

Key Indicator Method for assessing and designing physical workloads with respect to manual Lifting, Holding and Carrying of loads ≥ 3 kg KIM-LHC

Overview of Key Indicator Methods:

Key Indicator Method for assessing and designing physical workloads ...

- **with respect to manual Lifting, Holding and Carrying of loads (KIM-LHC)**
- with respect to manual Pushing and Pulling of loads (KIM-PP)
- during Manual Handling Operations (KIM-MHO)
- with respect to Whole-Body Forces (KIM-BF)
- with respect to Awkward Body Postures (KIM-ABP)
- with respect to Body Movement (KIM-BM)

as well as the respective **Extended** versions in a spreadsheet program (e.g. KIM-LHC-E)



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Photo: U. Völkner/fox-fotos.de

Scope of the Key Indicator Method (KIM-LHC)

- This Key Indicator Method considers the manual lifting, holding and carrying of loads ≥ 3 kg and serves to record relocating, holding and the mere transport of loads.
- Loads may be objects, people or animals. Related forms of lifting, such as lowering and relocating (predominantly horizontally), are included.
- **Typical activities:** Loading/unloading of bags, sorting packages, loading of equipment without lifting aids, picking, transferring palletised goods, repair work at the roof by hand, childcare in daycare centres as well as manual transport of patients.

Distinction from other Key Indicator Methods

- If the load is also changed, the Key Indicator Methods “Whole-Body Forces” (KIM-BF) and/or “Manual Handling Operations” (KIM-MHO) must also be considered depending on the level of force required.
- If the load is carried over longer distances (> 10 m) or under difficult walking conditions (e.g. soil, shafts, ladders, climbing, stairs, ascents/descents $> 10^\circ$), the Key Indicator Method “Body Movement” (KIM-BM) must also be taken into consideration.
- If the load is carried on one or two shoulders (including backpacks), the Key Indicator Method “Body Movement” (KIM-BM) must also be considered.
- Lifting, holding and carrying loads using equipment, such as pliers or shovels without changing/processing the transported goods or catching/throwing loads, must be assigned to the Key Indicator Methods “Manual Handling Operations” (KIM-MHO) or “Whole-Body Forces” (KIM-BF) depending on the level of force required.
- This Key Indicator Method serves to record the physical workload caused by relocating, holding or transport processes. Sub-activities with machines, tools and comparable work equipment that are hand-held or attached to the body are assessed depending on the force level using the Key Indicator Methods “Manual Handling Operations” (KIM-MHO) or “Whole-Body Forces” (KIM-BF).
- Care activities going beyond the definitions of manual lifting, holding and/or carrying described in this Key Indicator Method, such as transferring patients, must be assessed using the Key Indicator Method “Whole-Body Forces” (KIM-BF).
- If several different sub-activities take place per working day, they must be recorded and assessed separately (e.g. using KIM-LHC-E). The probability of physical overload can only be assessed if all physical workloads occurring during a working day are assessed.

Form including brief instructions

Key Indicator Method for assessing and designing physical workloads with respect to manual Lifting, Holding and Carrying of loads ≥ 3 kg (KIM-LHC)

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

1st step: Determination of time rating points

Frequency [up to ... times per sub-activity and working day]:	5	20	50	100	150	220	300	500	750	1000	1500	2000	2500
Time rating points:	1	1.5	2	2.5	3	3.5	4	5	6	7	8	9	10

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

Effective load weight ¹⁾	Load rating points for men	Load rating points for women
3 up to 5 kg	4	6
> 5 up to 10 kg	6	9
> 10 up to 15 kg	8	12
> 15 up to 20 kg	11	25
> 20 up to 25 kg	15	75
> 25 up to 30 kg	25	85
> 30 up to 35 kg	35	100
> 35 up to 40 kg	75	
> 40 kg	100	

















































¹⁾ "Effective load weight" refers to the physical workload which the employee actually has to apply.

When tilting a cardboard box, only approximately 50 % of the load weight has an effect and when carrying a load in pairs, approximately 60 % of the load weight has an effect per person (in case of increased requirements with respect to load control and coordination, more than 50 % must be assumed).

Load handling conditions	Rating points
Load is handled with both hands and symmetrically	0
Load is handled temporarily with one hand and/or asymmetrically, uneven load distribution between the two hands	2
Load is handled predominantly with one hand or unstable load centre	4


Body posture²⁾

The movement may take place in both directions, i.e. the pictograms shown can represent both start and finish of the load handling operation. If there are several pictograms in one field, they are to be considered to be equal. In addition to this, twisting/lateral inclination of the trunk, the load position / gripping at a distance from the body, working with raised hands and gripping above shoulder level must be taken into consideration (additional points).

Start / finish	Finish / start	Rating points	Start / finish	Finish / start	Rating points	Additional points (max. 6 points) <i>Only relevant where applicable.</i>				
		0	 	 	10 ³⁾	<u>Occasional</u> twisting and/or lateral inclination of the trunk identifiable	+1			
			 	 	13 ³⁾	<u>Frequent / constant</u> twisting and/or lateral inclination of the trunk identifiable	+3			
	 	3	 	 	15 ³⁾	Load centre and/or hands <u>occasionally</u> at a distance from the body	+1			
 	 	5	 	 	18 ³⁾	Load centre and/or hands <u>frequently / constantly</u> at a distance from the body	+3 ³⁾			
 	 	7	 	 	20 ³⁾	Arms raised <u>occasionally</u> , hands between elbow and shoulder level	+0.5			
			 	 		Arms raised <u>frequently / constantly</u> , hands between elbow and shoulder level	+1			
	 	9 ³⁾	 	 		Hands <u>occasionally</u> above shoulder height	+1			
			 	 		Hands <u>frequently / constantly</u> above shoulder height	+2 ³⁾			
						BP rating points	+	Additional points	=	Total
								(max. 6 points)		

²⁾ The typical body postures when picking up and putting down the load are to be taken into account in particular. Rare deviations can be ignored. If the lifting / holding work is carried out in a sitting position, e.g. when relocating something, the pictograms are to be used accordingly. Higher load weights should be avoided when handling loads in a sitting position.

³⁾ **Please note:** If this category was chosen, it is recommended to evaluate this sub-activity also using the KIM-BP (body postures)!

Unfavourable working conditions (specify only where applicable) <i>Indicators not mentioned in the tables are to be taken into account accordingly. Rare deviations can be ignored.</i>		Intermediate rating points IRP	∑ IRP
Hand/arm position and movement: 	occasionally at the limit of the movement ranges	1	
	frequently/constantly at the limit of the movement ranges	2	
Force transfer/application restricted: loads difficult to grip / greater holding forces required / no shaped grips / work gloves		1	
Force transfer/application considerably hindered: loads hardly possible to grip / slippery, soft, sharp edges / no/unsuitable grips / work gloves		2	
Adverse ambient conditions: unfavourable weather conditions and/or physical workloads caused by heat, draught, cold, wet		1	
Spatial conditions restricted: work area of less than 1.5 m ² , floor is moderately dirty and slightly uneven, slight inclination of up to 5°, slightly restricted stability, load must be positioned precisely		1	
Spatial conditions unfavourable: significantly restricted freedom of movement or space for movement is not high enough, working in confined spaces, floor is very dirty, uneven or roughly cobbled, steps / potholes, stronger inclination of 5-10°, restricted stability, load must be positioned very precisely		2 ⁴⁾	
Clothes: additional physical workload due to impairing clothes or equipment (e.g. when wearing heavy rain jackets, whole-body protection suits, respiratory protective equipment, tool belts or the like)		1	
Difficulties due to holding / carrying: The load has to be held between > 5 and 10 seconds or carried over a distance between > 2 m and 5 m.		2	
Significant difficulties due to holding / carrying: The load has to be held > 10 seconds or carried over a distance > 5 m.		5 ⁴⁾	
None: there are no unfavourable working conditions		0	


⁴⁾ Please note: If there are unfavourable spatial conditions when carrying loads or if the load has to be carried over distances > 10 m, this sub-activity is to be evaluated using the KIM-BM!

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
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

	Men	Women	
Effective load weight	<input type="text"/>	<input type="text"/>	
Load handling conditions +	<input type="text"/>	<input type="text"/>	
Total body posture +	<input type="text"/>	<input type="text"/>	
Unfavourable working conditions (∑ IRP) +	<input type="text"/>	<input type="text"/>	
Work organisation / temporal distribution +	<input type="text"/>	<input type="text"/>	
Time rating points X	<input type="text"/>	<input type="text"/>	Results
Total of indicator rating points:	<input type="text"/>	<input type="text"/>	
			Men Women
			<input type="text"/> <input type="text"/>

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

Risk	Risk range	Intensity of load ⁷⁾	a) Probability of physical overload b) Possible health consequences	Measures
	1 < 20 points	low	a) Physical overload is unlikely. b) No health risk is to be expected.	None
	2 20 - < 50 points	slightly increased	a) Physical overload is possible for less resilient persons. 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. 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. b) More pronounced disorders and/or dysfunctions, structural damage with pathological significance	Workplace redesign measures are necessary. Other prevention measures should be considered.

⁷⁾ 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.

Guideline for the Key Indicator Method for assessing and designing physical workloads with respect to manual Lifting, Holding and Carrying of loads ≥ 3 kg

KIM-LHC

Objective of the Key Indicator Method:

The objective of the KIMs is to document the main physical workload indicators as easily as possible, make correlations clear to the user and allow for a rough evaluation of the probability of physical overload. Possible consequences for health as well as the need for action resulting from that may be derived from this.

Please note:

This method serves to assess the working conditions with respect to manual lifting, holding and carrying of loads for orientation purposes. When determining the time rating points as well as the rating points for the key indicators (effective load weight, load handling conditions, body posture, unfavourable working conditions (total of all intermediate rating points) and work organisation / temporal distribution), an absolute prerequisite is nevertheless sound knowledge of the sub-activity being assessed. Without such knowledge, it is not permitted to conduct an assessment. Rough estimates or assumptions lead to false results.

Procedure:

Basically, assessment is carried out for sub-activities. If minor deviations, e.g. with respect to the load weight and/or body postures, arise within a sub-activity, average values must be formed. If a number of sub-activities with substantially different conditions are carried out within a working day or extremely varying conditions occur within a sub-activity, they must be estimated and documented separately. The probability of physical overload can only be assessed if all physical workloads occurring during a working day are assessed. For a summarised assessment of substantially different load handling operations, the KIM-LHC-E, for example, can be used.

In case of overlaps with other types of physical workload, it is to be examined whether other KIMs must also be used (in this respect, see https://www.baua.de/EN/Topics/Work-design/Physical-workload/Key-indicator-method/Key-indicator-method_node.html).

The assessment requires 3 (or possibly 4) steps to be carried out:

1. Determination of time rating points
2. Determination of the rating points for key indicators and
3. Evaluation/assessment. As a result, it may be
4. necessary to carry out a step which includes the derivation and implementation of workplace redesign measures and providing of preventive occupational medical care.

The load rating points are determined on the basis of the table, separately for men and women. If heavy loads with different weights are handled, frequency-weighted averaging of the load weights is permissible. If the load category ≥ 25 points has been reached, averaging is not permissible. If averaging is no longer permissible, the handling operations must be recorded as separate sub-activities (e.g. using KIM-LHC-E). The rating points for other indicators are determined according to the procedure described above. Useful interpolation for intermediate steps is permissible.

Time rating points < 1 may not be assigned, as the time rating point is always at least one (1) point!

Carrying out the documentation and evaluation/assessment:

1st step: Determination of time rating points

The time rating points are determined on the basis of the table depending on the frequency (number of repetitions) when lifting, lowering, relocating, holding or carrying loads within the sub-activity being assessed.

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

The rating points for load handling conditions, body posture, unfavourable working conditions and work organisation / temporal distribution are determined according to the procedure described above. Useful interpolation for intermediate steps is permissible. A distance between the chest and middle of the hand of more than 17 cm (5% percentile, European value) is considered to be gripping at a distance from the body.

3rd step: Evaluation and assessment

Each sub-activity is evaluated on the basis of an activity-related risk score (calculated by adding the rating points for the key indicators and multiplying this by the time rating points). This risk score can be assigned to a risk range relating to this sub-activity and, based on this, the probability of physical overload and possible consequences for health as well as the need for action resulting from that can be derived.

4th step: Workplace redesign and preventive occupational medical care

In addition to the prevention measures derived on the basis of the risk assessment, the following applies:

- From risk range 3 “substantially increased”, workplace redesign measures as well as further collective and individual prevention measures are usually necessary. In Germany, preventative occupational medical care in accordance with *ArbMedVV* [German Ordinance on Occupational Health Care] is to be offered^{*)}.
- Workplace redesign and prevention measures for groups of particularly vulnerable employees (e.g. young people or people with altered performance) must be considered irrespective of the intensity of load and on a case-by-case basis where appropriate, e.g. if employees demand preventive occupational medical care.
- By examining the highest risk scores of the key indicators, the causes of increased physical workloads can be identified and changes initiated. The need for a redesign should also be considered if individual indicators reach the maximum rating points. Where appropriate, indications to restrictions of the feasibility with respect to the rating points for individual indicators must be considered.

^{*)} *ArbMedVV* [German Ordinance on Occupational Health Care] as of June 2019