

Ergonomics Requirement Specification for External Machine Manufacturers

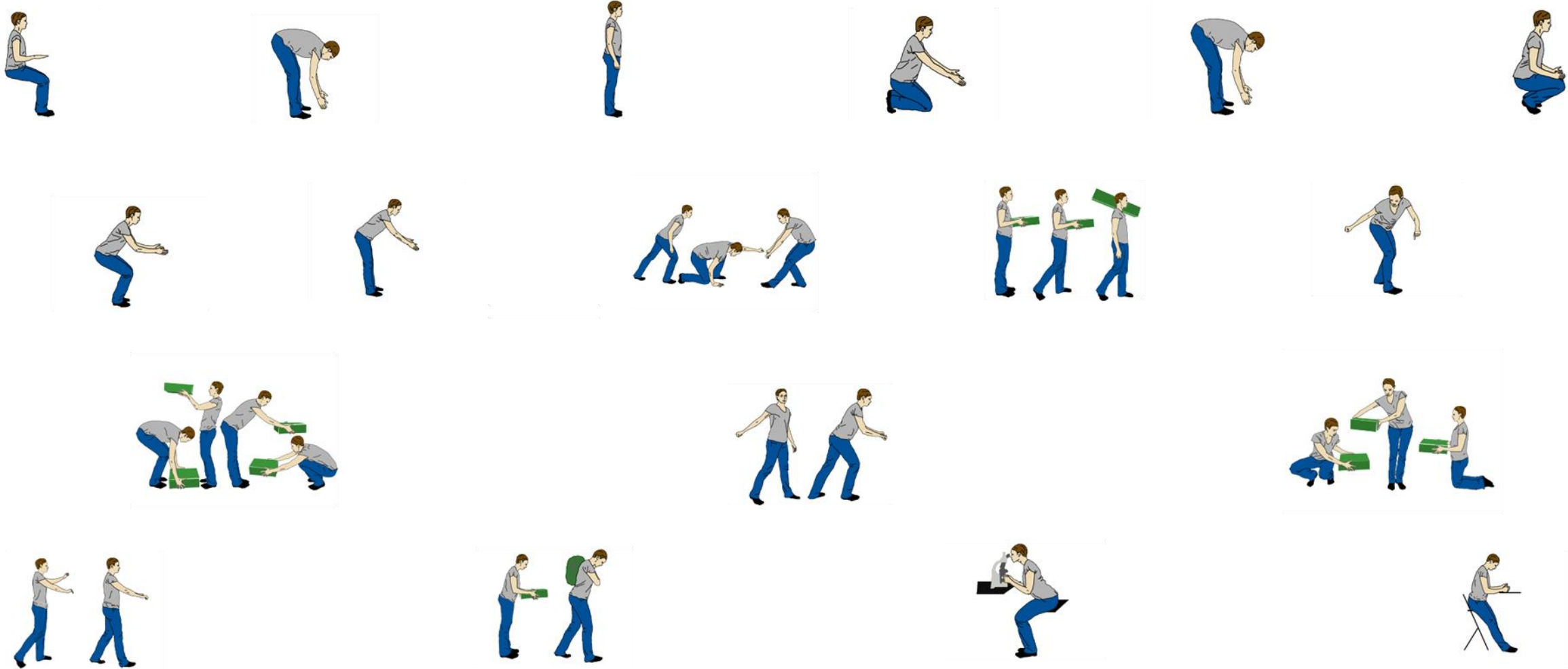
Our Requirements to New Machines

Neutral Body Posture – Trunk and Back
Evaluation of Body Postures

[Ergonomics Requirement Specification for External Machine Manufacturers - Continental AG](#)

Evaluation of Body Postures

Possible Body Postures



Trunk Flexion / Extension

Trunk and Back Bending of the trunk			Neutral (natural) Body Posture	Awkward Body Posture	
Source: German BGIA-Report 2/2007 Acc. to ISO 11226(2) & EN 1005-4			Optimal	Still acceptable posture	Extremely awkward posture
	Trunk Flexion (bending forwards)	+	0° to 20°	20° to 60°	> 60°
	Trunk Extension (bending to a side)	-	0°		< 0°

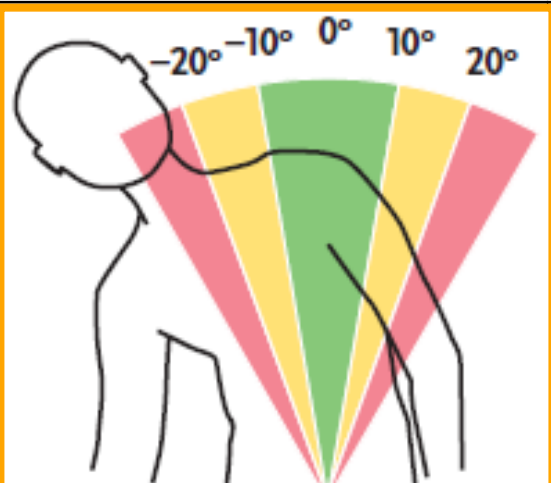
Definition of colors

Green: Optimal. This posture is allowed to be adopted for a long time.

Yellow: Still acceptable body posture. This posture is only allowed to be adopted for a **short period of time** or to perform work-tasks with **low frequencies**.

Red: Extremely awkward Body Posture. **Has to be avoided!**

Bending of the trunk to a side

Trunk and Back Bending of the trunk		Neutral (natural) Body Posture	Awkward Body Posture	
Source: German BGIA-Report 2/2007 Acc. to ISO 11226(2)		Optimal	Still acceptable posture	Extremely awkward posture
	Bending of the trunk to the right	+ 0° to 10°	10° to 20°	> 20°
	Bending of the trunk to the left	- 0° to -10°	-10° to -20°	< -20°

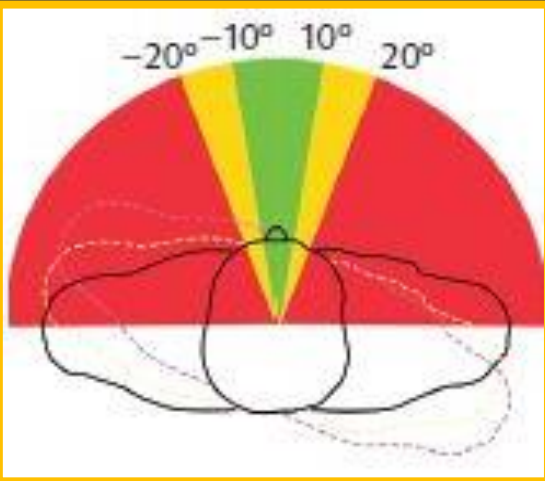
Definition of colors

Green: Optimal. This posture is allowed to be adopted for a long time.

Yellow: Still acceptable body posture. This posture is only allowed to be adopted for a **short period of time** or to perform work-tasks with **low frequencies**.

Red: Extremely awkward Body Posture. **Has to be avoided!**

Torsion of the trunk

Trunk and Back Torsion of the trunk		Neutral (natural) Body Posture	Awkward Body Posture	
Source: German BGIA-Report 2/2007 Acc. To ISO 11226(2)		Optimal	Still acceptable posture	Extremely awkward posture
	Torsion of the trunk to the right +	0° to 10°	10° to 20°	> 20°
	Torsion of the trunk to the left -	0° to -10°	-10° to -20°	< -20°

Definition of colors

Green: Optimal. This posture is allowed to be adopted for a long time.

Yellow: Still acceptable body posture. This posture is only allowed to be adopted for a **short period of time** or to perform work-tasks with **low frequencies**.

Red: Extremely awkward Body Posture. **Has to be avoided!**

Ergonomics Requirement Specification for External Machine Manufacturers

Our Requirements to New Machines

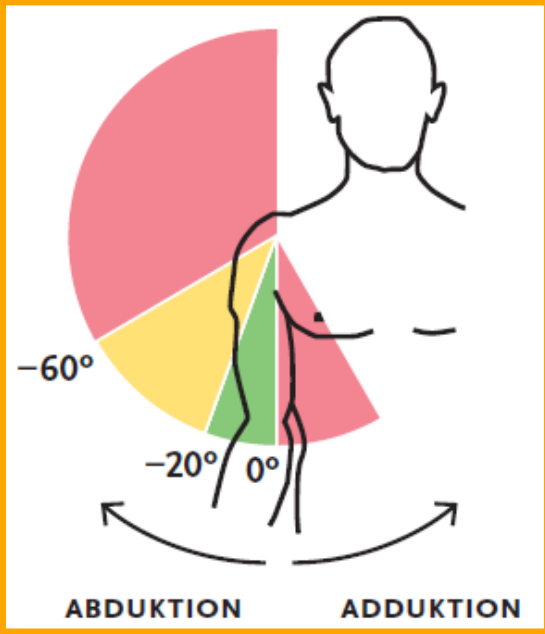
Neutral Joint Positions – Hands / Arms / Shoulders

Evaluation of Joint Positions

[Ergonomics Requirement Specification for External Machine Manufacturers - Continental AG](#)

Shoulder Joint

Adduction / Abduction

Shoulder Joint		Neutral (natural) Body Posture	Awkward Body Posture	
Source: German BGIA-Report 2/2007 Acc. To DIN EN 1005-4; German A 55		Optimal	Still acceptable posture	Extremely awkward posture
 <p>The diagram shows a human silhouette with the right arm. A vertical line represents the neutral position (0°). A green sector from 0° to -20° is labeled 'From the body = Abduction'. A yellow sector from -20° to -60° is also labeled 'From the body = Abduction'. A red sector from -60° to the left is labeled 'To the body = Adduction'. A curved arrow at the bottom indicates the range from 'ABDUKTION' (left) to 'ADDUKTION' (right).</p>	To the body = Adduction +	0°	> 0°	
	From the body = Abduction -	0° to -20°	-20° to -60°	< -60°

Definition of colors

Green: Optimal. This posture is allowed to be adopted for a long time.

Yellow: Still acceptable body posture. This posture is only allowed to be adopted for a **short period of time** or to perform work-tasks with **low frequencies**.

Red: Extremely awkward Body Posture. **Has to be avoided!**

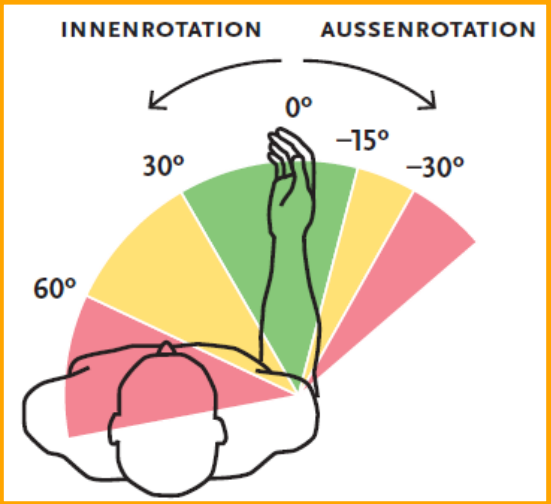
Shoulder Joint Flexion / Extension

Shoulder Joint		Neutral (natural) Body Posture	Awkward Body Posture	
Source: German BGIA-Report 2/2007 Acc. To DIN EN 1005-4; German A 55		Optimal	Still acceptable posture	Extremely awkward posture
	Forwards (Flexion) +	0° to 20°	20° to 60°	> 60°
	Backwards (Extension) -			< 0°

Definition of colors

- Green:** Optimal. This posture is allowed to be adopted for a long time.
- Yellow:** Still acceptable body posture. This posture is only allowed to be adopted for a short period of time or to perform work-tasks with low frequencies.
- Red:** Extremely awkward Body Posture. Has to be avoided!

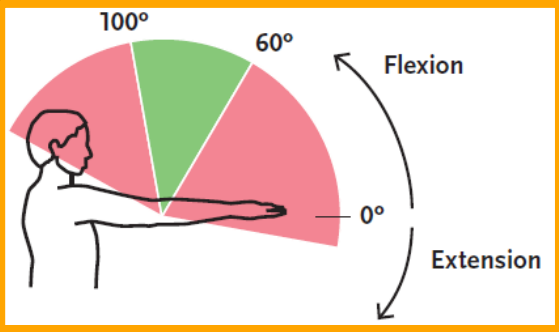
Shoulder Joint Pronation / Supination

Shoulder Joint		Neutral (natural) Body Posture	Awkward Body Posture	
Source: German BGIA-Report 2/2007 German A 55		Optimal	Still acceptable posture	Extremely awkward posture
 <p>The diagram illustrates shoulder joint rotation. It shows a top-down view of a person's head and shoulders. A vertical line represents the neutral position (0°). To the left, 'INNENROTATION' (pronation) is indicated with a curved arrow. To the right, 'AUSSENROTATION' (supination) is indicated with a curved arrow. The rotation is divided into colored segments: green (0° to 30°), yellow (30° to 60°), and red (> 60°) for pronation; and green (0° to -15°), yellow (-15° to -30°), and red (< -30°) for supination.</p>	Pronation (to the body) +	0° to 30°	30° to 60°	> 60°
	Supination (from the body) -	0° to -15°	-15° to -30°	< -30°

Definition of colors

- Green:** Optimal. This posture is allowed to be adopted for a **long time**.
- Yellow:** Still acceptable body posture. This posture is only allowed to be adopted for a **short period of time** or to perform work-tasks with **low frequencies**.
- Red:** Extremely awkward Body Posture. **Has to be avoided!**

Cubital Joint Flexion / Extension

Cubital Joint			Neutral (natural) Body Posture	Awkward Body Posture	
Source: German BGIA-Report 2/2007 Acc. To DIN EN 1005-4; German A 55			Optimal	Still acceptable posture	Extremely awkward posture
	Flexion	+	60° to 100°		> 100°
	Extension	-	60° to 100°		< 60°

Definition of colors

- Green:** Optimal. This posture is allowed to be adopted for a long time.
- Yellow:** Still acceptable body posture. This posture is only allowed to be adopted for a short period of time or to perform work-tasks with low frequencies.
- Red:** Extremely awkward Body Posture. Has to be avoided!

Lower Arm Pronation / Supination

Lower Arm			Neutral (natural) Body Posture	Awkward Body Posture	
Source: German BGIA-Report 2/2007 German A 55			Optimal	Still acceptable posture	Extremely awkward posture
	Pronation	+	0° to 20°	20° to 40°	> 40°
	Supination	-	0° to -30°	-30° to -55°	< -55°

Definition of colors

- Green:** Optimal. This posture is allowed to be adopted for a long time.
- Yellow:** Still acceptable body posture. This posture is only allowed to be adopted for a short period of time or to perform work-tasks with low frequencies.
- Red:** Extremely awkward Body Posture. Has to be avoided!

Wrist Flexion / Extension

Wrist		Neutral (natural) Body Posture	Awkward Body Posture		
Source: German BGIA-Report 2/2007 / German A 55		Optimal	Still acceptable posture	Extremely awkward posture	
	Extension -	0° to -25°	-25° to -50°	< -50°	
	Flexion +	0° to 20°	20° to 45°	> 45°	

Definition of colors

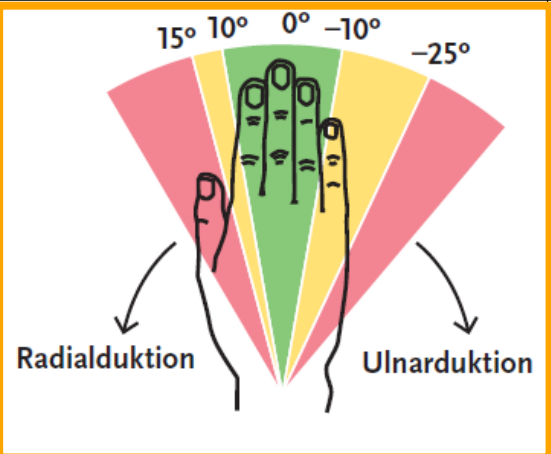
Green: Optimal. This posture is allowed to be adopted for a **long time**.

Yellow: Still acceptable body posture. This posture is only allowed to be adopted for a **short period of time** or to perform work-tasks with **low frequencies**.

Red: Extremely awkward Body Posture. **Has to be avoided!**

Wrist

Radial Abduction / Ulnar Abduction

Wrist		Neutral (natural) Body Posture	Awkward Body Posture	
Source: German BGIA-Report 2/2007 German A 55		Optimal	Still acceptable posture	Extremely awkward posture
	Radial Abduction +	0° to 10°	10° to 15°	> 15°
	Ulnar Abduction -	0° to -10°	-10° to -25°	< -25°

Definition of colors

Green: Optimal. This posture is allowed to be adopted for a **long time**.

Yellow: Still acceptable body posture. This posture is only allowed to be adopted for a **short period of time** or to perform work-tasks with **low frequencies**.

Red: Extremely awkward Body Posture. **Has to be avoided!**