 6)] | Rating points |
|---|---|
|  - Alternation between sitting and standing, alternation between standing and walking, dynamic sitting possible<br>- Trunk inclined forward only very slightly<br>- No twisting and/or lateral inclination of the trunk identifiable<br>- Head posture: variable, head not inclined backward and/or severely inclined forward or constantly moving<br>- No gripping above shoulder height / no gripping at a distance from the body | 0 x |
|  - Predominantly sitting or standing with occasional walking<br>- Trunk with slight inclination of the body towards the work area<br>- Occasional twisting and/or lateral inclination of the trunk identifiable<br>- Occasional deviations from good "neutral" head posture/movement<br>- Occasional gripping above shoulder height / occasional gripping at a distance from the body | 2 |
|  - Exclusively standing or sitting without walking<br>- Trunk clearly inclined forward and/or frequent twisting and/or lateral inclination of the trunk identifiable<br>- Frequent deviations from good "neutral" head posture/movement<br>- Head posture hunched forward for detail recognition / restricted freedom of movement<br>- Frequent gripping above shoulder height / frequent gripping at a distance from the body | 4 |
|  - Trunk severely inclined forward / frequent or long-lasting bending<br>- Work being carried out in a kneeling, squatting, lying position<br>- Constant twisting and/or lateral inclination of the trunk identifiable<br>- Body posture strictly fixed / visual check of action through magnifying glasses or microscopes<br>- Constant deviations from good "neutral" head posture/movement<br>- Constant gripping above shoulder height / constant gripping at a distance from the body | 6[7)] |

[5)] *Typical body postures are to be taken into account. Rare deviations can be ignored.*

[6)] *If the manual handling operations are not carried out in a stationary sitting, standing, kneeling, squatting, lying position, but in motion (walking, crawling), it is recommended to evaluate the sub-activity also using the KIM-BM.*

[7)] *Please note: If this category was chosen, it is recommended to evaluate this sub-activity also using the KIM-ABP!*

| Work organisation / temporal distribution | Rating points |
|---|---|
| **Good:** frequent variation of the physical workload situation due to other activities (including other types of physical workload) / without a tight sequence of higher physical workloads within one type of physical workload during a single working day. | 0 x |
| **Restricted**: rare variation of the physical workload situation due to other activities (including other types of physical workload) / occasional tight sequence of higher physical workloads within one type of physical workload during a single working day. | 2 |
| **Unfavourable**: no/hardly any variation of the physical workload situation due to other activities (including other types of physical workload) / frequent tight sequence of higher physical workloads within one type of physical workload during a single working day with concurrent high load peaks. | 4 |

### 3rd step: Evaluation and assessment

| | | |
|---|---|---|
| **Type of force exertion in the finger/hand area** | | |
| **Force transfer / gripping conditions** | + | |
| **Hand/arm position and movement** | + | |
| **Unfavourable working conditions** | + | |
| **Body posture** | + | |
| **Work organisation / temporal distribution** | + | |

**Time rating points** **x** **Total of indicator rating points:** = **Result**

**The risk score calculated and the table below can be used as the basis for a rough evaluation:**

| Risk | | Risk range | Intensity of load[*)] | a) Probability of physical overload<br>b) Possible health consequences | Measures |
|---|---|---|---|---|---|
|  | 1 | < 20 points | low | a) Physical overload is unlikely.<br>b) No health risk is to be expected. | None |
| | 2 | 20 - < 50 points | slightly increased | a) Physical overload is possible for less resilient persons.<br>b) Fatigue, low-grade adaptation problems which can be compensated for during leisure time | For less resilient persons, workplace redesign and other prevention measures may be helpful. |
| | 3 | 50 - < 100 points | substantially increased | a) Physical overload is also possible for normally resilient persons.<br>b) Disorders (pain), possibly including dysfunctions, reversible in most cases, without morphological manifestation | Workplace redesign and other prevention measures should be considered. |
| | 4 | ≥ 100 points | high | a) Physical overload is likely.<br>b) More pronounced disorders and/or dysfunctions, structural damage with pathological significance | Workplace redesign measures are necessary. Other prevention measures should be considered. |

[*)] *The boundaries between the risk ranges are fluid because of the individual working techniques and performance conditions. The classification may therefore only be regarded as an orientation aid. Basically, it must be assumed that the probability of physical overload will increase as the risk scores rise.*