WORKING FOR A HEALTHIER FUTURE

Report 601-00508
September 2016

Ergonomic Assessment of the Cylinder Lifter

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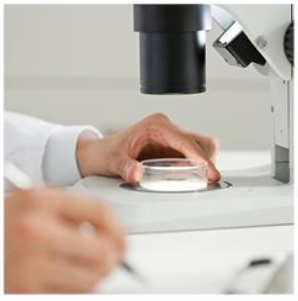

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REPORT TO CLIENT

Dated	:	14th September 2016
Specialist field	:	Ergonomics
On behalf of	:	EFP-ME UK Ltd
Reference	:	603-00508

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1 INTRODUCTION

The aim of this ergonomic assessment was to evaluate the use of the Cylinder Lifter compared to other methods of manually handling cylinders including churning and lifting them. The cylinder lifter has been designed to reduce the need to lift the cylinders when positioning them on welding sets or other raised platforms as well as improve manoeuvrability when they need to be moved around a workplace.

2 THE ISSUES

Manual handling of cylinders has long been associated with risk of injury mainly due to the weights being handled and the difficulty in gripping a cylindrical shape. For large scale operations, a number of different solutions have been developed including vacuum lifting equipment, crates that are used to move multiple cylinders using a fork-lift and other such devices. However, these are not helpful when only one or two cylinders are used in a working environment.

Where cylinders do still need to be lifted into position, there is a need to lift a heavy object which in relation to manual handling is a risk especially for larger cylinders due to the weight, the bulkiness of the load and the lack of a good gripping area.

2.1 THE CYLINDER LIFTER

The cylinder lifter has been designed to remove the need for the manual handling or lifting of cylinders and can be seen in Figure 1.

An evaluation was carried out between manually handling two cylinders, a large one of 85 kg and a smaller one of 63 kg. Both cylinders were manoeuvred on to platform approximately 20 cm above the floor surface height.

Figure 1 Cylinder Lifter

2.2 EVALUATION OF THE CYLINDER LIFTER VERSUS MANUAL HANDLING

Examination was made of the cylinder lift of the 85 kg cylinder and this was evaluated using the HSE Manual Handling Assessment Checklist (MAC tool) and the Rapid Entire Body Assessment tool (REBA). These are recognised tools that enable evaluation to be made in workplaces when a change is made to the work process. In this case, evaluating the manual movement of cylinders and the use of the cylinder lifter to manoeuvre cylinders.

To move cylinders without assistive devices most often involves the use of churning which according to BCGA GN 3. REV 3;2016 should only be carried out over a distance of 5 metres.

The difficulty with cylinder handling is manoeuvring them into brackets or cages where often the only solution is to lift the cylinder. This in itself is a major risk of injury due to both the weight of the cylinder and the shape and size of each cylinder.

The use of assistive devices has been researched previously including the hand-handle interface tool (Devereux et al., 1998) and handle designs for cylinder trolleys (Okunribido and Haslegrave 1999). The Cylinder Lifter has been designed to remove the need for lifting and manoeuvring of the cylinders by hand.

When using the Cylinder Lifter, the tasks involved including the following:

- Lining the Cylinder Lifter up with the Cylinder

- Attaching and tightening the security strap around the cylinder
- Tilting the cylinder within the lifter using hand and foot
- Positioning the cylinder where required
- Placing safety chain on cylinder
- Removing security strap
- Removing the Cylinder Lifter

2.2.1 The MAC Assessment

A copy of the MAC assessment chart is presented in Appendix 1. The assessment was carried out on two cylinders with weights of 85 kg and 63 kg under two conditions of moving the cylinders by hand and moving the cylinders using the Cylinder Lifter. The postures adopted during the cylinder movement are presented in Figures 2 to 7.

Table 1. MAC Scores

	63 kg Cylinder	**85 kg Cylinder**
MAC Score for manual movement onto stand	15	15
MAC Score for manual movement from stand	15	15
MAC Score for Cylinder Lifter on to stand	3	3
MAC Score for Cylinder Lifter from stand	3	3

Figure 2. Manual lifting of the 85 kg cylinder onto welding set platform

Figure 3. 85 kg cylinder ready to be lifted onto welding set platform

Figure 4. Loading of the 85 kg cylinder using the Cylinder Lifter onto a welding set platform

Figure 5. Manual lifting of the 63 kg cylinder onto a welding platform

Figure 6. 63 kg cylinder ready to be lifted onto welding set platform

Figure 7. Loading of the 63 kg cylinder using the Cylinder Lifter onto a welding set platform

2.2.2 The REBA Assessment

The REBA assessment was carried out to allow a different assessment tool to be used to examine changes between manually handling cylinders and using the Cylinder Lifter. The REBA tool allows for a more in-depth analysis of posture across different body sections, coupling to loads and the weights of the loads.

Table 2. REBA Scores

	63 kg Cylinder	85 kg Cylinder
REBA Score for manual movement onto stand	9	10
REBA Score for manual movement from stand	8	10
REBA Score for Cylinder Lifter on to stand	1	3
REBA Score for Cylinder Lifter from stand	3	3

The scores for REBA are then categorised into the following priority groupings.

REBA Score	Risk Level	Action
1	Negligible	None necessary
2 - 3	Low	May be necessary
4 - 7	Medium	Necessary
8 - 10	High	Necessary soon
11 - 15	Very High	Necessary now

As can be seen from the scores above, the cylinder lifter significantly reduces the score to a lower level for both cylinder types from a high risk/very high risk level to a low/negligible level.

The difference in the REBA scores between the 63 kg and 85 kg cylinders using the cylinder lifter is due to the number of changes in posture required. These included having to bend forward when loading the cylinder due to the handle height and reaching upwards to support the taller (85 kg cylinder) when tilting the cylinder.

3 SUMMARY AND CONCLUSIONS

The evaluation of using the cylinder lifter as compared to the manual handling of cylinders has identified that risks are significantly reduced when using the Cylinder Lifter. Much of this is down to the loss of the need to lift the cylinder at any point.

There are potentially some other factors which need to be considered as part of this evaluation and that is the tests were carried out in a controlled

environment where cylinders were placed onto a stand above ground level. This is not necessarily the case in reality where cylinders are often stored and positioned at ground level. The advantage that the Cylinder Lifter can give is that cylinders can be manoeuvred into small spaces without the need to churn or lift into position.

When raising the cylinder before moving it, whole body weight can be used to tilt the cylinder in the lifter. While this is a large advantage compared to lifting, some thought may need to be given to advising users on the need to wear boots with good grips (toe protection should already be in place) and ensuring the surrounding environment is dry and well maintained.

Conclusions

The use of the Cylinder Lifter compared to manually move and lift cylinders significantly reduces the risks identified using the MAC tool and the Rapid Entire Body Assessment.

Whilst carrying out the assessment with the 63 kg cylinder it was assumed by the client that the attached handle was a suitable lifting point. It has since been confirmed by the cylinder manufactures, that this is not the case where handle is there to protect the valve (Figure 8) and does have a warning on it to not use it for lifting (Figure 9)

Figure 8. Handle to protect valve and NOT for lifting, dragging or churning cylinder

Figure 9. Handle assembly on cylinder with icon indicating that the handle is not for lifting

The requirement to lift any of the cylinder weights stated in the report by any individual in the workplace would be difficult to defend. When carrying out a manual handling assessment, the lifting of such weights would be identified as highly risky especially with the poor grip associated with the larger cylinders. Lifting such weights has been identified as a high risk of injury with the types of injury induced including back, shoulder and elbow injuries.

4 REFERENCE SOURCES

British Compressed Gases Association (2016). Guidance Note 3: Safe cylinder handling and the application of the manual handling operations regulations to gas cylinders Revision 3.

Devereux J, Buckle P, Haisman M. (1998). The evaluation of a hand-handle interface tool (HHIT) for reducing musculoskeletal discomfort associated with the manual handling of gas cylinders. *International Journal of Industrial Ergonomics*; 21: 23-34.

Lloyds British (2015) Test report on Gas Cylinder Lifter Cranked Handle. Report No 249594.

Okunribido OO, Haslegrave CM. (1999) Effect of handle design for cylinder trolleys. *Applied Ergonomics;* 30: 407-419.

APPENDIX 1 MAC SCORES

85 kg cylinder manually handled onto stand

HSE Health & Safety Executive

Manual Handling Assessment Charts (MAC) - Score Sheet

Company Name: EFP-ME UK LTD

Insert the colour band for each of the risk factors in the boxes below, referring to your assessment using the tool.

Task Description - Please use diagrams if necessary

Manually lifting 230 bar Argon gas cylinder onto raised platform (Replicating a welding set).
Height lifted approximately 200 mm (8 inches)
Cylinder weight 85 kg (187.39 lbs)
Method used is the traditional 'Bear Hug' Technique.

Risk Factors	Colour Band (G, A, R, or P)			Numerical Score		
	Lift	Carry	Team	Lift	Carry	Team
Load weight and lift/carry frequency	Purple			10		
Hand distance from the lower back	Amber			3		
Vertical lift region	Green			0		
Trunk twisting/sideways bending Asymmetrical trunk load *(carrying)*	Green			0		
Postural constraints	Green			0		
Grip on the load	Red			2		
Floor surface	Green			0		
Other environmental factors	Green			0		
Carry distance *(carrying only)*						
Obstacles en route *(carrying only)*						
Communication and co-ordination *(team handling only)*						
		Total Score		15	0	0

Are there indications that the task is high risk? (please tick appropriate

- ☐ Task has a history of manual handling incidents *(eg company accident book, RIDDOR reports)*
- ☑ Task is known to be hard work or high risk
- ☑ Employees doing the work show signs that they are finding it hard work *(eg sweating, fatigue, red faces, swearing)*
- ☐ Other indications, if so what?

Signature _____ Date _____

Other risk factors, eg individual factors, psychosocial factors etc
For information on reducing the risks of individual or psychosocial factors Click here

Continue

85 kg cylinder manually handled from stand to ground

?

HSE Health & Safety Executive

Manual Handling Assessment Charts (MAC) - Score Sheet

Company Name: EFP-ME UK LTD

Insert the colour band for each of the risk factors in the boxes below, referring to your assessment using the tool.

Task Description - Please use diagrams if necessary

Manually lifting gas cylinder from platform(Replicating a welding set) to the ground.
Platform height approximately 200 mm. Cylinder weight 85 kg.
Method used; Traditional 'Bear Hug' technique.

Risk Factors	Colour Band (G, A, R, or P)			Numerical Score		
	Lift	Carry	Team	Lift	Carry	Team
Load weight and lift/carry frequency	PURPLE			10		
Hand distance from the lower back	AMBER			3		
Vertical lift region	GREEN			0		
Trunk twisting/sideways bending Asymmetrical trunk/load *(carrying)*	GREEN			0		
Postural constraints	GREEN			0		
Grip on the load	RED			2		
Floor surface	GREEN			0		
Other environmental factors	GREEN			0		
Carry distance *(carrying only)*						
Obstacles en route *(carrying only)*						
Communication and co-ordination *(team handling only)*						
		Total Score		15	0	0

Are there indications that the task is high risk? (please tick appropriate boxes)

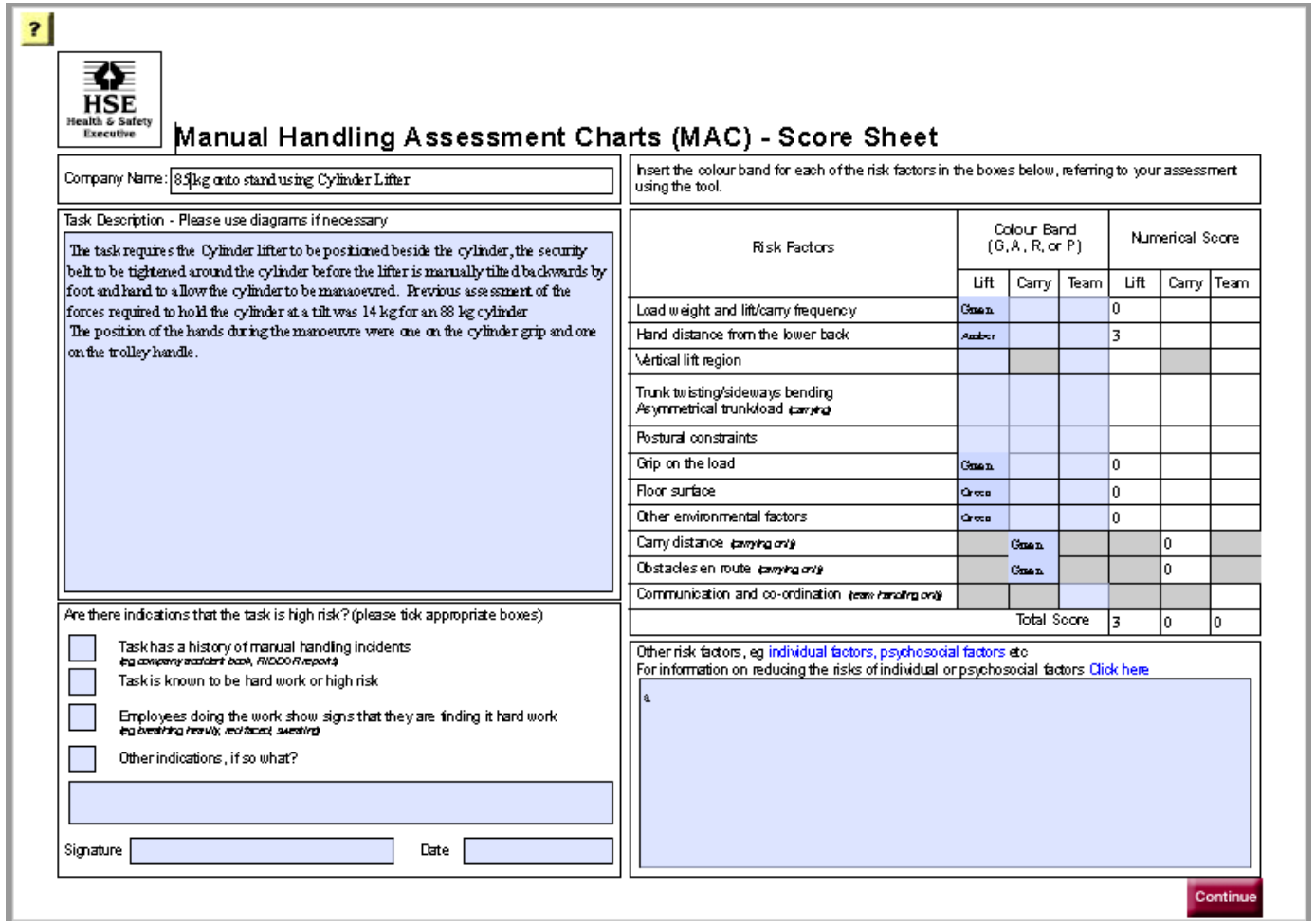
- ☐ Task has a history of manual handling incidents *(eg company accident book, RIDDOR reports)*
- ☑ Task is known to be hard work or high risk
- ☑ Employees doing the work show signs that they are finding it hard work *(eg breathing heavily, red-faced, sweating)*
- ☐ Other indications, if so what?

Signature: Dr Joanne Crawford Date: 8/9/2016

Other risk factors, eg individual factors, psychosocial factors etc
For information on reducing the risks of individual or psychosocial factors Click here

Continue

85 kg cylinder moved onto stand using the cylinder lifter



HSE Health & Safety Executive

Manual Handling Assessment Charts (MAC) - Score Sheet

Company Name: 85kg onto stand using Cylinder Lifter

Insert the colour band for each of the risk factors in the boxes below, referring to your assessment using the tool.

Task Description - Please use diagrams if necessary

The task requires the Cylinder lifter to be positioned beside the cylinder, the security belt to be tightened around the cylinder before the lifter is manually tilted backwards by foot and hand to allow the cylinder to be manaoevred. Previous assessment of the forces required to hold the cylinder at a tilt was 14 kg for an 88 kg cylinder
The position of the hands during the manoeuvre were one on the cylinder grip and one on the trolley handle.

Risk Factors	Colour Band (G, A, R, or P)			Numerical Score		
	Lift	Carry	Team	Lift	Carry	Team
Load weight and lift/carry frequency	Green			0		
Hand distance from the lower back	Amber			3		
Vertical lift region						
Trunk twisting/sideways bending Asymmetrical trunk/load *(carrying)*						
Postural constraints						
Grip on the load	Green			0		
Floor surface	Green			0		
Other environmental factors	Green			0		
Carry distance *(carrying only)*		Green			0	
Obstacles en route *(carrying only)*		Green			0	
Communication and co-ordination *(team handling only)*						
			Total Score	3	0	0

Are there indications that the task is high risk? (please tick appropriate boxes)

- ☐ Task has a history of manual handling incidents *(eg company accident book, RIDDOR reports)*
- ☐ Task is known to be hard work or high risk
- ☐ Employees doing the work show signs that they are finding it hard work *(eg breathing heavily, red faced, sweating)*
- ☐ Other indications, if so what?

Signature Date

Other risk factors, eg individual factors, psychosocial factors etc
For information on reducing the risks of individual or psychosocial factors Click here

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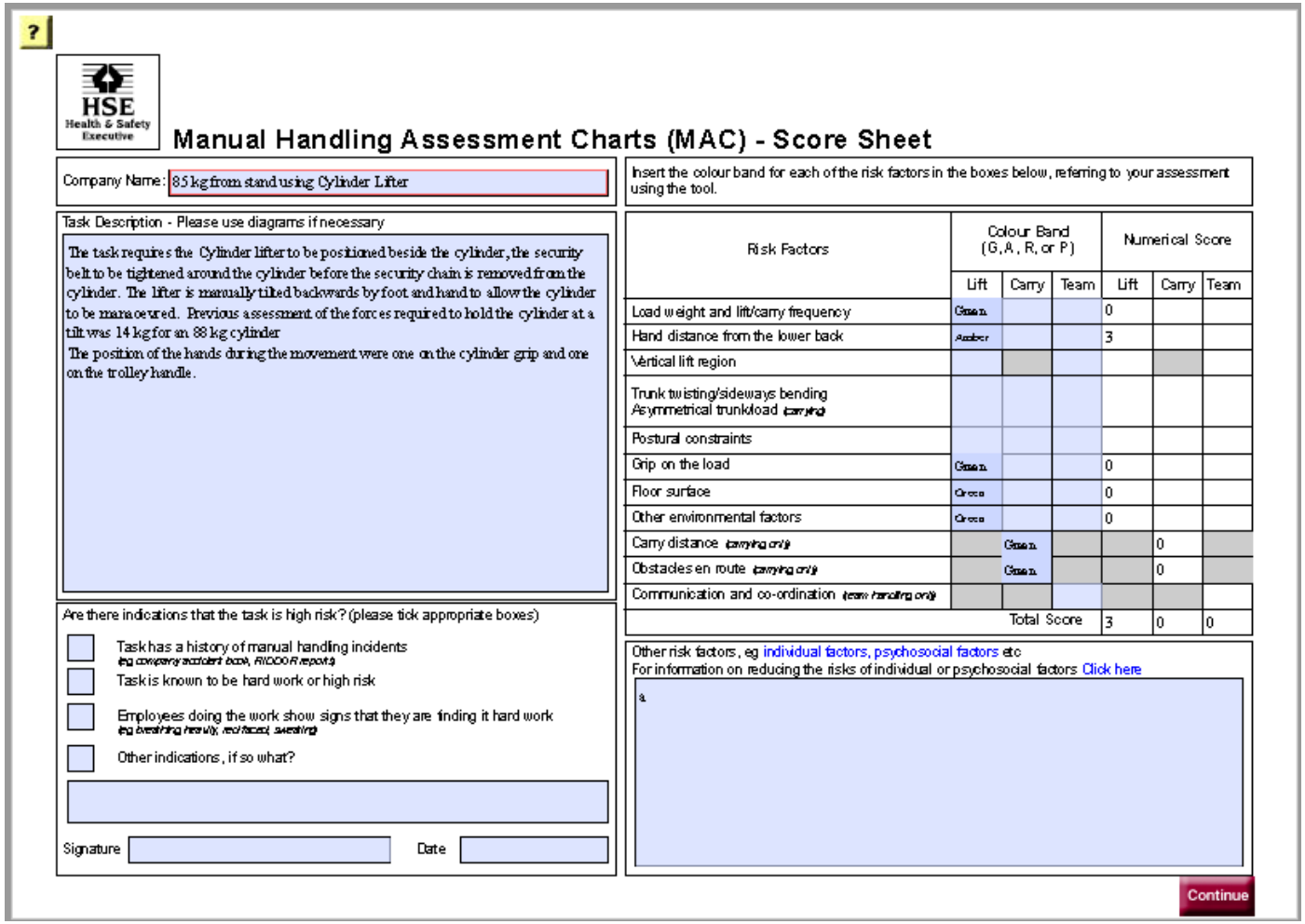
85 kg cylinder moved from stand using the Cylinder Lifter



HSE Health & Safety Executive

Manual Handling Assessment Charts (MAC) - Score Sheet

Company Name: 85 kg from stand using Cylinder Lifter

Insert the colour band for each of the risk factors in the boxes below, referring to your assessment using the tool.

Task Description - Please use diagrams if necessary

The task requires the Cylinder lifter to be positioned beside the cylinder, the security belt to be tightened around the cylinder before the security chain is removed from the cylinder. The lifter is manually tilted backwards by foot and hand to allow the cylinder to be manoeuvred. Previous assessment of the forces required to hold the cylinder at a tilt was 14 kg for an 88 kg cylinder
The position of the hands during the movement were one on the cylinder grip and one on the trolley handle.

Risk Factors	Colour Band (G, A, R, or P)			Numerical Score		
	Lift	Carry	Team	Lift	Carry	Team
Load weight and lift/carry frequency	Green			0		
Hand distance from the lower back	Amber			3		
Vertical lift region						
Trunk twisting/sideways bending Asymmetrical trunk/load *(carrying)*						
Postural constraints						
Grip on the load	Green			0		
Floor surface	Green			0		
Other environmental factors	Green			0		
Carry distance *(carrying only)*		Green			0	
Obstacles en route *(carrying only)*		Green			0	
Communication and co-ordination *(team handling only)*						
Total Score				3	0	0

Are there indications that the task is high risk? (please tick appropriate boxes)

- ☐ Task has a history of manual handling incidents *(eg company accident book, RIDDOR reports)*
- ☐ Task is known to be hard work or high risk
- ☐ Employees doing the work show signs that they are finding it hard work *(eg breathing heavily, red faced, sweating)*
- ☐ Other indications, if so what?

Signature _____ Date _____

Other risk factors, eg individual factors, psychosocial factors etc
For information on reducing the risks of individual or psychosocial factors Click here

a

Continue

63 kg cylinder manually handled onto stand

?

HSE Health & Safety Executive

Manual Handling Assessment Charts (MAC) - Score Sheet

Company Name: EFP-ME UK LTD

Task Description - Please use diagrams if necessary

Manually lifting 300 bar Air Products gas cylinder onto platform(Replicating a welding set). Platform height approximately 200 mm. Cylinder weight 63 kg.
Method used; Traditional 'Bear Hug' technique as used on the taller cylinders could not be used. Instead, this cylinder was lifted with the 'integral handle' as it was assumed by the client that the handle was a lifting point. It has since been pointed out by the cylinder manufacturers that 'THE HANDLE SHOULD NOT BE USED FOR LIFTING'

Type of operation for the handle as illustrated below;(Basic turning/positioning of the cylinder)

HANDLE CLEARLY MARKED 'NOT FOR LIFTING'

Are there indications that the task is high risk? (please tick appropriate boxes)

- ☐ Task has a history of manual handling incidents *(eg company accident book, RIDDOR reports)*
- ☑ Task is known to be hard work or high risk
- ☑ Employees doing the work show signs that they are finding it hard work *(eg breathing heavily, red-faced, sweating)*
- ☐ Other indications, if so what?

Signature: Dr Joanne Crawford Date: 8/9/2016

Insert the colour band for each of the risk factors in the boxes below, referring to your assessment using the tool.

Risk Factors	Colour Band (G, A, R, or P)			Numerical Score		
	Lift	Carry	Team	Lift	Carry	Team
Load weight and lift/carry frequency	PURPLE			10		
Hand distance from the lower back	AMBER			3		
Vertical lift region	GREEN			0		
Trunk twisting/sideways bending Asymmetrical trunk/load *(carrying)*	GREEN			0		
Postural constraints	GREEN			0		
Grip on the load	RED			2		
Floor surface	GREEN			0		
Other environmental factors	GREEN			0		
Carry distance *(carrying only)*						
Obstacles en route *(carrying only)*						
Communication and co-ordination *(team handling only)*						
			Total Score	15	0	0

Other risk factors, eg individual factors, psychosocial factors etc
For information on reducing the risks of individual or psychosocial factors Click here

Continue

63 kg cylinder manually handled from stand onto ground

?

HSE Health & Safety Executive

Manual Handling Assessment Charts (MAC) - Score Sheet

Company Name: EFP-ME UK LTD

Task Description - Please use diagrams if necessary

Manually lifting 300 bar Air Products gas cylinder from platform(Replicating a welding set) to the ground. Platform height approximately 200 mm. Cylinder weight 63 kg. Method used; Traditional 'Bear Hug' technique as used on the taller cylinders could not be used. Instead, this cylinder was lifted with the 'integral handle' as it was assumed by the client that the handle was a lifting point. It has since been pointed out by the cylinder manufacturers that 'THE HANDLE SHOULD NOT BE USED FOR LIFTING'

Type of operation for the handle as illustrated below;(Basic turning/positioning of the cylinder)

HANDLE CLEARLY MARKED 'NOT FOR LIFTING'

Are there indications that the task is high risk? (please tick appropriate boxes)

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- ☑ Task is known to be hard work or high risk
- ☑ Employees doing the work show signs that they are finding it hard work *(eg breathing heavily, red-faced, sweating)*
- ☐ Other indications, if so what?

Signature: Dr Joanne Crawford Date: 8/9/2016

Insert the colour band for each of the risk factors in the boxes below, referring to your assessment using the tool.

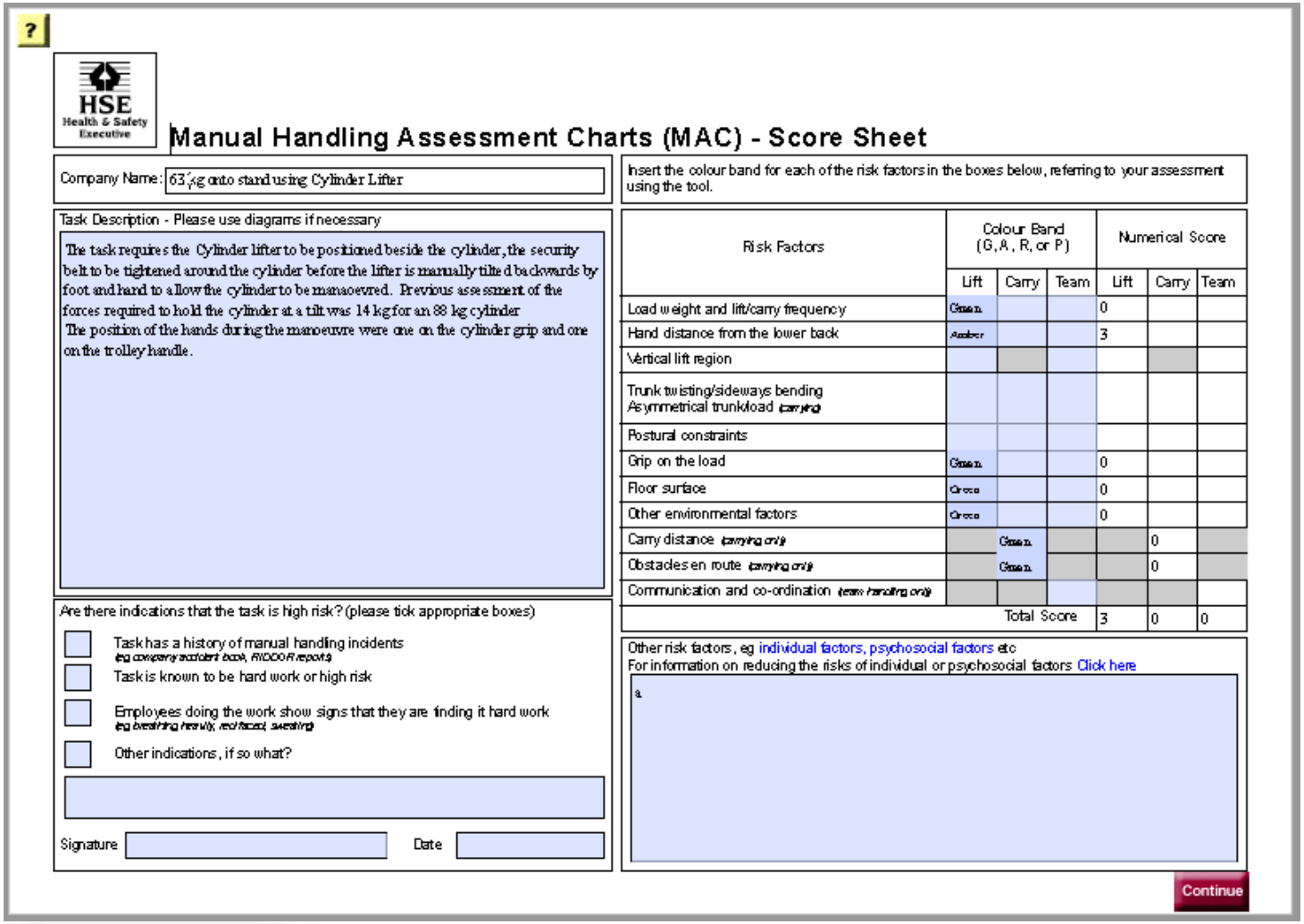
Risk Factors	Colour Band (G, A, R, or P)			Numerical Score		
	Lift	Carry	Team	Lift	Carry	Team
Load weight and lift/carry frequency	PURPLE			10		
Hand distance from the lower back	AMBER			3		
Vertical lift region	GREEN			0		
Trunk twisting/sideways bending Asymmetrical trunk/load *(carrying)*	GREEN			0		
Postural constraints	GREEN			0		
Grip on the load	RED			2		
Floor surface	GREEN			0		
Other environmental factors	GREEN			0		
Carry distance *(carrying only)*						
Obstacles en route *(carrying only)*						
Communication and co-ordination *(team handling only)*						
			Total Score	15	0	0

Other risk factors, eg individual factors, psychosocial factors etc

For information on reducing the risks of individual or psychosocial factors Click here

Continue

63 kg cylinder moved onto stand using the cylinder lifter



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Manual Handling Assessment Charts (MAC) - Score Sheet

Company Name: 63 kg onto stand using Cylinder Lifter

Insert the colour band for each of the risk factors in the boxes below, referring to your assessment using the tool.

Task Description - Please use diagrams if necessary

The task requires the Cylinder lifter to be positioned beside the cylinder, the security belt to be tightened around the cylinder before the lifter is manually tilted backwards by foot and hand to allow the cylinder to be manaoevred. Previous assessment of the forces required to hold the cylinder at a tilt was 14 kg for an 88 kg cylinder
The position of the hands during the manoeuvre were one on the cylinder grip and one on the trolley handle.

Risk Factors	Colour Band (G, A, R, or P)			Numerical Score		
	Lift	Carry	Team	Lift	Carry	Team
Load weight and lift/carry frequency	Green			0		
Hand distance from the lower back	Amber			3		
Vertical lift region						
Trunk twisting/sideways bending Asymmetrical trunk load *(carrying)*						
Postural constraints						
Grip on the load	Green			0		
Floor surface	Green			0		
Other environmental factors	Green			0		
Carry distance *(carrying only)*		Green			0	
Obstacles en route *(carrying only)*		Green			0	
Communication and co-ordination *(team handling only)*						
			Total Score	3	0	0

Are there indications that the task is high risk? (please tick appropriate boxes)

- ☐ Task has a history of manual handling incidents *(eg company accident book, RIDDOR reports)*
- ☐ Task is known to be hard work or high risk
- ☐ Employees doing the work show signs that they are finding it hard work *(eg breathing heavily, red faced, sweating)*
- ☐ Other indications, if so what?

Signature _____ Date _____

Other risk factors, eg individual factors, psychosocial factors etc
For information on reducing the risks of individual or psychosocial factors Click here

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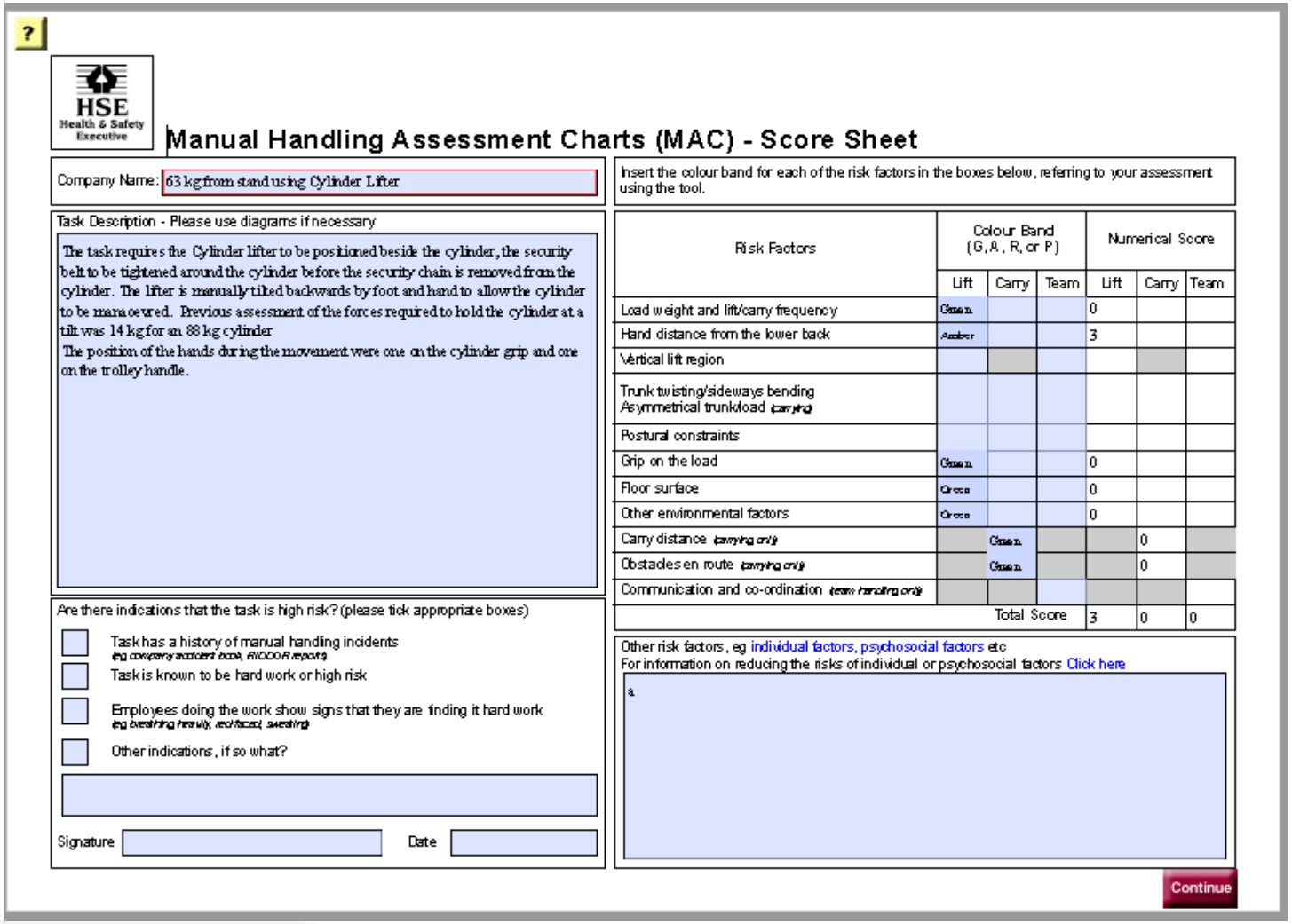
Continue

63 kg moving from stand to ground level using the Cylinder Lifter



HSE Health & Safety Executive

Manual Handling Assessment Charts (MAC) - Score Sheet

Company Name: 63 kg from stand using Cylinder Lifter

Insert the colour band for each of the risk factors in the boxes below, referring to your assessment using the tool.

Task Description - Please use diagrams if necessary

The task requires the Cylinder lifter to be positioned beside the cylinder, the security belt to be tightened around the cylinder before the security chain is removed from the cylinder. The lifter is manually tilted backwards by foot and hand to allow the cylinder to be manoeuvred. Previous assessment of the forces required to hold the cylinder at a tilt was 14 kg for an 88 kg cylinder
The position of the hands during the movement were one on the cylinder grip and one on the trolley handle.

Risk Factors	Colour Band (G, A, R, or P)			Numerical Score		
	Lift	Carry	Team	Lift	Carry	Team
Load weight and lift/carry frequency	Green			0		
Hand distance from the lower back	Amber			3		
Vertical lift region						
Trunk twisting/sideways bending Asymmetrical trunk/load (carrying)						
Postural constraints						
Grip on the load	Green			0		
Floor surface	Green			0		
Other environmental factors	Green			0		
Carry distance (carrying only)		Green			0	
Obstacles en route (carrying only)		Green			0	
Communication and co-ordination (team handling only)						
			Total Score	3	0	0

Are there indications that the task is high risk? (please tick appropriate boxes)

- ☐ Task has a history of manual handling incidents (eg company accident book, RIDDOR reports)
- ☐ Task is known to be hard work or high risk
- ☐ Employees doing the work show signs that they are finding it hard work (eg breathing heavily, red faced, sweating)
- ☐ Other indications, if so what?

Signature _____ Date _____

Other risk factors, eg individual factors, psychosocial factors etc
For information on reducing the risks of individual or psychosocial factors Click here

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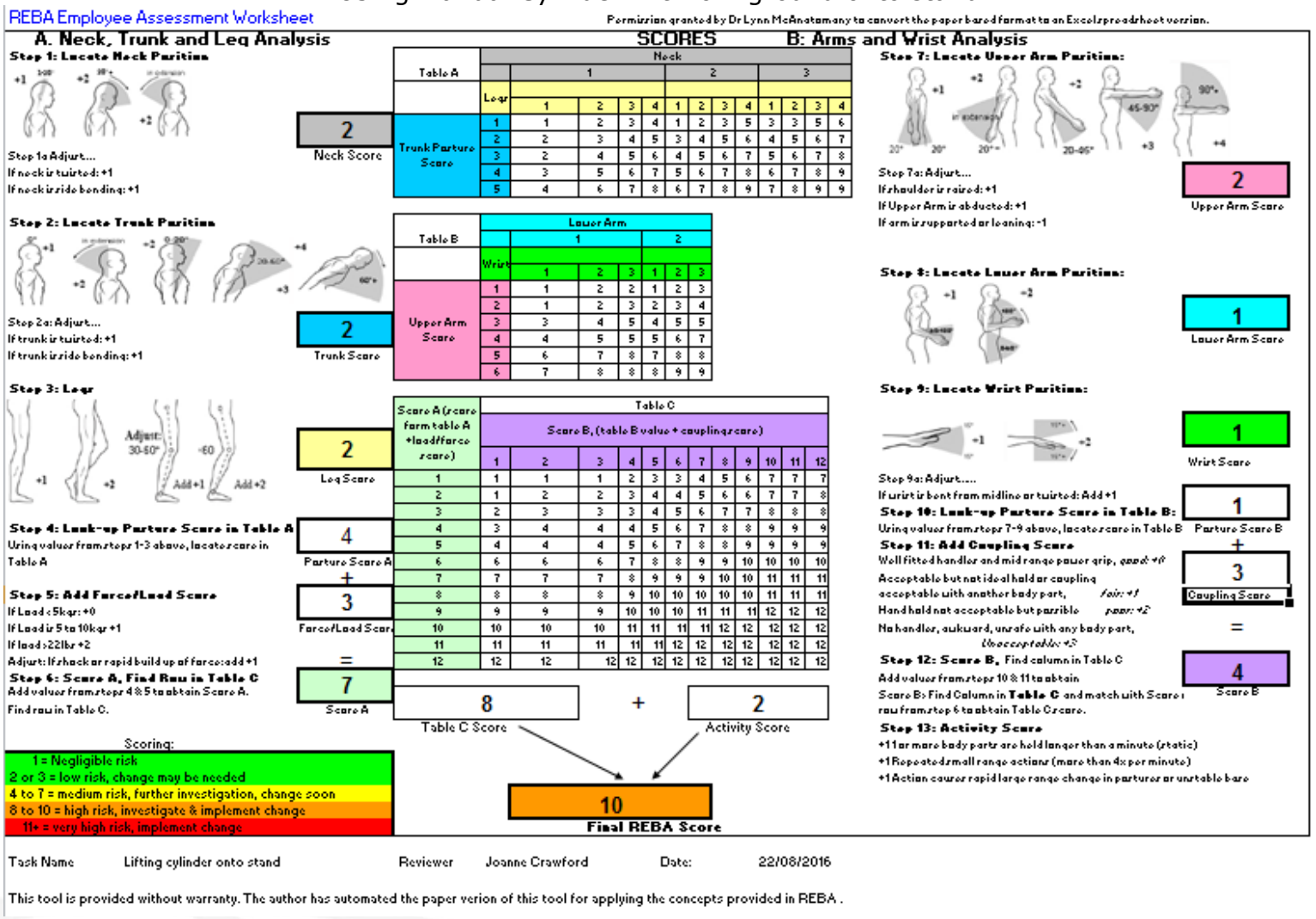
Continue

APPENDIX 2 REBA CHARTS

85 kg Manual Cylinder Lift from ground onto stand



REBA Employee Assessment Worksheet

Permission granted by Dr Lynn McAtamney to convert the paper based format to an Excel spreadsheet version.

A. Neck, Trunk and Leg Analysis — **SCORES** — **B: Arms and Wrist Analysis**

Step 1: Locate Neck Position

Step 1a Adjust...
If neck is twisted: +1
If neck is side bending: +1

Table A	Neck 1				Neck 2				Neck 3			
Legs	1	2	3	4	1	2	3	4	1	2	3	4
1	1	2	3	4	1	2	3	5	3	3	5	6
2	2	3	4	5	3	4	5	6	4	5	6	7
3	2	4	5	6	4	5	6	7	5	6	7	8
4	3	5	6	7	5	6	7	8	6	7	8	9
5	4	6	7	8	6	7	8	9	7	8	9	9

Neck Score: **2**

Step 2: Locate Trunk Position

Step 2a: Adjust...
If trunk is twisted: +1
If trunk is side bending: +1

Table B	Lower Arm 1			Lower Arm 2		
Wrist	1	2	3	1	2	3
1	1	2	2	1	2	3
2	1	2	3	2	3	4
3	3	4	5	4	5	5
4	4	5	5	5	6	7
5	6	7	8	7	8	8
6	7	8	8	8	9	9

Trunk Score: **2**

Step 3: Legs

Leg Score: **2**

Step 4: Look-up Posture Score in Table A

Using values from steps 1-3 above, locate score in Table A

Posture Score A: **4**

Step 5: Add Force/Load Score

If Load < 5kgs: +0
If Load is 5 to 10kgs: +1
If load >22lbs: +2
Adjust: If shock or rapid build up of force: add +1

Force/Load Score: **3**

Step 6: Score A, Find Row in Table C

Add values from steps 4 & 5 to obtain Score A.
Find row in Table C.

Score A: **7**

Score A (score from table A + load/force score)	Table C: Score B, (table B value + coupling score)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	1	1	1	2	3	3	4	5	6	7	7	7
2	1	2	2	3	4	4	5	6	6	7	7	8
3	2	3	3	3	4	5	6	7	7	8	8	8
4	3	4	4	4	5	6	7	8	8	9	9	9
5	4	4	4	5	6	7	8	8	9	9	9	9
6	6	6	6	7	8	8	9	9	10	10	10	10
7	7	7	7	8	9	9	9	10	10	11	11	11
8	8	8	8	9	10	10	10	10	10	11	11	11
9	9	9	9	10	10	10	11	11	11	12	12	12
10	10	10	10	11	11	11	11	12	12	12	12	12
11	11	11	11	11	12	12	12	12	12	12	12	12
12	12	12	12	12	12	12	12	12	12	12	12	12

Table C Score: **8** + Activity Score: **2**

Final REBA Score: 10

Scoring:
1 = Negligible risk
2 or 3 = low risk, change may be needed
4 to 7 = medium risk, further investigation, change soon
8 to 10 = high risk, investigate & implement change
11+ = very high risk, implement change

Step 7: Locate Upper Arm Position:

Step 7a: Adjust...
If shoulder is raised: +1
If Upper Arm is abducted: +1
If arm is supported or leaning: -1

Upper Arm Score: **2**

Step 8: Locate Lower Arm Position:

Lower Arm Score: **1**

Step 9: Locate Wrist Position:

Wrist Score: **1**

Step 9a: Adjust....
If wrist is bent from midline or twisted: Add +1

Step 10: Look-up Posture Score in Table B: **1**

Using values from steps 7-9 above, locate score in Table B

Posture Score B

Step 11: Add Coupling Score **+**

Well fitted handles and mid range power grip, *good: +0*
Acceptable but not ideal hand or coupling acceptable with another body part, *fair: +1*
Hand hold not acceptable but possible *poor: +2*
No handles, awkward, unsafe with any body part, *unacceptable: +3*

Coupling Score: **3**

=

Step 12: Score B, Find column in Table C

Add values from steps 10 & 11 to obtain Score B. Find Column in **Table C** and match with Score A row from step 6 to obtain Table C score.

Score B: **4**

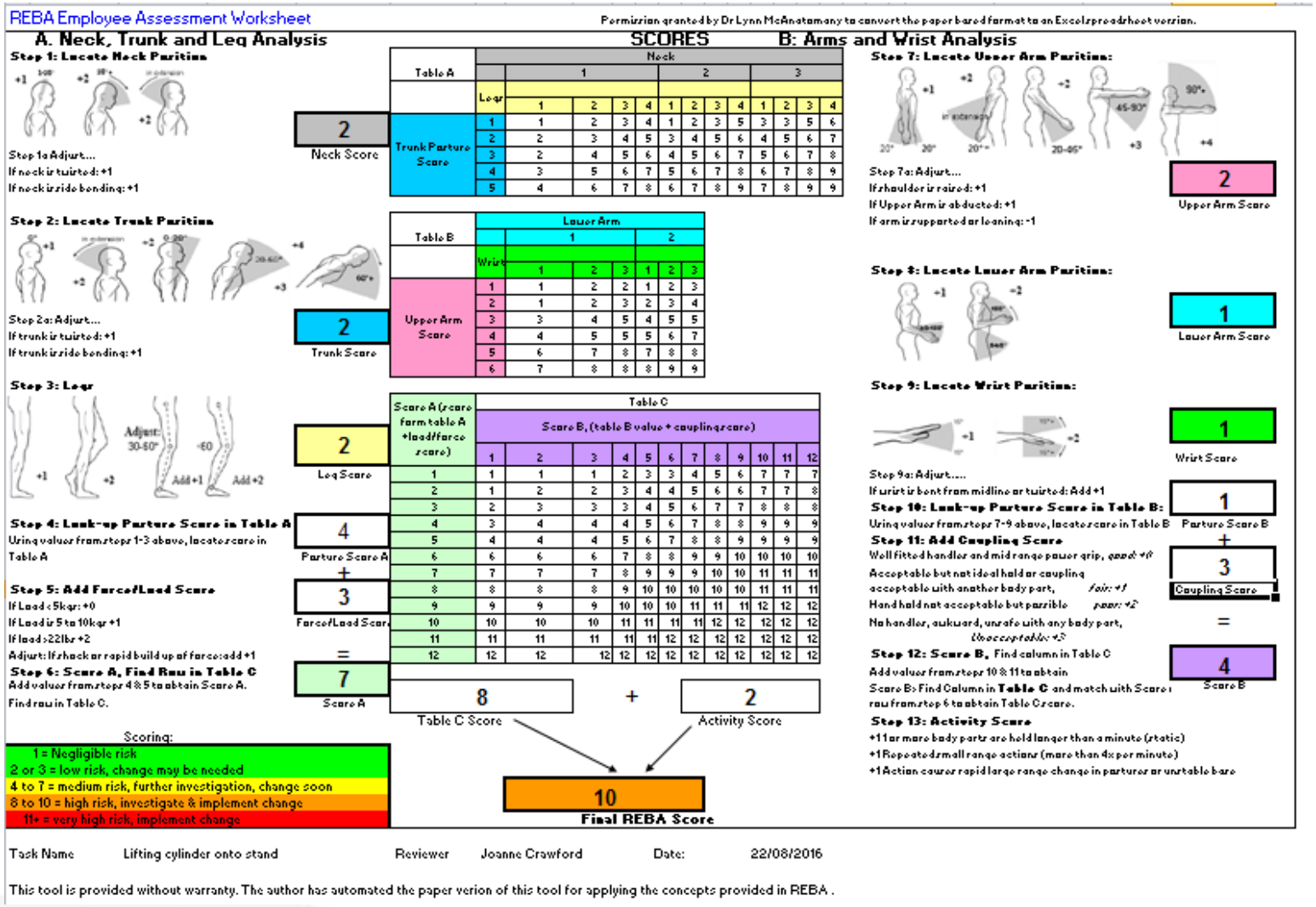
Step 13: Activity Score

+1 if one or more body parts are held longer than a minute (static)
+1 if Repeated small range actions (more than 4x per minute)
+1 if Action causes rapid large range changes in posture or unstable base

Task Name: Lifting cylinder onto stand — Reviewer: Joanne Crawford — Date: 22/08/2016

This tool is provided without warranty. The author has automated the paper version of this tool for applying the concepts provided in REBA .

85 kg Manual Cylinder Lift from stand to ground level



REBA Employee Assessment Worksheet

Permission granted by Dr Lynn McAtamney to convert the paper based format to an Excel spreadsheet version.

A. Neck, Trunk and Leg Analysis — **SCORES** — **B: Arms and Wrist Analysis**

Step 1: Locate Neck Position

Step 1a Adjust...
If neck is twisted: +1
If neck is side bending: +1

Table A	Neck 1				Neck 2				Neck 3			
Trunk Posture Score / Legs	1	2	3	4	1	2	3	4	1	2	3	4
1	1	2	3	4	1	2	3	5	3	3	5	6
2	2	3	4	5	3	4	5	6	4	5	6	7
3	2	4	5	6	4	5	6	7	5	6	7	8
4	3	5	6	7	5	6	7	8	6	7	8	9
5	4	6	7	8	6	7	8	9	7	8	9	9

2 — Neck Score

Step 2: Locate Trunk Position

Step 2a: Adjust...
If trunk is twisted: +1
If trunk is side bending: +1

Table B	Lower Arm 1			Lower Arm 2		
Upper Arm Score / Wrist	1	2	3	1	2	3
1	1	2	2	1	2	3
2	1	2	3	2	3	4
3	3	4	5	4	5	5
4	4	5	5	5	6	7
5	6	7	8	7	8	8
6	7	8	8	8	9	9

2 — Trunk Score

Step 3: Legs

Adjust: 30-60° +1, >60° Add +2

2 — Leg Score

Step 4: Look-up Posture Score in Table A

Using values from steps 1-3 above, locate score in Table A

4 — Posture Score A

\+

Step 5: Add Force/Load Score

If Load < 5kgs: +0
If Load is 5 to 10kgs: +1
If load >22lbs +2
Adjust: If shock or rapid build up of force: add +1

3 — Force/Load Score

=

Step 6: Score A, Find Row in Table C

Add values from steps 4 & 5 to obtain Score A.
Find row in Table C.

7 — Score A

Score A (score from table A +load/force score)	Table C: Score B, (table B value + coupling score)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	1	1	1	2	3	3	4	5	6	7	7	7
2	1	2	2	3	4	4	5	6	6	7	7	8
3	2	3	3	3	4	5	6	7	7	8	8	8
4	3	4	4	4	5	6	7	8	8	9	9	9
5	4	4	4	5	6	7	8	8	9	9	9	9
6	6	6	6	7	8	8	9	9	10	10	10	10
7	7	7	7	8	9	9	9	10	10	11	11	11
8	8	8	8	9	10	10	10	10	10	11	11	11
9	9	9	9	10	10	10	11	11	11	12	12	12
10	10	10	10	11	11	11	11	12	12	12	12	12
11	11	11	11	11	11	12	12	12	12	12	12	12
12	12	12	12	12	12	12	12	12	12	12	12	12

8 — Table C Score

\+

2 — Activity Score

10 — **Final REBA Score**

Scoring:

1 = Negligible risk
2 or 3 = low risk, change may be needed
4 to 7 = medium risk, further investigation, change soon
8 to 10 = high risk, investigate & implement change
11+ = very high risk, implement change

Step 7: Locate Upper Arm Position:

Step 7a: Adjust...
If shoulder is raised: +1
If Upper Arm is abducted: +1
If arm is supported or leaning: -1

2 — Upper Arm Score

Step 8: Locate Lower Arm Position:

1 — Lower Arm Score

Step 9: Locate Wrist Position:

1 — Wrist Score

Step 9a: Adjust....
If wrist is bent from midline or twisted: Add +1

Step 10: Look-up Posture Score in Table B:

Using values from steps 7-9 above, locate score in Table B

1 — Posture Score B

\+

Step 11: Add Coupling Score

Well fitted handles and mid range power grip, *good +0*
Acceptable but not ideal hand or coupling acceptable with another body part, *fair: +1*
Hand hold not acceptable but possible *poor: +2*
No handles, awkward, unsafe with any body part, *Unacceptable +3*

3 — Coupling Score

=

Step 12: Score B, Find column in Table C

Add values from steps 10 & 11 to obtain Score B. Find Column in **Table C** and match with Score row from step 6 to obtain Table C score.

4 — Score B

Step 13: Activity Score

+1 if one or more body parts are held longer than a minute (static)
+1 Repeated small range actions (more than 4x per minute)
+1 Actions cause rapid large range change in posture or unstable base

Task Name: Lifting cylinder onto stand — Reviewer: Joanne Crawford — Date: 22/08/2016

This tool is provided without warranty. The author has automated the paper version of this tool for applying the concepts provided in REBA .

85 kg Cylinder Lift from ground level to stand

REBA Employee Assessment Worksheet

Permission granted by Dr Lynn McAtamney to convert the paper based format to an Excel spreadsheet version.

A. Neck, Trunk and Leg Analysis

Step 1: Locate Neck Position

Step 1a Adjust...
If neck is twisted: +1
If neck is side bending: +1

Table A	Neck 1				Neck 2				Neck 3			
Trunk Posture Score / Legs	1	2	3	4	1	2	3	4	1	2	3	4
1	1	2	3	4	1	2	3	5	3	3	5	6
2	2	3	4	5	3	4	5	6	4	5	6	7
3	2	4	5	6	4	5	6	7	5	6	7	8
4	3	5	6	7	5	6	7	8	6	7	8	9
5	4	6	7	8	6	7	8	9	7	8	9	9

1 — Neck Score

Step 2: Locate Trunk Position

Step 2a: Adjust...
If trunk is twisted: +1
If trunk is side bending: +1

Table B	Lower Arm 1			Lower Arm 2		
Upper Arm Score / Wrist	1	2	3	1	2	3
1	1	2	2	1	2	3
2	1	2	3	2	3	4
3	3	4	5	4	5	5
4	4	5	5	5	6	7
5	6	7	8	7	8	8
6	7	8	8	8	9	9

1 — Trunk Score

Step 3: Legs

1 — Leg Score

Score A (score from table A +load/force score)	Table C: Score B, (table B value + coupling score)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	1	1	1	2	3	3	4	5	6	7	7	7
2	1	2	2	3	4	4	5	6	6	7	7	8
3	2	3	3	3	4	5	6	7	7	8	8	8
4	3	4	4	4	5	6	7	8	8	9	9	9
5	4	4	4	5	6	7	8	8	9	9	9	9
6	6	6	6	7	8	8	9	9	10	10	10	10
7	7	7	7	8	9	9	9	10	10	11	11	11
8	8	8	8	9	10	10	10	10	10	11	11	11
9	9	9	9	10	10	10	11	11	11	12	12	12
10	10	10	10	11	11	11	12	12	12	12	12	12
11	11	11	11	11	12	12	12	12	12	12	12	12
12	12	12	12	12	12	12	12	12	12	12	12	12

Step 4: Look-up Posture Score in Table A
Using values from steps 1-3 above, locate score in Table A

1 — Posture Score A

\+

Step 5: Add Force/Load Score
If Load < 5kgs: +0
If Load is 5 to 10kgs: +1
If load >22lbs: +2
Adjust: If shock or rapid build up of force: add +1

1 — Force/Load Score

=

Step 6: Score A, Find Row in Table C
Add values from steps 4 & 5 to obtain Score A.
Find row in Table C.

2 — Score A

3 — Table C Score

\+

0 — Activity Score

Scoring:

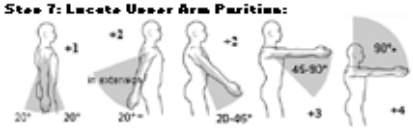
1 = Negligible risk
2 or 3 = low risk, change may be needed
4 to 7 = medium risk, further investigation, change soon
8 to 10 = high risk, investigate & implement change
11+ = very high risk, implement change

3 — Final REBA Score

SCORES

B: Arms and Wrist Analysis

Step 7: Locate Upper Arm Position:



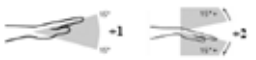
Step 7a: Adjust...
If shoulder is raised: +1
If Upper Arm is abducted: +1
If arm is supported or leaning: -1

3 — Upper Arm Score

Step 8: Locate Lower Arm Position:

2 — Lower Arm Score

Step 9: Locate Wrist Position:



1 — Wrist Score

Step 9a: Adjust.....
If wrist is bent from midline or twisted: Add +1

Step 10: Look-up Posture Score in Table B:
Using values from steps 7-9 above, locate score in Table B

4 — Posture Score B

\+

Step 11: Add Coupling Score

Well fitted handles and mid range power grip,	*good: +0*
Acceptable but not ideal hold or coupling acceptable with another body part,	*fair: +1*
Hand hold not acceptable but possible	*poor: +2*
No handles, awkward, unsafe with any body part,	*Unacceptable: +3*

0 — Coupling Score

=

Step 12: Score B, Find column in Table C
Add values from steps 10 & 11 to obtain Score B. Find Column in **Table C** and match with Score row from step 6 to obtain Table C score.

4 — Score B

Step 13: Activity Score
+1 if one or more body parts are held longer than a minute (static)
+1 Repeated small range actions (more than 4x per minute)
+1 Action causes rapid large range changes in posture or unstable base

Task Name: Lifting cylinder onto stand Reviewer: Joanne Crawford Date: 22/08/2016

This tool is provided without warranty. The author has automated the paper version of this tool for applying the concepts provided in REBA .

85 kg Cylinder Lifter from stand to ground level

REBA Employee Assessment Worksheet

Permission granted by Dr Lynn McAtamney to convert the paper based format to an Excel spreadsheet version.

A. Neck, Trunk and Leg Analysis

Step 1: Locate Neck Position

Step 1a Adjust...
If neck is twisted: +1
If neck is side bending: +1

Table A	Neck 1				Neck 2				Neck 3			
Legs	1	2	3	4	1	2	3	4	1	2	3	4
1	1	2	3	4	1	2	3	5	3	3	5	6
2	2	3	4	5	3	4	5	6	4	5	6	7
3	2	4	5	6	4	5	6	7	5	6	7	8
4	3	5	6	7	5	6	7	8	6	7	8	9
5	4	6	7	8	6	7	8	9	7	8	9	9

Trunk Posture Score

1 Neck Score

Step 2: Locate Trunk Position

Step 2a: Adjust...
If trunk is twisted: +1
If trunk is side bending: +1

Table B	Lower Arm 1			Lower Arm 2		
Wrist	1	2	3	1	2	3
1	1	2	2	1	2	3
2	1	2	3	2	3	4
3	3	4	5	4	5	5
4	4	5	5	5	6	7
5	6	7	8	7	8	8
6	7	8	8	8	9	9

Upper Arm Score

1 Trunk Score

Step 3: Legs

1 Leg Score

Step 4: Look-up Posture Score in Table A
Using values from steps 1-3 above, locate score in Table A

1 Posture Score A

\+

Step 5: Add Force/Load Score
If Load < 5kgs: +0
If Load is 5 to 10kgs: +1
If load >22lbs +2
Adjust: If shock or rapid build up of force: add +1

1 Force/Load Score

=

Step 6: Score A, Find Row in Table C
Add values from steps 4 & 5 to obtain Score A.
Find row in Table C.

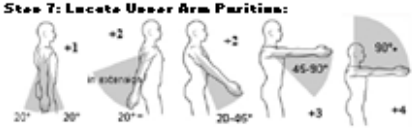
2 Score A

Score A (score form table A +load/force score)	Table C: Score B, (table B value + coupling score)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	1	1	1	2	3	3	4	5	6	7	7	7
2	1	2	2	3	4	4	5	6	6	7	7	8
3	2	3	3	3	4	5	6	7	7	8	8	8
4	3	4	4	4	5	6	7	8	8	9	9	9
5	4	4	4	5	6	7	8	8	9	9	9	9
6	6	6	6	7	8	8	9	9	10	10	10	10
7	7	7	7	8	9	9	9	10	10	11	11	11
8	8	8	8	9	10	10	10	10	10	11	11	11
9	9	9	9	10	10	10	11	11	11	12	12	12
10	10	10	10	11	11	11	11	12	12	12	12	12
11	11	11	11	11	12	12	12	12	12	12	12	12
12	12	12	12	12	12	12	12	12	12	12	12	12

SCORES

B: Arms and Wrist Analysis

Step 7: Locate Upper Arm Position:



Step 7a: Adjust...
If shoulder is raised: +1
If Upper Arm is abducted: +1
If arm is supported or leaning: -1

3 Upper Arm Score

Step 8: Locate Lower Arm Position:

1 Lower Arm Score

Step 9: Locate Wrist Position:

1 Wrist Score

Step 9a: Adjust....
If wrist is bent from midline or twisted: Add +1

Step 10: Look-up Posture Score in Table B:
Using values from steps 7-9 above, locate score in Table B

3 Posture Score B

\+

Step 11: Add Coupling Score
Well fitted handles and mid range power grip, *good: +0*
Acceptable but not ideal hold or coupling acceptable with another body part, *fair: +1*
Hand hold not acceptable but possible *poor: +2*
No handles, awkward, unsafe with any body part, *unacceptable: +3*

0 Coupling Score

=

Step 12: Score B, Find column in Table C
Add values from steps 10 & 11 to obtain Score B. Find Column in **Table C** and match with Score A row from step 6 to obtain Table C score.

3 Score B

Step 13: Activity Score
+1 if one or more body parts are held longer than a minute (static)
+1 Repeated small range actions (more than 4x per minute)
+1 Action causes rapid large range changes in posture or unstable base

2 Table C Score + **1** Activity Score

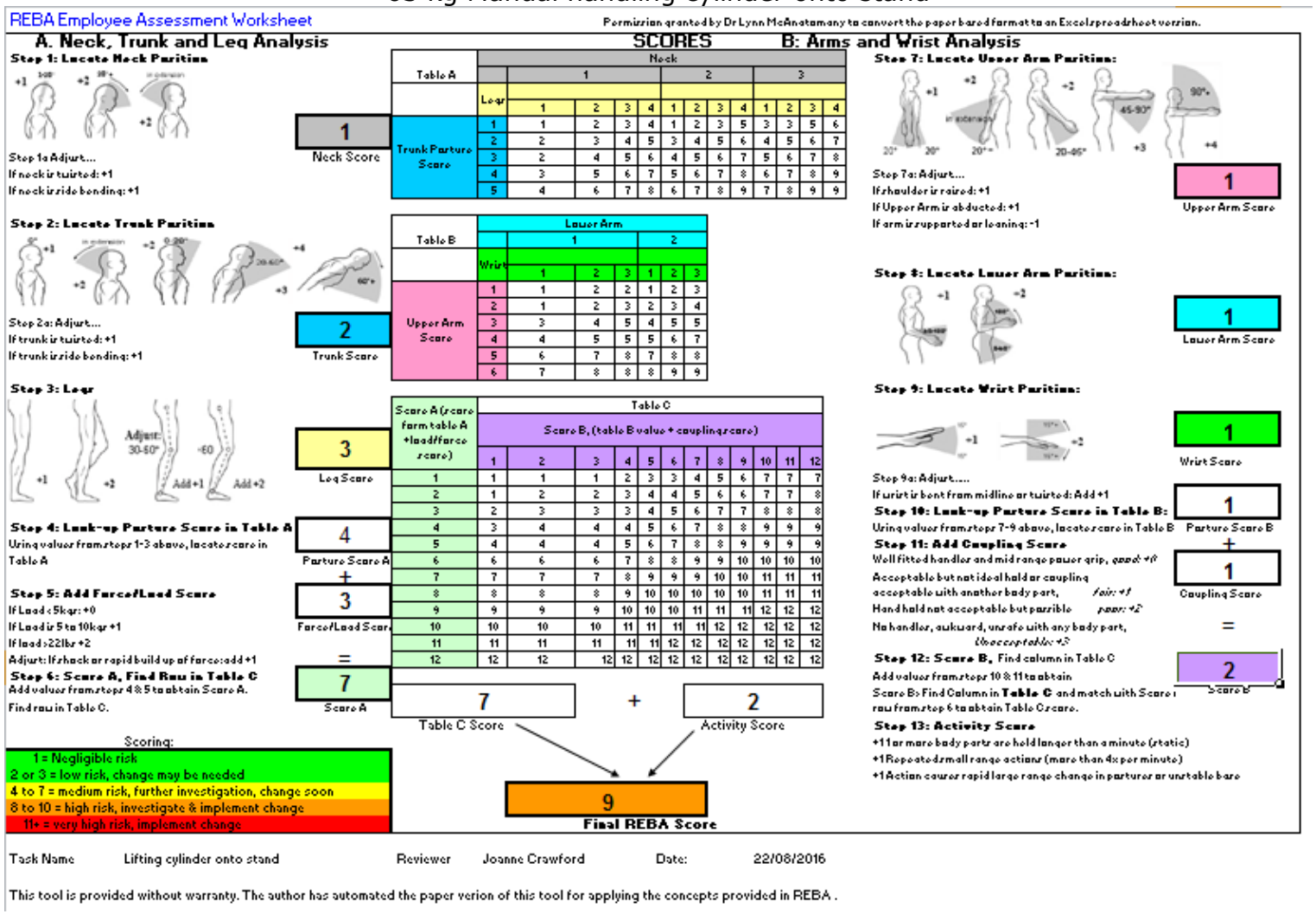
Scoring:
1 = Negligible risk
2 or 3 = low risk, change may be needed
4 to 7 = medium risk, further investigation, change soon
8 to 10 = high risk, investigate & implement change
11+ = very high risk, implement change

3 Final REBA Score

Task Name: Lifting cylinder from stand Reviewer: Joanne Crawford Date: 22/08/2016

This tool is provided without warranty. The author has automated the paper version of this tool for applying the concepts provided in REBA .

63 kg Manual handling cylinder onto stand



REBA Employee Assessment Worksheet

Permission granted by Dr Lynn McAtamney to convert the paper based format to an Excel spreadsheet version.

A. Neck, Trunk and Leg Analysis — **SCORES** — **B: Arms and Wrist Analysis**

Step 1: Locate Neck Position

Step 1a Adjust...
If neck is twisted: +1
If neck is side bending: +1

Neck Score: 1

Step 2: Locate Trunk Position

Step 2a: Adjust...
If trunk is twisted: +1
If trunk is side bending: +1

Trunk Score: 2

Step 3: Legs

Adjust: 30-60° Add +1, >60 Add +2

Leg Score: 3

Step 4: Look-up Posture Score in Table A

Using values from steps 1-3 above, locate score in Table A

Posture Score A: 4

Step 5: Add Force/Load Score

If Load < 5kgs: +0
If Load is 5 to 10kgs +1
If load >22lbs +2
Adjust: If shock or rapid build up of force: add +1

Force/Load Score: +3

Step 6: Score A, Find Row in Table C

Add values from steps 4 & 5 to obtain Score A.
Find row in Table C.

Score A: =7

Table A

Neck	1				2				3			
Legs	1	2	3	4	1	2	3	4	1	2	3	4
Trunk Posture Score 1	1	2	3	4	1	2	3	5	3	3	5	6
Trunk Posture Score 2	2	3	4	5	3	4	5	6	4	5	6	7
Trunk Posture Score 3	2	4	5	6	4	5	6	7	5	6	7	8
Trunk Posture Score 4	3	5	6	7	5	6	7	8	6	7	8	9
Trunk Posture Score 5	4	6	7	8	6	7	8	9	7	8	9	9

Table B

Lower Arm	1			2		
Wrist	1	2	3	1	2	3
Upper Arm Score 1	1	2	2	1	2	3
Upper Arm Score 2	1	2	3	2	3	4
Upper Arm Score 3	3	4	5	4	5	5
Upper Arm Score 4	4	5	5	5	6	7
Upper Arm Score 5	6	7	8	7	8	8
Upper Arm Score 6	7	8	8	8	9	9

Table C

Score A (score from table A +load/force score)	Score B, (table B value + coupling score)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	1	1	1	2	3	3	4	5	6	7	7	7
2	1	2	2	3	4	4	5	6	6	7	7	8
3	2	3	3	3	4	5	6	7	7	8	8	8
4	3	4	4	4	5	6	7	8	8	9	9	9
5	4	4	4	5	6	7	8	8	9	9	9	9
6	6	6	6	7	8	8	9	9	10	10	10	10
7	7	7	7	8	9	9	9	10	10	11	11	11
8	8	8	8	9	10	10	10	10	10	11	11	11
9	9	9	9	10	10	10	11	11	11	12	12	12
10	10	10	10	11	11	11	11	12	12	12	12	12
11	11	11	11	11	11	12	12	12	12	12	12	12
12	12	12	12	12	12	12	12	12	12	12	12	12

Table C Score: 7 + Activity Score: 2

Scoring:

1 = Negligible risk
2 or 3 = low risk, change may be needed
4 to 7 = medium risk, further investigation, change soon
8 to 10 = high risk, investigate & implement change
11+ = very high risk, implement change

Final REBA Score: 9

Step 7: Locate Upper Arm Position:

Step 7a: Adjust...
If shoulder is raised: +1
If Upper Arm is abducted: +1
If arm is supported or leaning: -1

Upper Arm Score: 1

Step 8: Locate Lower Arm Position:

Lower Arm Score: 1

Step 9: Locate Wrist Position:

Wrist Score: 1

Step 9a: Adjust.....
If wrist is bent from midline or twisted: Add +1

Step 10: Look-up Posture Score in Table B: 1 — Posture Score B

Using values from steps 7-9 above, locate score in Table B

Step 11: Add Coupling Score + 1 — Coupling Score

Well fitted handles and mid range power grip, *good: +0*
Acceptable but not ideal hand or coupling acceptable with another body part, *fair: +1*
Hand hold not acceptable but possible *poor: +2*
No handles, awkward, unsafe with any body part, *unacceptable +3*

Step 12: Score B, Find column in Table C = 2 — Score B

Add values from steps 10 & 11 to obtain Score B. Find Column in **Table C** and match with Score row from step 6 to obtain Table C score.

Step 13: Activity Score

+1 if one or more body parts are held longer than a minute (static)
+1 Repeated small range actions (more than 4x per minute)
+1 Action causes rapid large range change in posture or unstable base

Task Name: Lifting cylinder onto stand — Reviewer: Joanne Crawford — Date: 22/08/2016

This tool is provided without warranty. The author has automated the paper version of this tool for applying the concepts provided in REBA .

63 kg Manual handling cylinder from stand to ground level

REBA Employee Assessment Worksheet

Permission granted by Dr Lynn McAtamney to convert the paper based format to an Excel spreadsheet version.

A. Neck, Trunk and Leg Analysis — **SCORES** — **B: Arms and Wrist Analysis**

Step 1: Locate Neck Position

Step 1a Adjust...
If neck is twisted: +1
If neck is side bending: +1

Neck Score: 1

Step 2: Locate Trunk Position

Step 2a: Adjust...
If trunk is twisted: +1
If trunk is side bending: +1

Trunk Score: 1

Step 3: Legs

Adjust: 30-60° +1 | >60° +2

Leg Score: 3

Step 4: Look-up Posture Score in Table A

Using values from steps 1-3 above, locate score in Table A

Posture Score A: 3

Step 5: Add Force/Load Score

If Load < 5kgs: +0
If Load is 5 to 10kgs +1
If load >22lbs +2
Adjust: If shock or rapid build up of force: add +1

Force/Load Score: 3

=

Step 6: Score A, Find Row in Table C

Add values from steps 4 & 5 to obtain Score A.
Find row in Table C.

Score A: 6

Table A	Neck 1				Neck 2				Neck 3			
Legs / Trunk Posture Score	1	2	3	4	1	2	3	4	1	2	3	4
1	1	2	3	4	1	2	3	5	3	3	5	6
2	2	3	4	5	3	4	5	6	4	5	6	7
3	2	4	5	6	4	5	6	7	5	6	7	8
4	3	5	6	7	5	6	7	8	6	7	8	9
5	4	6	7	8	6	7	8	9	7	8	9	9

Table B	Lower Arm 1			Lower Arm 2		
Upper Arm Score / Wrist	1	2	3	1	2	3
1	1	2	2	1	2	3
2	1	2	3	2	3	4
3	3	4	5	4	5	5
4	4	5	5	5	6	7
5	6	7	8	7	8	8
6	7	8	8	8	9	9

Score A (score from table A + load/force score)	Table C: Score B, (table B value + coupling score)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	1	1	1	2	3	3	4	5	6	7	7	7
2	1	2	2	3	4	4	5	6	6	7	7	8
3	2	3	3	3	4	5	6	7	7	8	8	8
4	3	4	4	4	5	6	7	8	8	9	9	9
5	4	4	4	5	6	7	8	8	9	9	9	9
6	6	6	6	7	8	8	9	9	10	10	10	10
7	7	7	7	8	9	9	9	10	10	11	11	11
8	8	8	8	9	10	10	10	10	10	11	11	11
9	9	9	9	10	10	10	11	11	11	12	12	12
10	10	10	10	11	11	11	11	12	12	12	12	12
11	11	11	11	11	11	12	12	12	12	12	12	12
12	12	12	12	12	12	12	12	12	12	12	12	12

Table C Score: 8 + **Activity Score: 0**

Step 7: Locate Upper Arm Position:

Step 7a: Adjust...
If shoulder is raised: +1
If Upper Arm is abducted: +1
If arm is supported or leaning: -1

Upper Arm Score: 3

Step 8: Locate Lower Arm Position:

Lower Arm Score: 2

Step 9: Locate Wrist Position:

Wrist Score: 1

Step 9a: Adjust.....
If wrist is bent from midline or twisted: Add +1

Step 10: Look-up Posture Score in Table B:

Using values from steps 7-9 above, locate score in Table B

Posture Score B: 4

+

Step 11: Add Coupling Score

Well fitted handles and mid range power grip, *good: +0*
Acceptable but not ideal hold or coupling acceptable with another body part, *fair: +1*
Hand hold not acceptable but possible *poor: +2*
No handles, awkward, unsafe with any body part, *unacceptable: +3*

Coupling Score: 1

=

Step 12: Score B, Find column in Table C
Add values from steps 10 & 11 to obtain Score B. Find Column in **Table C** and match with Score row from step 6 to obtain Table C score.

Score B: 5

Step 13: Activity Score

+1 if one or more body parts are held longer than a minute (static)
+1 Repeated small range actions (more than 4x per minute)
+1 Action causes rapid large range changes in postures or unstable base

Scoring:

1 = Negligible risk
2 or 3 = low risk, change may be needed
4 to 7 = medium risk, further investigation, change soon
8 to 10 = high risk, investigate & implement change
11+ = very high risk, implement change

Final REBA Score: 8

Task Name: Lifting cylinder from stand | Reviewer: Joanne Crawford | Date: 22/08/2016

This tool is provided without warranty. The author has automated the paper version of this tool for applying the concepts provided in REBA .

63 kg Cylinder Lift onto stand

REBA Employee Assessment Worksheet

Permission granted by Dr Lynn McAtamney to convert the paper based format to an Excel spreadsheet version.

A. Neck, Trunk and Leg Analysis

Step 1: Locate Neck Position

Step 1a Adjust...
If neck is twisted: +1
If neck is side bending: +1

Step 2: Locate Trunk Position

Step 2a: Adjust...
If trunk is twisted: +1
If trunk is side bending: +1

Step 3: Legs

Step 4: Look-up Posture Score in Table A
Using values from steps 1-3 above, locate score in Table A

Step 5: Add Force/Load Score
If Load < 5kgs: +0
If Load is 5 to 10kgs +1
If load >22lbs +2
Adjust: If shock or rapid build up of force: add +1

Step 6: Score A, Find Row in Table C
Add values from steps 4 & 5 to obtain Score A.
Find row in Table C.

Table A	Neck 1				Neck 2				Neck 3			
Legs	1	2	3	4	1	2	3	4	1	2	3	4
Trunk 1	1	2	3	4	1	2	3	5	3	3	5	6
Trunk 2	2	3	4	5	3	4	5	6	4	5	6	7
Trunk 3	2	4	5	6	4	5	6	7	5	6	7	8
Trunk 4	3	5	6	7	5	6	7	8	6	7	8	9
Trunk 5	4	6	7	8	6	7	8	9	7	8	9	9

Table B	Lower Arm 1			Lower Arm 2		
Wrist	1	2	3	1	2	3
Upper Arm 1	1	2	2	1	2	3
Upper Arm 2	1	2	3	2	3	4
Upper Arm 3	3	4	5	4	5	5
Upper Arm 4	4	4	5	5	6	7
Upper Arm 5	6	7	8	7	8	8
Upper Arm 6	7	8	8	8	9	9

Score A (score from table A +load/force score)	Table C: Score B, (table B value + coupling score)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	1	1	1	2	3	3	4	5	6	7	7	7
2	1	2	2	3	4	4	5	6	6	7	7	8
3	2	3	3	3	4	5	6	7	7	8	8	8
4	3	4	4	4	5	6	7	8	8	9	9	9
5	4	4	4	5	6	7	8	8	9	9	9	9
6	6	6	6	7	8	8	9	9	10	10	10	10
7	7	7	7	8	9	9	9	10	10	11	11	11
8	8	8	8	9	10	10	10	10	10	11	11	11
9	9	9	9	10	10	10	11	11	11	12	12	12
10	10	10	10	11	11	11	11	12	12	12	12	12
11	11	11	11	11	11	12	12	12	12	12	12	12
12	12	12	12	12	12	12	12	12	12	12	12	12

SCORES

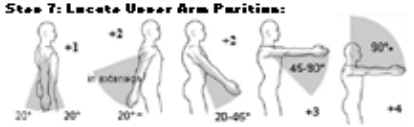
Neck Score	1
Trunk Score	1
Leg Score	1
Posture Score A	1
+ Force/Load Score	1
= Score A	2
Table C Score	1
+ Activity Score	0
Final REBA Score	**1**

Scoring:

1 = Negligible risk
2 or 3 = low risk, change may be needed
4 to 7 = medium risk, further investigation, change soon
8 to 10 = high risk, investigate & implement change
11+ = very high risk, implement change

B: Arms and Wrist Analysis

Step 7: Locate Upper Arm Position:



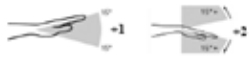
Step 7a: Adjust....
If shoulder is raised: +1
If Upper Arm is abducted: +1
If arm is supported or leaning: -1

Upper Arm Score: 1

Step 8: Locate Lower Arm Position:

Lower Arm Score: 2

Step 9: Locate Wrist Position:



Wrist Score: 1

Step 9a: Adjust.....
If wrist is bent from midline or twisted: Add +1

Step 10: Look-up Posture Score in Table B:
Using values from steps 7-9 above, locate score in Table B

Posture Score B: 1

Step 11: Add Coupling Score
Well fitted handles and mid range power grip, *good: +0*
Acceptable but not ideal hand or coupling acceptable with another body part, *fair: +1*
Hand hold not acceptable but possible *poor: +2*
No handles, awkward, unsafe with any body part, *unacceptable: +3*

+ Coupling Score: 0

Step 12: Score B, Find column in Table C
Add values from steps 10 & 11 to obtain Score B. Find Column in **Table C** and match with Score row from step 6 to obtain Table C score.

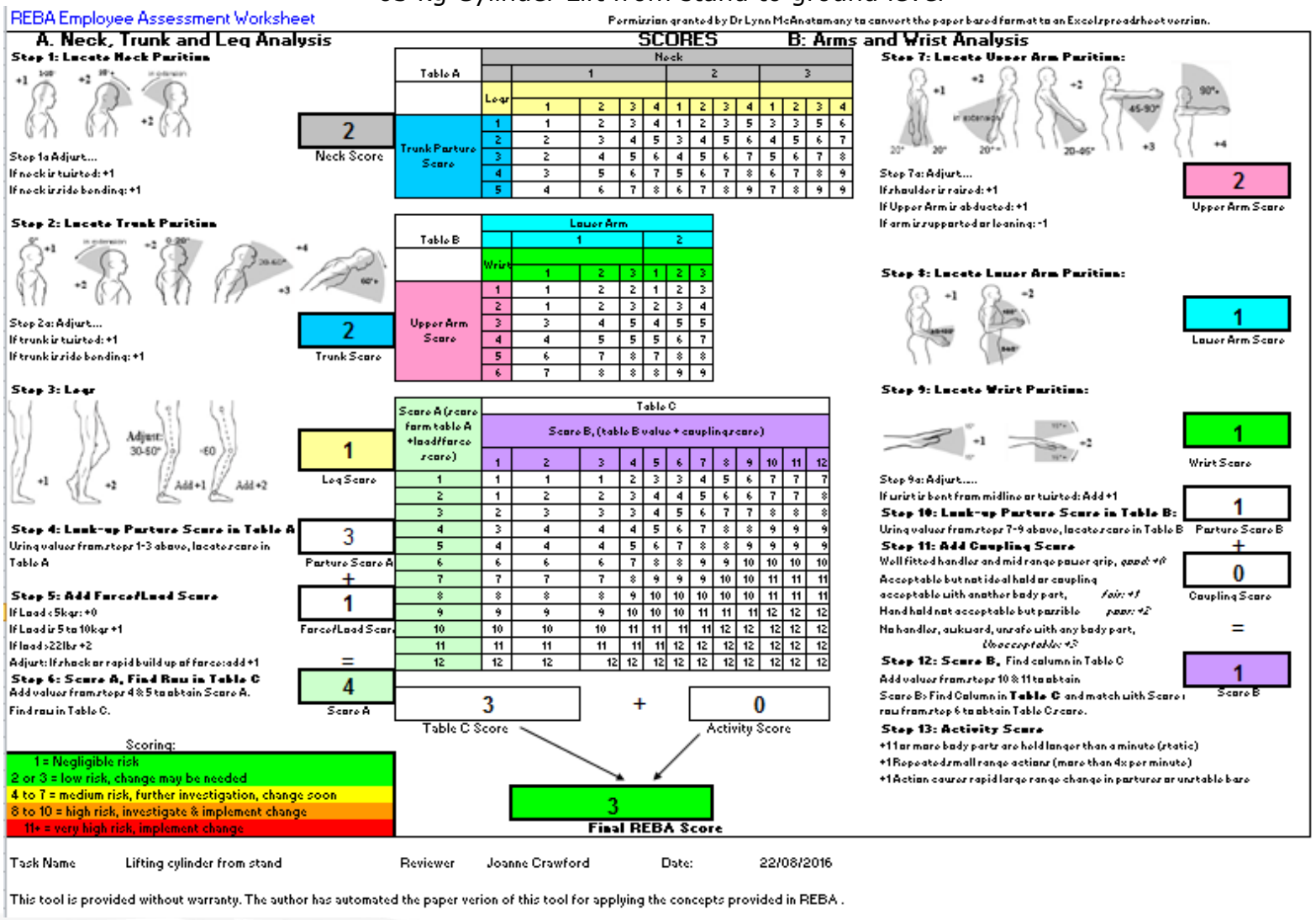
= Score B: 1

Step 13: Activity Score
+1 if one or more body parts are held longer than a minute (static)
+1 Repeated small range actions (more than 4x per minute)
+1 Action causes rapid large range change in posture or unstable base

Task Name: Lifting cylinder onto stand Reviewer: Joanne Crawford Date: 22/08/2016

This tool is provided without warranty. The author has automated the paper version of this tool for applying the concepts provided in REBA .

63 kg Cylinder Lift from stand to ground level



REBA Employee Assessment Worksheet

Permission granted by Dr Lynn McAtamney to convert the paper based format to an Excel spreadsheet version.

A. Neck, Trunk and Leg Analysis — **SCORES** — **B: Arms and Wrist Analysis**

Step 1: Locate Neck Position

Step 1a Adjust...
If neck is twisted: +1
If neck is side bending: +1

Table A	Neck 1				Neck 2				Neck 3			
Legs	1	2	3	4	1	2	3	4	1	2	3	4
1	1	2	3	4	1	2	3	5	3	3	5	6
2	2	3	4	5	3	4	5	6	4	5	6	7
3	2	4	5	6	4	5	6	7	5	6	7	8
4	3	5	6	7	5	6	7	8	6	7	8	9
5	4	6	7	8	6	7	8	9	7	8	9	9

Trunk Posture Score

2 Neck Score

Step 2: Locate Trunk Position

Step 2a: Adjust...
If trunk is twisted: +1
If trunk is side bending: +1

Table B	Lower Arm 1			Lower Arm 2		
Wrist	1	2	3	1	2	3
1	1	2	2	1	2	3
2	1	2	3	2	3	4
3	3	4	5	4	5	5
4	4	5	5	5	6	7
5	6	7	8	7	8	8
6	7	8	8	8	9	9

Upper Arm Score

2 Trunk Score

Step 3: Legs

Adjust: 30-60° +1, >60° +2

1 Leg Score

Step 4: Look-up Posture Score in Table A
Using values from steps 1-3 above, locate score in Table A

3 Posture Score A

Step 5: Add Force/Load Score
If Load < 5kgs: +0
If Load is 5 to 10kgs: +1
If load >22lbs: +2
Adjust: If shock or rapid build up of force: add +1

1 Force/Load Score

=

Step 6: Score A, Find Row in Table C
Add values from steps 4 & 5 to obtain Score A.
Find row in Table C.

4 Score A

Score A (score from table A +load/force score)	Table C: Score B, (table B value + coupling score)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	1	1	1	2	3	3	4	5	6	7	7	7
2	1	2	2	3	4	4	5	6	6	7	7	8
3	2	3	3	3	4	5	6	7	7	8	8	8
4	3	4	4	4	5	6	7	8	8	9	9	9
5	4	4	4	5	6	7	8	8	9	9	9	9
6	6	6	6	7	8	8	9	9	10	10	10	10
7	7	7	7	8	9	9	9	10	10	11	11	11
8	8	8	8	9	10	10	10	10	10	11	11	11
9	9	9	9	10	10	10	11	11	11	12	12	12
10	10	10	10	11	11	11	11	12	12	12	12	12
11	11	11	11	11	11	12	12	12	12	12	12	12
12	12	12	12	12	12	12	12	12	12	12	12	12

3 Table C Score + **0** Activity Score

Scoring:
1 = Negligible risk
2 or 3 = low risk, change may be needed
4 to 7 = medium risk, further investigation, change soon
8 to 10 = high risk, investigate & implement change
11+ = very high risk, implement change

3 **Final REBA Score**

Step 7: Locate Upper Arm Position:

Step 7a: Adjust...
If shoulder is raised: +1
If Upper Arm is abducted: +1
If arm is supported or leaning: -1

2 Upper Arm Score

Step 8: Locate Lower Arm Position:

1 Lower Arm Score

Step 9: Locate Wrist Position:

1 Wrist Score

Step 9a: Adjust....
If wrist is bent from midline or twisted: Add +1

Step 10: Look-up Posture Score in Table B:
Using values from steps 7-9 above, locate score in Table B

1 Posture Score B

+

Step 11: Add Coupling Score
Well fitted handle and mid range power grip, *good: +0*
Acceptable but not ideal hold or coupling acceptable with another body part, *fair: +1*
Hand hold not acceptable but possible *poor: +2*
No handle, awkward, unsafe with any body part, *unacceptable: +3*

0 Coupling Score

=

Step 12: Score B, Find column in Table C
Add values from steps 10 & 11 to obtain Score B. Find Column in **Table C** and match with Score row from step 6 to obtain Table C score.

1 Score B

Step 13: Activity Score
+1 if one or more body parts are held longer than a minute (static)
+1 Repeated small range actions (more than 4x per minute)
+1 Action causes rapid large range change in posture or unstable base

Task Name: Lifting cylinder from stand — Reviewer: Joanne Crawford — Date: 22/08/2016

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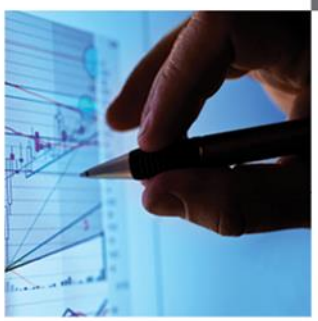

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