

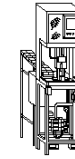
Program: \_\_\_\_\_ Job/Operation Description: \_\_\_\_\_

Phase: \_\_\_\_\_ Design \_\_\_\_\_ Mock-up \_\_\_\_\_ Pre-Production \_\_\_\_\_ Other (list): \_\_\_\_\_

Analyst: \_\_\_\_\_

Further information can be found on pages 12 - 40 of the Design-In Ergonomics Guidelines (DEG) @ <http://apollo.delphiauto.net/ergonomics/design-in.htm>

Design Factor	Design Guidelines	Graphic	Check Circle:		
			OK	Outside Guidelines	N/A
<b>3.1 Repetition</b> Operator Cycle Time (seconds)			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	*If job is > 30 seconds, indicate the percentage of cycle time where same motion(s) is repeated or sustained:			<input type="checkbox"/>	<input type="checkbox"/>
<b>3.2 One Hand Force</b> Neutral Wrist	lbs. 0 2 4 6 8 10 12 14 16 18 	Neutral Posture 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	kg. 0 1 2 3 4 5 6 7 8		Deviated Wrist (1/2 the force of neutral wrist)	<input type="checkbox"/>	<input type="checkbox"/>
<b>3.3 Finger Force/Pinch Grip</b> Neutral Wrist	lbs. 0 1 2 3 4 5 6 7 8 9 10 	Maximum for Repetitive Work 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	kg. 0 1 2 3 4 4.5		Deviated Wrist (1/2 the force of neutral wrist)	<input type="checkbox"/>	<input type="checkbox"/>
	lbs. 0 1 2 3 4 5 	Maximum for Non-Repetitive Work 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	kg. 0 1 2 2.3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



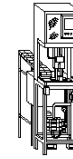
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			OK	Outside Guidelines	N/A
<b>3.4 Vertical Hand Height - Measured from standing surface to where the work is performed (hand height).</b>					
Heavy Work, > 10 lbs. (5 kg)	in. 29 30 31 32 <b>33</b> 34 35 36 37 cm. 74 84 Preferred 94	<p>Precision Light Heavy</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Light Work, <= 10 lbs. (5 kg)	in. 36 37 <b>38 39 40</b> 41 42 43 cm. 91 96 99 101 Preferred 109		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Precision Work, < 2 lbs. (1 kg)	in. 38 39 <b>40</b> 41 42 43 44 45 cm. 96 101 Preferred 109 114		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>3.5 Horizontal Forward Reach</b> (Measured from front edge of table to where hands perform work in front of body.)	<p>Optimal Zone Non-Rep.</p> <p>Left Hand Right Hand</p>	<p>Operator</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>3.6 Horizontal Side Reach</b> (Measured from the center front edge of table to where hands perform work left and right.)	<p>Optimal Zone Non-Rep.</p> <p>Left Hand Right Hand</p>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



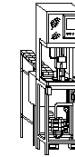
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			OK	Outside Guidelines	N/A
<b>3.7 Monitors -</b> Monitors should be easily accessible. Is monitor location adjustable?  * If not adjustable, vertical location of monitor should be 'standing eye height' (measured from standing surface to top of screen).	_____ Vertically _____ Swing Arm _____ Horizontally _____ Not applicable _____ Tilt _____ Not adjustable*		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	in. _____ Preferred _____ 52 53 54 55 56 57 58 59 60 61 _____ Frequently Used _____ Infrequently Used _____ cm 132 135 137 140 142 145 147 150 152 155		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>3.8 Clearances for Stand Only</b>  Foot Height  Foot Depth  Knee Depth	in. 4" Minimum 5 6+  cm. 10cm Minimum 13 15+		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	in. 5" Minimum 6 7+  cm. 13cm Minimum 15 18+		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	in. 4" Minimum 5 6+  cm. 10cm Minimum 13 15+		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>3.9 Clearances for Sit/Stand</b>  Leg Width  Knee Depth	in. 24" Minimum 25 26+  cm. 61cm Minimum 64 66+		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	in. 20" Minimum 21 22+  cm. 51cm Minimum 53 56+		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>3.10 Noise</b>	See Delphi-A Sound Level Specifications or Industrial Hygiene for further information.	<a href="http://apollo.delphiauto.net/health_safety/procedure.htm">http://apollo.delphiauto.net/health_safety/procedure.htm</a>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>3.11 Lighting</b>	Would internal machine lighting aid operator in operation, changeover, set-up, PM, etc.?	No picture	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

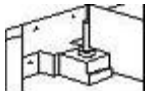
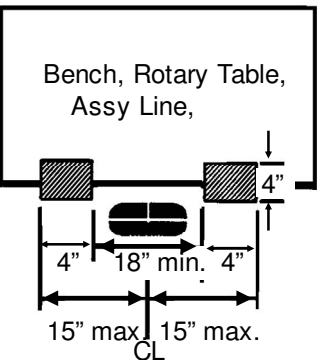


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Design Factor	Design Guidelines	Graphic	Check Circle:																									
			OK	Outside Guidelines	N/A																							
<b>3.12 Single Controls</b> (whisker switch, wobble stick, etc.)	Should be placed at approximately the same vertical location as where hands are performing work. Vertical hand height (in/cm):		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																							
<b>3.13 Dual Controls</b>  Vertical Location (Measured from standing surface)	<table border="1"> <tr> <td>in.</td> <td>32</td> <td>33</td> <td>34</td> <td>35</td> <td>36</td> <td>37</td> <td>38</td> </tr> <tr> <td>cm.</td> <td>81</td> <td>84</td> <td>86</td> <td>89</td> <td>91</td> <td>94</td> <td>97</td> </tr> </table> <p style="text-align: center;">Preferred</p>	in.	32	33	34	35	36	37	38	cm.	81	84	86	89	91	94	97	<p>Top View</p> 	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>							
in.	32	33	34	35	36	37	38																					
cm.	81	84	86	89	91	94	97																					
Horizontal Location (Measured from center of controls)	<table border="1"> <tr> <td>in.</td> <td>15</td> <td>12</td> <td>9</td> <td>6</td> <td>3</td> <td>0</td> <td>3</td> <td>6</td> <td>9</td> <td>12</td> <td>15</td> </tr> <tr> <td>cm</td> <td>38</td> <td>23</td> <td>23</td> <td>23</td> <td>23</td> <td>23</td> <td>23</td> <td>23</td> <td>23</td> <td>23</td> <td>38</td> </tr> </table> <p style="text-align: center;">Optimal      Not in Range      Optimal</p>	in.	15	12	9	6	3	0	3	6	9	12	15	cm	38	23	23	23	23	23	23	23	23	23	38	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
in.	15	12	9	6	3	0	3	6	9	12	15																	
cm	38	23	23	23	23	23	23	23	23	23	38																	
For more information on controls and safety, visit this web site or talk to your H&S rep. <a href="http://apollo.delphiauto.net/health_safety/">http://apollo.delphiauto.net/health_safety/</a>																												
<b>3.14 Component Placement into Fixture - Visual Access</b>	<table border="1"> <tr> <td>OK</td> <td></td> <td></td> <td>Not Good</td> </tr> <tr> <td>Top or Front</td> <td>Side</td> <td>Under or Bottom (guided)</td> <td>Under or Bottom (not guided)</td> </tr> </table>	OK			Not Good	Top or Front	Side	Under or Bottom (guided)	Under or Bottom (not guided)	<p>Loading a fixture from the top or front is preferable because it requires less operator time. When loading from under or bottom, like the upper mandrel of an arbor press, the load is blind and requires additional time for alignment and placing.</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>															
OK			Not Good																									
Top or Front	Side	Under or Bottom (guided)	Under or Bottom (not guided)																									
<b>3.15 Component Alignment Options into Fixture</b>	<table border="1"> <tr> <td>OK</td> <td></td> <td>Not Good</td> </tr> <tr> <td>Positive/Self Align</td> <td>Guided/ Rough Locators</td> <td>Operator Judgment</td> </tr> </table>	OK		Not Good	Positive/Self Align	Guided/ Rough Locators	Operator Judgment	<p>Another efficiency factor is the design of the fixture. Positive or self-aligning fixtures are preferred to prevent the operator from having to make assessments on proper part placement.</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																	
OK		Not Good																										
Positive/Self Align	Guided/ Rough Locators	Operator Judgment																										
<b>3.16 Line of Sight Obstructions</b>	Is it possible to see the fixture or perform the task without having to stoop or bend?	Design equipment and locate fixtures so operators do not have to bend their neck or back in order to load, see, activate, unload, etc. An awkward posture is an injury risk factor.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																							