

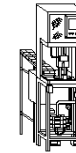
Program: _____ Job/Operation Description: _____

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
3.1 Repetition Operator Cycle Time (seconds)					
	*If job is > 30 seconds, indicate the percentage of cycle time where same motion(s) is repeated or sustained:				
3.2 One Hand Force Neutral Wrist	lbs. 0 2 4 6 8 10 12 14 16 18 				
	kg. 0 1 2 3 4 5 6 7 8				
Deviated Wrist (1/2 the force of neutral wrist)	lbs. 0 1 2 3 4 5 6 7 8 9 				
	kg. 0 1 2 3 4				
3.3 Finger Force/Pinch Grip Neutral Wrist	lbs. 0 1 2 3 4 5 6 7 8 9 10 				
	kg. 0 1 2 3 4 4.5				
Deviated Wrist (1/2 the force of neutral wrist)	lbs. 0 1 2 3 4 5 				
	kg. 0 1 2 2.3				



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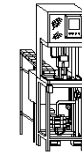
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Design Factor	Design Guidelines	Graphic	Check Circle:		
			OK	Outside Guidelines	N/A
3.4 Vertical Hand Height - Measured from standing surface to where the work is performed (hand height).					
Heavy Work, > 5 kg (10 lbs)	in. 31 32 33 34 35 Preferred 38 39 cm. 79 81 84 86 89 91 94 97 99	<p>Precision Light Heavy</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Light Work, <= 5 kg (10 lbs)	in. 37 39 40 41 42 Preferred 45 cm. 94 101 104 106 109 112 114		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Precision Work, < 1 kg (2 lbs)	in. 43 45 46 47 48 49 Preferred cm. 109 114 117 119 122 124		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3.5 Horizontal Forward Reach (Measured from front edge of table to where hands perform work in front of body.)					
<p>Non-Rep. Optimal Zone Non-Rep.</p> <p>in. 19 15 10 5 0 5 10 15 19 cm. 48 38 25 13 0 13 25 38 48</p> <p>Left Hand Right Hand</p>		<p>Inrequent Reaches Only Optimal Work Area for Repetitive and Inrequent Reaches</p> <p>60 in. (152cm) 31 in. (79 cm) 27 in. (69 cm) 19 in. (48cm) 15 in. (38cm) 10 in. (26cm) 7 in. (18cm)</p> <p>Left Hand Right Hand Optimal Work Area (Both Hands) Operator</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p>Non-Rep. Optimal Zone Non-Rep.</p> <p>in. 31 27 25 20 15 10 5 0 5 10 15 20 25 27 31 cm. 78 68 64 51 38 25 13 0 13 25 38 51 64 68 78</p> <p>Left Hand Right Hand</p>			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3.6 Horizontal Side Reach (Measured from the center front edge of table to where hands perform work left and right.)					



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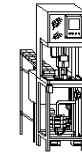
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			OK	Outside Guidelines	N/A
3.7 Monitors - Monitors should be easily accessible. Is monitor location adjustable? _____ Vertically _____ Swing Arm _____ Horizontally _____ Not applicable _____ Tilt _____ Not adjustable* * If not adjustable, vertical 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. 57 59 61 Preferred 62 63 64 cm 144 148 150 154 156 158 160 162 Frequently Used Infrequently Used		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3.8 Clearances for Stand Only 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"/>
3.9 Clearances for Sit/Stand 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"/>
3.10 Noise	See Delphi-A Sound Level Specifications or Industrial Hygiene for further information.	http://apollo.delphiauto.net/health_safety/procedureur.htm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3.11 Lighting	Would internal machine lighting aid operator in operation, changeover, set-up, PM, etc.?	No picture	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

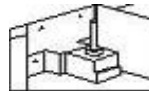
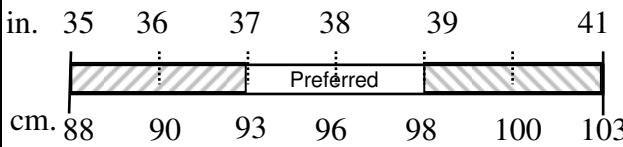
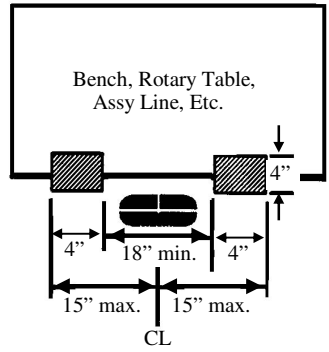
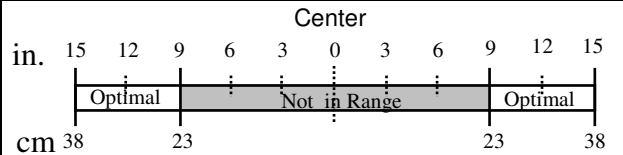


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			OK	Outside Guidelines	N/A								
3.12 Single Controls (whisker switch, wobble stick, etc.)	Should be placed at approximately the same vertical location as where hands are performing work. Vertical hand height (in/cm):		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>								
3.13 Dual Controls Vertical Location (Measured from standing surface)	in. 35 36 37 38 39 41  cm. 88 90 93 96 98 100 103	Top View  Bench, Rotary Table, Assy Line, Etc.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>								
Horizontal Location (Measured from center of controls)	in. 15 12 9 6 3 0 3 6 9 12 15 Center  cm 38 23 23 38		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>								
For more information on controls and safety, visit this web site or talk to your H&S rep. http://apollo.delphiauto.net/health_safety/													
3.14 Component Placement into Fixture - Visual Access	<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)	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.	<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)										
3.15 Component Alignment Options into Fixture	<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	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.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
OK		Not Good											
Positive/Self Align	Guided/ Rough Locators	Operator Judgment											
3.16 Line of Sight Obstructions	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"/>								