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## FORMED PARTS FLAT PATTERNS

**SCOPE:** THIS SPECIFICATION APPLIES TO LOW AND MEDIUM STRENGTH STEEL PLATES AND FLAT BAR.

**PURPOSE:** TO PROVIDE MANUFACTURING WITH FLAT PATTERNS ON ENGINEERING DRAWING FOR INTERNALLY MANUFACTURED FORMED PARTS.

1. ALL ENGINEERING DRAWINGS OF FORMED PARTS ARE TO HAVE FLAT PATTERNS. FLAT PATTERNS ARE TO BE DRAWN ON SEPARATE SHEETS WHICH WILL CARRY THE SAME PART NUMBER WITH CONSECUTIVE SHEET NUMBERS.
2. FLAT PATTERN DEVELOPED MATERIAL LENGTH IS TO BE CALCULATED WITH THE FOLLOWING FORMULA:

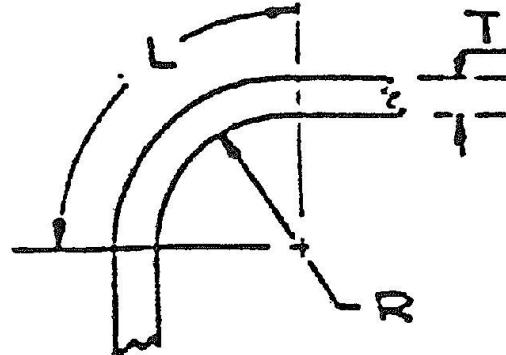
$$L = ((0.4T + R) \times A) / 57.3$$

L = LENGTH OF RAW MATERIAL

T = MATERIAL THICKNESS

R = BEND RADIUS

A = ANGLE OF BEND IN DEGREES



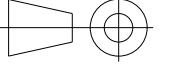
3. THE FOLLOWING TABLES ARE PROVIDED FOR REFERENCE USE:

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Approved by <b>TRB</b>	Date (MMDDYYYY) <b>12142009</b>		Name <b>ENGINEERING SPECIFICATION, FORMED &amp; FLAT</b>	Mass (Unit) <b>Mass (unit)</b>	Sheet (# / #) <b>1 / 13</b>	Revision <b>B</b>
Drawn by <b>YCY</b>	Date (MMDDYYYY) <b>12142009</b>	Third angle projection		Drawing Number <b>ESN-0003</b>		

1	2	3	4	5	6						
DEG Bend Allowance Angle - A		Material Thickness (in) - T		EO Number							
1	3/16	1/4	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	2	090794
Radius (in) - R											
3/16	0.005										
1/4	0.006	0.006									
5/16	0.007	0.007									
3/8	0.008	0.008	0.009								
7/16	0.009	0.009	0.010								
1/2	0.010	0.010	0.011	0.012							
5/8	0.012	0.013	0.014	0.014	0.015						
3/4	0.014	0.015	0.016	0.017	0.017	0.018					
7/8	0.017	0.017	0.018	0.019	0.020	0.021					
1	0.019	0.019	0.020	0.021	0.022	0.023	0.024				
1 1/8	0.021	0.021	0.022	0.023	0.024	0.025	0.027				
1 1/4	0.023	0.024	0.024	0.025	0.026	0.027	0.029	0.031			
1 3/8	0.025	0.026	0.027	0.027	0.028	0.029	0.031	0.033			
1 1/2	0.027	0.028	0.029	0.030	0.031	0.031	0.033	0.035	0.037		
1 5/8	0.030	0.030	0.031	0.032	0.033	0.034	0.035	0.037	0.039		
1 3/4	0.032	0.032	0.033	0.034	0.035	0.036	0.038	0.039	0.041		
1 7/8	0.034	0.034	0.035	0.036	0.037	0.038	0.040	0.041	0.043		
2	0.036	0.037	0.038	0.038	0.039	0.040	0.042	0.044	0.045	0.049	
2 1/8	0.038	0.039	0.040	0.041	0.041	0.042	0.044	0.046	0.048	0.051	
2 1/4	0.041	0.041	0.042	0.043	0.044	0.045	0.046	0.048	0.050	0.053	
2 3/8	0.043	0.043	0.044	0.045	0.046	0.047	0.048	0.050	0.052	0.055	
2 1/2	0.045	0.045	0.046	0.047	0.048	0.049	0.051	0.052	0.054	0.058	
2 5/8	0.047	0.048	0.048	0.049	0.050	0.051	0.053	0.055	0.056	0.060	
2 3/4	0.049	0.050	0.051	0.051	0.052	0.053	0.055	0.057	0.058	0.062	
2 7/8	0.051	0.052	0.053	0.054	0.055	0.055	0.057	0.059	0.061	0.064	
3	0.054	0.054	0.055	0.056	0.057	0.058	0.059	0.061	0.063	0.066	
3 1/8	0.056	0.056	0.057	0.058	0.059	0.060	0.062	0.063	0.065	0.068	
3 1/4	0.058	0.058	0.059	0.060	0.061	0.062	0.064	0.065	0.067	0.071	
3 3/8	0.060	0.061	0.062	0.062	0.063	0.064	0.066	0.068	0.069	0.073	
3 1/2	0.062	0.063	0.064	0.065	0.065	0.066	0.068	0.070	0.072	0.075	
3 5/8	0.065	0.065	0.066	0.067	0.068	0.068	0.070	0.072	0.074	0.077	
3 3/4	0.067	0.067	0.068	0.069	0.070	0.071	0.072	0.074	0.076	0.079	
3 7/8	0.069	0.069	0.070	0.071	0.072	0.073	0.075	0.076	0.078	0.082	
4	0.071	0.072	0.072	0.073	0.074	0.075	0.077	0.079	0.080	0.084	
4 1/8	0.073	0.074	0.075	0.075	0.076	0.077	0.079	0.081	0.082	0.086	
4 1/4	0.075	0.076	0.077	0.078	0.079	0.079	0.081	0.083	0.085	0.088	
4 3/8	0.078	0.078	0.079	0.080	0.081	0.082	0.083	0.085	0.087	0.090	
4 1/2	0.080	0.080	0.081	0.082	0.083	0.084	0.086	0.087	0.089	0.092	
4 5/8	0.082	0.082	0.083	0.084	0.085	0.086	0.088	0.089	0.091	0.095	
4 3/4	0.084	0.085	0.086	0.086	0.087	0.088	0.090	0.092	0.093	0.097	
4 7/8	0.086	0.087	0.088	0.089	0.089	0.090	0.092	0.094	0.096	0.099	
5	0.089	0.089	0.090	0.091	0.092	0.092	0.094	0.096	0.098	0.101	
5 1/8	0.091	0.091	0.092	0.093	0.094	0.095	0.096	0.098	0.100	0.103	
5 1/4	0.093	0.093	0.094	0.095	0.096	0.097	0.099	0.100	0.102	0.106	
5 3/8	0.095	0.096	0.096	0.097	0.098	0.099	0.101	0.103	0.104	0.108	
5 1/2	0.097	0.098	0.099	0.099	0.100	0.101	0.103	0.105	0.106	0.110	
5 5/8	0.099	0.100	0.101	0.102	0.103	0.103	0.105	0.107	0.109	0.112	
5 3/4	0.102	0.102	0.103	0.104	0.105	0.106	0.107	0.109	0.111	0.114	
5 7/8	0.104	0.104	0.105	0.106	0.107	0.108	0.110	0.111	0.113	0.116	
6	0.106	0.106	0.107	0.108	0.109	0.110	0.112	0.113	0.115	0.119	

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Approved by <b>TRB</b>	Date (MMDDYYYY) <b>12142009</b>	 <b>CARGOTEC</b> HIAB • KALMAR • MACGREGOR	Name <b>ENGINEERING SPECIFICATION, FORMED &amp; FLAT</b>	Mass (Unit) <b>Mass (unit)</b>	Sheet (# / #) <b>2 / 13</b>	Revision <b>B</b>
Drawn by <b>YCY</b>	Date (MMDDYYYY) <b>12142009</b>	Third angle projection 	Drawing Number <b>ESN-0003</b>			

1	2	3	4	5	6						
DEG Bend Allowance Angle - A		Material Thickness (in) - T		EO Number							
Radius (in) - R	3/16	1/4	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	2	090794
	Developed Length (in) - L										Drawn/Changed
3/16	0.009										YCY
1/4	0.011	0.012									12/14/2009
5/16	0.014	0.014									Approved
3/8	0.016	0.017	0.018								TRB
7/16	0.018	0.019	0.021								12/14/2009
1/2	0.020	0.021	0.023	0.024							Position
5/8	0.024	0.025	0.027	0.029	0.031						Description
3/4	0.029	0.030	0.031	0.033	0.035	0.037					- Released
7/8	0.033	0.034	0.036	0.038	0.039	0.041					
1	0.038	0.038	0.040	0.042	0.044	0.045	0.049				
1 1/8	0.042	0.043	0.045	0.046	0.048	0.050	0.053				
1 1/4	0.046	0.047	0.049	0.051	0.052	0.054	0.058	0.061			
1 3/8	0.051	0.051	0.053	0.055	0.057	0.058	0.062	0.065			
1 1/2	0.055	0.056	0.058	0.059	0.061	0.063	0.066	0.070	0.073		
1 5/8	0.059	0.060	0.062	0.064	0.065	0.067	0.071	0.074	0.078		
1 3/4	0.064	0.065	0.066	0.068	0.070	0.072	0.075	0.079	0.082		
1 7/8	0.068	0.069	0.071	0.072	0.074	0.076	0.079	0.083	0.086		
2	0.072	0.073	0.075	0.077	0.079	0.080	0.084	0.087	0.091	0.098	
2 1/8	0.077	0.078	0.079	0.081	0.083	0.085	0.088	0.092	0.095	0.102	
2 1/4	0.081	0.082	0.084	0.086	0.087	0.089	0.092	0.096	0.099	0.106	
2 3/8	0.086	0.086	0.088	0.090	0.092	0.093	0.097	0.100	0.104	0.111	
2 1/2	0.090	0.091	0.092	0.094	0.096	0.098	0.101	0.105	0.108	0.115	
2 5/8	0.094	0.095	0.097	0.099	0.100	0.102	0.106	0.109	0.113	0.120	
2 3/4	0.099	0.099	0.101	0.103	0.105	0.106	0.110	0.113	0.117	0.124	
2 7/8	0.103	0.104	0.106	0.107	0.109	0.111	0.114	0.118	0.121	0.128	
3	0.107	0.108	0.110	0.112	0.113	0.115	0.119	0.122	0.126	0.133	
3 1/8	0.112	0.113	0.114	0.116	0.118	0.120	0.123	0.127	0.130	0.137	
3 1/4	0.116	0.117	0.119	0.120	0.122	0.124	0.127	0.131	0.134	0.141	
3 3/8	0.120	0.121	0.123	0.125	0.127	0.128	0.132	0.135	0.139	0.146	
3 1/2	0.125	0.126	0.127	0.129	0.131	0.133	0.136	0.140	0.143	0.150	
3 5/8	0.129	0.130	0.132	0.134	0.135	0.137	0.140	0.144	0.147	0.154	
3 3/4	0.134	0.134	0.136	0.138	0.140	0.141	0.145	0.148	0.152	0.159	
3 7/8	0.138	0.139	0.140	0.142	0.144	0.146	0.149	0.153	0.156	0.163	
4	0.142	0.143	0.145	0.147	0.148	0.150	0.154	0.157	0.161	0.168	
4 1/8	0.147	0.147	0.149	0.151	0.153	0.154	0.158	0.161	0.165	0.172	
4 1/4	0.151	0.152	0.154	0.155	0.157	0.159	0.162	0.166	0.169	0.176	
4 3/8	0.155	0.156	0.158	0.160	0.161	0.163	0.167	0.170	0.174	0.181	
4 1/2	0.160	0.161	0.162	0.164	0.166	0.168	0.171	0.175	0.178	0.185	
4 5/8	0.164	0.165	0.167	0.168	0.170	0.172	0.175	0.179	0.182	0.189	
4 3/4	0.168	0.169	0.171	0.173	0.175	0.176	0.180	0.183	0.187	0.194	
4 7/8	0.173	0.174	0.175	0.177	0.179	0.181	0.184	0.188	0.191	0.198	
5	0.177	0.178	0.180	0.182	0.183	0.185	0.188	0.192	0.195	0.202	
5 1/8	0.182	0.182	0.184	0.186	0.188	0.189	0.193	0.196	0.200	0.207	
5 1/4	0.186	0.187	0.188	0.190	0.192	0.194	0.197	0.201	0.204	0.211	
5 3/8	0.190	0.191	0.193	0.195	0.196	0.198	0.202	0.205	0.209	0.216	
5 1/2	0.195	0.195	0.197	0.199	0.201	0.202	0.206	0.209	0.213	0.220	
5 5/8	0.199	0.200	0.202	0.203	0.205	0.207	0.210	0.214	0.217	0.224	
5 3/4	0.203	0.204	0.206	0.208	0.209	0.211	0.215	0.218	0.222	0.229	
5 7/8	0.208	0.209	0.210	0.212	0.214	0.216	0.219	0.223	0.226	0.233	
6	0.212	0.213	0.215	0.216	0.218	0.220	0.223	0.227	0.230	0.237	

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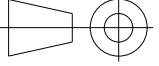
Approved by **TRB** Date (MMDDYYYY) **12142009**  
 Drawn by **YCY** Date (MMDDYYYY) **12142009**  
  
 Third angle projection

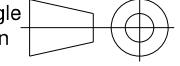
Name  
**ENGINEERING  
SPECIFICATION,  
FORMED & FLAT**

Mass (Unit)  
**Mass (unit)** Sheet (# / #) **3 / 13** Revision **B**  
 Drawing Number  
**ESN-0003**

1	2	3	4	5	6						
DEG Bend Allowance Angle - A		Material Thickness (in) - T		EO Number							
Radius (in) - R	3/16	1/4	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	2	090794
3/16	0.014										Drawn/Changed
1/4	0.017	0.018									Date (MMDDYYYY)
5/16	0.020	0.022									YCY
3/8	0.024	0.025	0.027								12/14/2009
7/16	0.027	0.028	0.031								Approved
1/2	0.030	0.031	0.034	0.037							TRB
5/8	0.037	0.038	0.041	0.043	0.046						12/14/2009
3/4	0.043	0.045	0.047	0.050	0.052	0.055					Position
7/8	0.050	0.051	0.054	0.056	0.059	0.062					Description
1	0.056	0.058	0.060	0.063	0.065	0.068	0.073				- Released
1 1/8	0.063	0.064	0.067	0.069	0.072	0.075	0.080				
1 1/4	0.069	0.071	0.073	0.076	0.079	0.081	0.086	0.092			
1 3/8	0.076	0.077	0.080	0.082	0.085	0.088	0.093	0.098			
1 1/2	0.082	0.084	0.086	0.089	0.092	0.094	0.099	0.105	0.110		
1 5/8	0.089	0.090	0.093	0.096	0.098	0.101	0.106	0.111	0.116		
1 3/4	0.096	0.097	0.099	0.102	0.105	0.107	0.113	0.118	0.123		
1 7/8	0.102	0.103	0.106	0.109	0.111	0.114	0.119	0.124	0.130		
2	0.109	0.110	0.113	0.115	0.118	0.120	0.126	0.131	0.136	0.147	
2 1/8	0.115	0.116	0.119	0.122	0.124	0.127	0.132	0.137	0.143	0.153	
2 1/4	0.122	0.123	0.126	0.128	0.131	0.134	0.139	0.144	0.149	0.160	
2 3/8	0.128	0.130	0.132	0.135	0.137	0.140	0.145	0.151	0.156	0.166	
2 1/2	0.135	0.136	0.139	0.141	0.144	0.147	0.152	0.157	0.162	0.173	
2 5/8	0.141	0.143	0.145	0.148	0.151	0.153	0.158	0.164	0.169	0.179	
2 3/4	0.148	0.149	0.152	0.154	0.157	0.160	0.165	0.170	0.175	0.186	
2 7/8	0.154	0.156	0.158	0.161	0.164	0.166	0.171	0.177	0.182	0.192	
3	0.161	0.162	0.165	0.168	0.170	0.173	0.178	0.183	0.188	0.199	
3 1/8	0.168	0.169	0.171	0.174	0.177	0.179	0.185	0.190	0.195	0.205	
3 1/4	0.174	0.175	0.178	0.181	0.183	0.186	0.191	0.196	0.202	0.212	
3 3/8	0.181	0.182	0.185	0.187	0.190	0.192	0.198	0.203	0.208	0.219	
3 1/2	0.187	0.188	0.191	0.194	0.196	0.199	0.204	0.209	0.215	0.225	
3 5/8	0.194	0.195	0.198	0.200	0.203	0.205	0.211	0.216	0.221	0.232	
3 3/4	0.200	0.202	0.204	0.207	0.209	0.212	0.217	0.223	0.228	0.238	
3 7/8	0.207	0.208	0.211	0.213	0.216	0.219	0.224	0.229	0.234	0.245	
4	0.213	0.215	0.217	0.220	0.223	0.225	0.230	0.236	0.241	0.251	
4 1/8	0.220	0.221	0.224	0.226	0.229	0.232	0.237	0.242	0.247	0.258	
4 1/4	0.226	0.228	0.230	0.233	0.236	0.238	0.243	0.249	0.254	0.264	
4 3/8	0.233	0.234	0.237	0.240	0.242	0.245	0.250	0.255	0.260	0.271	
4 1/2	0.240	0.241	0.243	0.246	0.249	0.251	0.257	0.262	0.267	0.277	
4 5/8	0.246	0.247	0.250	0.253	0.255	0.258	0.263	0.268	0.274	0.284	
4 3/4	0.253	0.254	0.257	0.259	0.262	0.264	0.270	0.275	0.280	0.291	
4 7/8	0.259	0.260	0.263	0.266	0.268	0.271	0.276	0.281	0.287	0.297	
5	0.266	0.267	0.270	0.272	0.275	0.277	0.283	0.288	0.293	0.304	
5 1/8	0.272	0.274	0.276	0.279	0.281	0.284	0.289	0.295	0.300	0.310	
5 1/4	0.279	0.280	0.283	0.285	0.288	0.291	0.296	0.301	0.306	0.317	
5 3/8	0.285	0.287	0.289	0.292	0.295	0.297	0.302	0.308	0.313	0.323	
5 1/2	0.292	0.293	0.296	0.298	0.301	0.304	0.309	0.314	0.319	0.330	
5 5/8	0.298	0.300	0.302	0.305	0.308	0.310	0.315	0.321	0.326	0.336	
5 3/4	0.305	0.306	0.309	0.312	0.314	0.317	0.322	0.327	0.332	0.343	
5 7/8	0.312	0.313	0.315	0.318	0.321	0.323	0.329	0.334	0.339	0.349	
6	0.318	0.319	0.322	0.325	0.327	0.330	0.335	0.340	0.346	0.356	

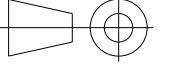
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Approved by <b>TRB</b>	Date (MMDDYYYY) <b>12142009</b>		Name <b>ENGINEERING SPECIFICATION, FORMED &amp; FLAT</b>	Mass (Unit) <b>Mass (unit)</b>	Sheet (# / #) <b>4 / 13</b>	Revision <b>B</b>
Drawn by <b>YCY</b>	Date (MMDDYYYY) <b>12142009</b>	Third angle projection 	Drawing Number <b>ESN-0003</b>			

1	2	3	4	5	6						
DEG Bend Allowance Angle - A		Material Thickness (in) - T		EO Number							
Radius (in) - R	3/16	1/4	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	2	090794
	Developed Length (in) - L										Drawn/Changed
3/16	0.018	0.024									YCY
1/4	0.023	0.029									12/14/2009
5/16	0.027	0.037									Approved
3/8	0.031	0.041									TRB
7/16	0.036	0.049									12/14/2009
1/2	0.040	0.045									Position
5/8	0.049	0.051									Description
3/4	0.058	0.059									- Released
7/8	0.066	0.068									
1	0.075	0.077									
1 1/8	0.084	0.086									
1 1/4	0.092	0.094									
1 3/8	0.101	0.103									
1 1/2	0.110	0.112									
1 5/8	0.119	0.120									
1 3/4	0.127	0.129									
1 7/8	0.136	0.138									
2	0.145	0.147									
2 1/8	0.154	0.155									
2 1/4	0.162	0.164									
2 3/8	0.171	0.173									
2 1/2	0.180	0.182									
2 5/8	0.188	0.190									
2 3/4	0.197	0.199									
2 7/8	0.206	0.208									
3	0.215	0.216									
3 1/8	0.223	0.225									
3 1/4	0.232	0.234									
3 3/8	0.241	0.243									
3 1/2	0.250	0.251									
3 5/8	0.258	0.260									
3 3/4	0.267	0.269									
3 7/8	0.276	0.277									
4	0.284	0.286									
4 1/8	0.293	0.295									
4 1/4	0.302	0.304									
4 3/8	0.311	0.312									
4 1/2	0.319	0.321									
4 5/8	0.328	0.330									
4 3/4	0.337	0.339									
4 7/8	0.346	0.347									
5	0.354	0.356									
5 1/8	0.363	0.365									
5 1/4	0.372	0.373									
5 3/8	0.380	0.382									
5 1/2	0.389	0.391									
5 5/8	0.398	0.400									
5 3/4	0.407	0.408									
5 7/8	0.415	0.417									
6	0.424	0.426									
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	Drawn by YCY	Date (MMDDYYYY) 12142009	Third angle projection 								

1	2	3	4	5	6						
DEG Bend Allowance Angle - A		Material Thickness (in) - T		EO Number							
Radius (in) - R	5/16	1/4	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	2	090794
3/16	0.023										Drawn/Changed
1/4	0.028	0.031									Date (MMDDYYYY)
5/16	0.034	0.036									YCY
3/8	0.039	0.041	0.046								12/14/2009
7/16	0.045	0.047	0.051								Approved
1/2	0.050	0.052	0.057	0.061							TRB
5/8	0.061	0.063	0.068	0.072	0.076						12/14/2009
3/4	0.072	0.074	0.079	0.083	0.087	0.092					Position
7/8	0.083	0.085	0.089	0.094	0.098	0.103					Description
1	0.094	0.096	0.100	0.105	0.109	0.113	0.122				- Released
1 1/8	0.105	0.107	0.111	0.116	0.120	0.124	0.133				
1 1/4	0.116	0.118	0.122	0.127	0.131	0.135	0.144	0.153			
1 3/8	0.127	0.129	0.133	0.137	0.142	0.146	0.155	0.164			
1 1/2	0.137	0.140	0.144	0.148	0.153	0.157	0.166	0.175	0.183		
1 5/8	0.148	0.151	0.155	0.159	0.164	0.168	0.177	0.185	0.194		
1 3/4	0.159	0.161	0.166	0.170	0.175	0.179	0.188	0.196	0.205		
1 7/8	0.170	0.172	0.177	0.181	0.185	0.190	0.199	0.207	0.216		
2	0.181	0.183	0.188	0.192	0.196	0.201	0.209	0.218	0.227	0.244	
2 1/8	0.192	0.194	0.199	0.203	0.207	0.212	0.220	0.229	0.238	0.255	
2 1/4	0.203	0.205	0.209	0.214	0.218	0.223	0.231	0.240	0.249	0.266	
2 3/8	0.214	0.216	0.220	0.225	0.229	0.233	0.242	0.251	0.260	0.277	
2 1/2	0.225	0.227	0.231	0.236	0.240	0.244	0.253	0.262	0.271	0.288	
2 5/8	0.236	0.238	0.242	0.247	0.251	0.255	0.264	0.273	0.281	0.299	
2 3/4	0.247	0.249	0.253	0.257	0.262	0.266	0.275	0.284	0.292	0.310	
2 7/8	0.257	0.260	0.264	0.268	0.273	0.277	0.286	0.295	0.303	0.321	
3	0.268	0.271	0.275	0.279	0.284	0.288	0.297	0.305	0.314	0.332	
3 1/8	0.279	0.281	0.286	0.290	0.295	0.299	0.308	0.316	0.325	0.342	
3 1/4	0.290	0.292	0.297	0.301	0.305	0.310	0.318	0.327	0.336	0.353	
3 3/8	0.301	0.303	0.308	0.312	0.316	0.321	0.329	0.338	0.347	0.364	
3 1/2	0.312	0.314	0.318	0.323	0.327	0.332	0.340	0.349	0.358	0.375	
3 5/8	0.323	0.325	0.329	0.334	0.338	0.342	0.351	0.360	0.369	0.386	
3 3/4	0.334	0.336	0.340	0.345	0.349	0.353	0.362	0.371	0.380	0.397	
3 7/8	0.345	0.347	0.351	0.356	0.360	0.364	0.373	0.382	0.390	0.408	
4	0.356	0.358	0.362	0.366	0.371	0.375	0.384	0.393	0.401	0.419	
4 1/8	0.366	0.369	0.373	0.377	0.382	0.386	0.395	0.404	0.412	0.430	
4 1/4	0.377	0.380	0.384	0.388	0.393	0.397	0.406	0.414	0.423	0.441	
4 3/8	0.388	0.390	0.395	0.399	0.404	0.408	0.417	0.425	0.434	0.452	
4 1/2	0.399	0.401	0.406	0.410	0.414	0.419	0.428	0.436	0.445	0.462	
4 5/8	0.410	0.412	0.417	0.421	0.425	0.430	0.438	0.447	0.456	0.473	
4 3/4	0.421	0.423	0.428	0.432	0.436	0.441	0.449	0.458	0.467	0.484	
4 7/8	0.432	0.434	0.438	0.443	0.447	0.452	0.460	0.469	0.478	0.495	
5	0.443	0.445	0.449	0.454	0.458	0.462	0.471	0.480	0.489	0.506	
5 1/8	0.454	0.456	0.460	0.465	0.469	0.473	0.482	0.491	0.500	0.517	
5 1/4	0.465	0.467	0.471	0.476	0.480	0.484	0.493	0.502	0.510	0.528	
5 3/8	0.476	0.478	0.482	0.486	0.491	0.495	0.504	0.513	0.521	0.539	
5 1/2	0.486	0.489	0.493	0.497	0.502	0.506	0.515	0.524	0.532	0.550	
5 5/8	0.497	0.500	0.504	0.508	0.513	0.517	0.526	0.534	0.543	0.561	
5 3/4	0.508	0.510	0.515	0.519	0.524	0.528	0.537	0.545	0.554	0.572	
5 7/8	0.519	0.521	0.526	0.530	0.534	0.539	0.548	0.556	0.565	0.582	
6	0.530	0.532	0.537	0.541	0.545	0.550	0.558	0.567	0.576	0.593	

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Approved by <b>TRB</b>	Date (MMDDYYYY) <b>12142009</b>	 <b>CARGOTEC</b> <b>HIAB • KALMAR • MACGREGOR</b>	Name <b>ENGINEERING SPECIFICATION, FORMED &amp; FLAT</b>	Mass (Unit) <b>Mass (unit)</b>	Sheet (# / #) <b>6 / 13</b>	Revision <b>B</b>
Drawn by <b>YCY</b>	Date (MMDDYYYY) <b>12142009</b>	Third angle projection 	Drawing Number <b>ESN-0003</b>			

1	2	3	4	5	6								
DEG Bend Allowance Angle - A	Material Thickness (in) - T										EO Number		
Radius (in) - R	6	3/16	1/4	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	2	Drawn/Changed	Date (MMDDYYYY)
3/16	0.027											YCY	12/14/2009
1/4	0.034	0.037										Approved	TRB
5/16	0.041	0.043										Date (MMDDYYYY)	12/14/2009
3/8	0.047	0.050	0.055									Position	Description
7/16	0.054	0.056	0.062									-	Released
1/2	0.060	0.063	0.068	0.073									
5/8	0.073	0.076	0.081	0.086	0.092								
3/4	0.086	0.089	0.094	0.099	0.105	0.110							
7/8	0.099	0.102	0.107	0.113	0.118	0.123							
1	0.113	0.115	0.120	0.126	0.131	0.136	0.147						
1 1/8	0.126	0.128	0.134	0.139	0.144	0.149	0.160						
1 1/4	0.139	0.141	0.147	0.152	0.157	0.162	0.173	0.183					
1 3/8	0.152	0.154	0.160	0.165	0.170	0.175	0.186	0.196					
1 1/2	0.165	0.168	0.173	0.178	0.183	0.188	0.199	0.209	0.220				
1 5/8	0.178	0.181	0.186	0.191	0.196	0.202	0.212	0.223	0.233				
1 3/4	0.191	0.194	0.199	0.204	0.209	0.215	0.225	0.236	0.246				
1 7/8	0.204	0.207	0.212	0.217	0.223	0.228	0.238	0.249	0.259				
2	0.217	0.220	0.225	0.230	0.236	0.241	0.251	0.262	0.272	0.293			
2 1/8	0.230	0.233	0.238	0.243	0.249	0.254	0.264	0.275	0.285	0.306			
2 1/4	0.243	0.246	0.251	0.257	0.262	0.267	0.277	0.288	0.298	0.319			
2 3/8	0.257	0.259	0.264	0.270	0.275	0.280	0.291	0.301	0.312	0.332			
2 1/2	0.270	0.272	0.277	0.283	0.288	0.293	0.304	0.314	0.325	0.346			
2 5/8	0.283	0.285	0.291	0.296	0.301	0.306	0.317	0.327	0.338	0.359			
2 3/4	0.296	0.298	0.304	0.309	0.314	0.319	0.330	0.340	0.351	0.372			
2 7/8	0.309	0.312	0.317	0.322	0.327	0.332	0.343	0.353	0.364	0.385			
3	0.322	0.325	0.330	0.335	0.340	0.346	0.356	0.366	0.377	0.398			
3 1/8	0.335	0.338	0.343	0.348	0.353	0.359	0.369	0.380	0.390	0.411			
3 1/4	0.348	0.351	0.356	0.361	0.366	0.372	0.382	0.393	0.403	0.424			
3 3/8	0.361	0.364	0.369	0.374	0.380	0.385	0.395	0.406	0.416	0.437			
3 1/2	0.374	0.377	0.382	0.387	0.393	0.398	0.408	0.419	0.429	0.450			
3 5/8	0.387	0.390	0.395	0.401	0.406	0.411	0.421	0.432	0.442	0.463			
3 3/4	0.401	0.403	0.408	0.414	0.419	0.424	0.435	0.445	0.455	0.476			
3 7/8	0.414	0.416	0.421	0.427	0.432	0.437	0.448	0.458	0.469	0.490			
4	0.427	0.429	0.435	0.440	0.445	0.450	0.461	0.471	0.482	0.503			
4 1/8	0.440	0.442	0.448	0.453	0.458	0.463	0.474	0.484	0.495	0.516			
4 1/4	0.453	0.455	0.461	0.466	0.471	0.476	0.487	0.497	0.508	0.529			
4 3/8	0.466	0.469	0.474	0.479	0.484	0.490	0.500	0.510	0.521	0.542			
4 1/2	0.479	0.482	0.487	0.492	0.497	0.503	0.513	0.524	0.534	0.555			
4 5/8	0.492	0.495	0.500	0.505	0.510	0.516	0.526	0.537	0.547	0.568			
4 3/4	0.505	0.508	0.513	0.518	0.524	0.529	0.539	0.550	0.560	0.581			
4 7/8	0.518	0.521	0.526	0.531	0.537	0.542	0.552	0.563	0.573	0.594			
5	0.531	0.534	0.539	0.545	0.550	0.555	0.565	0.576	0.586	0.607			
5 1/8	0.545	0.547	0.552	0.558	0.563	0.568	0.579	0.589	0.599	0.620			
5 1/4	0.558	0.560	0.565	0.571	0.576	0.581	0.592	0.602	0.613	0.634			
5 3/8	0.571	0.573	0.579	0.584	0.589	0.594	0.605	0.615	0.626	0.647			
5 1/2	0.584	0.586	0.592	0.597	0.602	0.607	0.618	0.628	0.639	0.660			
5 5/8	0.597	0.599	0.605	0.610	0.615	0.620	0.631	0.641	0.652	0.673			
5 3/4	0.610	0.613	0.618	0.623	0.628	0.634	0.644	0.654	0.665	0.686			
5 7/8	0.623	0.626	0.631	0.636	0.641	0.647	0.657	0.668	0.678	0.699			
6	0.636	0.639	0.644	0.649	0.654	0.660	0.670	0.681	0.691	0.712			

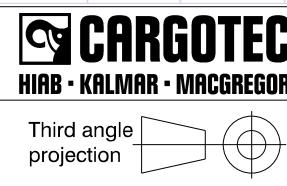
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Approved by  
**TRB**

Drawn by  
**YCY**

Date (MMDDYYYY)  
**12142009**

Date (MMDDYYYY)  
**12142009**



Third angle projection

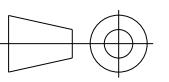
Name  
**ENGINEERING SPECIFICATION, FORMED & FLAT**

Mass (Unit)  
**Mass (unit)**

Sheet (# / #)  
**7 / 13**

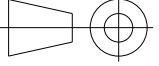
Revision  
**B**

Drawing Number  
**ESN-0003**

1	2	3	4	5	6
DEG Bend Allowance Angle - A		Material Thickness (in) - T		EO Number	
Radius (in) - R	7	3/16    1/4    3/8    1/2    5/8    3/4    1	1    1/4    1    1/2    2	Drawn/Changed	Date (MMDDYYYY)
		Developed Length (in) - L		Approved	Date (MMDDYYYY)
	3/16	0.032		Position	Description
	1/4	0.040	0.043		
	5/16	0.047	0.050		
	3/8	0.055	0.058	0.064	
	7/16	0.063	0.066	0.072	
	1/2	0.070	0.073	0.079	
	5/8	0.086	0.089	0.095	
	3/4	0.101	0.104	0.110	
	7/8	0.116	0.119	0.125	
	1	0.131	0.134	0.140	
	1 1/8	0.147	0.150	0.156	
	1 1/4	0.162	0.165	0.171	
	1 3/8	0.177	0.180	0.186	
	1 1/2	0.192	0.195	0.202	
	1 5/8	0.208	0.211	0.217	
	1 3/4	0.223	0.226	0.232	
	1 7/8	0.238	0.241	0.247	
	2	0.253	0.257	0.263	
	2 1/8	0.269	0.272	0.278	
	2 1/4	0.284	0.287	0.293	
	2 3/8	0.299	0.302	0.308	
	2 1/2	0.315	0.318	0.324	
	2 5/8	0.330	0.333	0.339	
	2 3/4	0.345	0.348	0.354	
	2 7/8	0.360	0.363	0.370	
	3	0.376	0.379	0.385	
	3 1/8	0.391	0.394	0.400	
	3 1/4	0.406	0.409	0.415	
	3 3/8	0.421	0.425	0.431	
	3 1/2	0.437	0.440	0.446	
	3 5/8	0.452	0.455	0.461	
	3 3/4	0.467	0.470	0.476	
	3 7/8	0.483	0.486	0.492	
	4	0.498	0.501	0.507	
	4 1/8	0.513	0.516	0.522	
	4 1/4	0.528	0.531	0.538	
	4 3/8	0.544	0.547	0.553	
	4 1/2	0.559	0.562	0.568	
	4 5/8	0.574	0.577	0.583	
	4 3/4	0.589	0.592	0.599	
	4 7/8	0.605	0.608	0.614	
	5	0.620	0.623	0.629	
	5 1/8	0.635	0.638	0.644	
	5 1/4	0.651	0.654	0.660	
	5 3/8	0.666	0.669	0.675	
	5 1/2	0.681	0.684	0.690	
	5 5/8	0.696	0.699	0.705	
	5 3/4	0.712	0.715	0.721	
	5 7/8	0.727	0.730	0.736	
	6	0.742	0.745	0.751	
		0.757	0.764	0.770	
			0.782	0.794	
				0.806	0.831
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Approved by		Date (MMDDYYYY)	 <b>CARGOTEC</b> HIAB • KALMAR • MACGREGOR	Name	Mass (Unit)
TRB		12142009		ENGINEERING SPECIFICATION, FORMED & FLAT	Sheet (# / #)
Drawn by		Date (MMDDYYYY)	Third angle projection 	Mass (unit)	Revision
YCY		12142009		ESN-0003	B
Drawing Number					

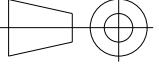
1	2	3	4	5	6							
DEG Bend Allowance Angle - A		Material Thickness (in) - T		EO Number								
8	3/16	1/4	3/8	1/2	5/8	3/4	1	1 1/4	1	1 1/2	2	090794
Radius (in) - R												Drawn/Changed
3/16	0.037											Date (MMDDYYYY)
1/4	0.045	0.049										YCY
5/16	0.054	0.058										12/14/2009
3/8	0.063	0.066	0.073									Approved
7/16	0.072	0.075	0.082									TRB
1/2	0.080	0.084	0.091	0.098								Date (MMDDYYYY)
5/8	0.098	0.101	0.108	0.115	0.122							12/14/2009
3/4	0.115	0.119	0.126	0.133	0.140	0.147						Position
7/8	0.133	0.136	0.143	0.150	0.157	0.164						Description
1	0.150	0.154	0.161	0.168	0.175	0.182	0.195					- Released
1 1/8	0.168	0.171	0.178	0.185	0.192	0.199	0.213					
1 1/4	0.185	0.188	0.195	0.202	0.209	0.216	0.230	0.244				
1 3/8	0.202	0.206	0.213	0.220	0.227	0.234	0.248	0.262				
1 1/2	0.220	0.223	0.230	0.237	0.244	0.251	0.265	0.279	0.293			
1 5/8	0.237	0.241	0.248	0.255	0.262	0.269	0.283	0.297	0.311			
1 3/4	0.255	0.258	0.265	0.272	0.279	0.286	0.300	0.314	0.328			
1 7/8	0.272	0.276	0.283	0.290	0.297	0.304	0.318	0.332	0.346			
2	0.290	0.293	0.300	0.307	0.314	0.321	0.335	0.349	0.363	0.391		
2 1/8	0.307	0.311	0.318	0.325	0.332	0.339	0.353	0.366	0.380	0.408		
2 1/4	0.325	0.328	0.335	0.342	0.349	0.356	0.370	0.384	0.398	0.426		
2 3/8	0.342	0.346	0.353	0.360	0.366	0.373	0.387	0.401	0.415	0.443		
2 1/2	0.360	0.363	0.370	0.377	0.384	0.391	0.405	0.419	0.433	0.461		
2 5/8	0.377	0.380	0.387	0.394	0.401	0.408	0.422	0.436	0.450	0.478		
2 3/4	0.394	0.398	0.405	0.412	0.419	0.426	0.440	0.454	0.468	0.496		
2 7/8	0.412	0.415	0.422	0.429	0.436	0.443	0.457	0.471	0.485	0.513		
3	0.429	0.433	0.440	0.447	0.454	0.461	0.475	0.489	0.503	0.531		
3 1/8	0.447	0.450	0.457	0.464	0.471	0.478	0.492	0.506	0.520	0.548		
3 1/4	0.464	0.468	0.475	0.482	0.489	0.496	0.510	0.524	0.538	0.565		
3 3/8	0.482	0.485	0.492	0.499	0.506	0.513	0.527	0.541	0.555	0.583		
3 1/2	0.499	0.503	0.510	0.517	0.524	0.531	0.545	0.558	0.572	0.600		
3 5/8	0.517	0.520	0.527	0.534	0.541	0.548	0.562	0.576	0.590	0.618		
3 3/4	0.534	0.538	0.545	0.551	0.558	0.565	0.579	0.593	0.607	0.635		
3 7/8	0.551	0.555	0.562	0.569	0.576	0.583	0.597	0.611	0.625	0.653		
4	0.569	0.572	0.579	0.586	0.593	0.600	0.614	0.628	0.642	0.670		
4 1/8	0.586	0.590	0.597	0.604	0.611	0.618	0.632	0.646	0.660	0.688		
4 1/4	0.604	0.607	0.614	0.621	0.628	0.635	0.649	0.663	0.677	0.705		
4 3/8	0.621	0.625	0.632	0.639	0.646	0.653	0.667	0.681	0.695	0.723		
4 1/2	0.639	0.642	0.649	0.656	0.663	0.670	0.684	0.698	0.712	0.740		
4 5/8	0.656	0.660	0.667	0.674	0.681	0.688	0.702	0.716	0.729	0.757		
4 3/4	0.674	0.677	0.684	0.691	0.698	0.705	0.719	0.733	0.747	0.775		
4 7/8	0.691	0.695	0.702	0.709	0.716	0.723	0.736	0.750	0.764	0.792		
5	0.709	0.712	0.719	0.726	0.733	0.740	0.754	0.768	0.782	0.810		
5 1/8	0.726	0.729	0.736	0.743	0.750	0.757	0.771	0.785	0.799	0.827		
5 1/4	0.743	0.747	0.754	0.761	0.768	0.775	0.789	0.803	0.817	0.845		
5 3/8	0.761	0.764	0.771	0.778	0.785	0.792	0.806	0.820	0.834	0.862		
5 1/2	0.778	0.782	0.789	0.796	0.803	0.810	0.824	0.838	0.852	0.880		
5 5/8	0.796	0.799	0.806	0.813	0.820	0.827	0.841	0.855	0.869	0.897		
5 3/4	0.813	0.817	0.824	0.831	0.838	0.845	0.859	0.873	0.887	0.914		
5 7/8	0.831	0.834	0.841	0.848	0.855	0.862	0.876	0.890	0.904	0.932		
6	0.848	0.852	0.859	0.866	0.873	0.880	0.894	0.908	0.921	0.949		

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Approved by <b>TRB</b>	Date (MMDDYYYY) <b>12142009</b>		Name <b>ENGINEERING SPECIFICATION, FORMED &amp; FLAT</b>	Mass (Unit) <b>Mass (unit)</b>	Sheet (# / #) <b>9 / 13</b>	Revision <b>B</b>
Drawn by <b>YCY</b>	Date (MMDDYYYY) <b>12142009</b>	Third angle projection 	Drawing Number <b>ESN-0003</b>			

1	2	3	4	5	6						
DEG Bend Allowance Angle - A		Material Thickness (in) - T		EO Number							
Radius (in) - R	3/16	1/4	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	2	090794
	Developed Length (in) - L										Drawn/Changed
9	0.041	0.055									Date (MMDDYYYY)
1/4	0.051	0.065									YCY
5/16	0.061	0.075	0.082								12/14/2009
3/8	0.071	0.084	0.092								Approved
7/16	0.080	0.094	0.102	0.110							TRB
1/2	0.090	0.104	0.122	0.130	0.137						12/14/2009
5/8	0.110	0.124	0.141	0.149	0.157	0.165					Position
3/4	0.130	0.134	0.161	0.169	0.177	0.185					Description
7/8	0.149	0.153	0.161	0.169	0.177	0.185					- Released
1	0.169	0.173	0.181	0.188	0.196	0.204	0.220				
1 1/8	0.188	0.192	0.200	0.208	0.216	0.224	0.240				
1 1/4	0.208	0.212	0.220	0.228	0.236	0.243	0.259	0.275			
1 3/8	0.228	0.232	0.240	0.247	0.255	0.263	0.279	0.295			
1 1/2	0.247	0.251	0.259	0.267	0.275	0.283	0.298	0.314	0.330		
1 5/8	0.267	0.271	0.279	0.287	0.295	0.302	0.318	0.334	0.349		
1 3/4	0.287	0.291	0.298	0.306	0.314	0.322	0.338	0.353	0.369		
1 7/8	0.306	0.310	0.318	0.326	0.334	0.342	0.357	0.373	0.389		
2	0.326	0.330	0.338	0.346	0.353	0.361	0.377	0.393	0.408	0.440	
2 1/8	0.346	0.349	0.357	0.365	0.373	0.381	0.397	0.412	0.428	0.459	
2 1/4	0.365	0.369	0.377	0.385	0.393	0.401	0.416	0.432	0.448	0.479	
2 3/8	0.385	0.389	0.397	0.404	0.412	0.420	0.436	0.452	0.467	0.499	
2 1/2	0.404	0.408	0.416	0.424	0.432	0.440	0.455	0.471	0.487	0.518	
2 5/8	0.424	0.428	0.436	0.444	0.452	0.459	0.475	0.491	0.507	0.538	
2 3/4	0.444	0.448	0.455	0.463	0.471	0.479	0.495	0.510	0.526	0.558	
2 7/8	0.463	0.467	0.475	0.483	0.491	0.499	0.514	0.530	0.546	0.577	
3	0.483	0.487	0.495	0.503	0.510	0.518	0.534	0.550	0.565	0.597	
3 1/8	0.503	0.507	0.514	0.522	0.530	0.538	0.554	0.569	0.585	0.616	
3 1/4	0.522	0.526	0.534	0.542	0.550	0.558	0.573	0.589	0.605	0.636	
3 3/8	0.542	0.546	0.554	0.562	0.569	0.577	0.593	0.609	0.624	0.656	
3 1/2	0.562	0.565	0.573	0.581	0.589	0.597	0.613	0.628	0.644	0.675	
3 5/8	0.581	0.585	0.593	0.601	0.609	0.616	0.632	0.648	0.664	0.695	
3 3/4	0.601	0.605	0.613	0.620	0.628	0.636	0.652	0.668	0.683	0.715	
3 7/8	0.620	0.624	0.632	0.640	0.648	0.656	0.671	0.687	0.703	0.734	
4	0.640	0.644	0.652	0.660	0.668	0.675	0.691	0.707	0.723	0.754	
4 1/8	0.660	0.664	0.671	0.679	0.687	0.695	0.711	0.726	0.742	0.774	
4 1/4	0.679	0.683	0.691	0.699	0.707	0.715	0.730	0.746	0.762	0.793	
4 3/8	0.699	0.703	0.711	0.719	0.726	0.734	0.750	0.766	0.781	0.813	
4 1/2	0.719	0.723	0.730	0.738	0.746	0.754	0.770	0.785	0.801	0.832	
4 5/8	0.738	0.742	0.750	0.758	0.766	0.774	0.789	0.805	0.821	0.852	
4 3/4	0.758	0.762	0.770	0.777	0.785	0.793	0.809	0.825	0.840	0.872	
4 7/8	0.777	0.781	0.789	0.797	0.805	0.813	0.829	0.844	0.860	0.891	
5	0.797	0.801	0.809	0.817	0.825	0.832	0.848	0.864	0.880	0.911	
5 1/8	0.817	0.821	0.829	0.836	0.844	0.852	0.868	0.884	0.899	0.931	
5 1/4	0.836	0.840	0.848	0.856	0.864	0.872	0.887	0.903	0.919	0.950	
5 3/8	0.856	0.860	0.868	0.876	0.884	0.891	0.907	0.923	0.938	0.970	
5 1/2	0.876	0.880	0.887	0.895	0.903	0.911	0.927	0.942	0.958	0.990	
5 5/8	0.895	0.899	0.907	0.915	0.923	0.931	0.946	0.962	0.978	1.009	
5 3/4	0.915	0.919	0.927	0.935	0.942	0.950	0.966	0.982	0.997	1.029	
5 7/8	0.935	0.938	0.946	0.954	0.962	0.970	0.986	1.001	1.017	1.048	
6	0.954	0.958	0.966	0.974	0.982	0.990	1.005	1.021	1.037	1.068	

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Approved by <b>TRB</b>	Date (MMDDYYYY) <b>12142009</b>		Name <b>ENGINEERING SPECIFICATION, FORMED &amp; FLAT</b>	Mass (Unit) <b>Mass (unit)</b>	Sheet (# / #) <b>10 / 13</b>	Revision <b>B</b>
Drawn by <b>YCY</b>	Date (MMDDYYYY) <b>12142009</b>	Third angle projection 	Drawing Number <b>ESN-0003</b>			

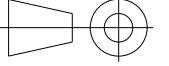
1	2	3	4	5	6						
DEG Bend Allowance Angle - A		Material Thickness (in) - T		EO Number							
Radius (in) - R	3/16	1/4	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	2	090794
	Developed Length (in) - L										Drawn/Changed
3/16	0.046										YCY
1/4	0.057	0.061									12/14/2009
5/16	0.068	0.072									Approved
3/8	0.079	0.083	0.092								TRB
7/16	0.089	0.094	0.103								Date (MMDDYYYY)
1/2	0.100	0.105	0.113	0.122							12/14/2009
5/8	0.122	0.127	0.135	0.144	0.153						Position
3/4	0.144	0.148	0.157	0.166	0.175	0.183					Description
7/8	0.166	0.170	0.179	0.188	0.196	0.205					- Released
1	0.188	0.192	0.201	0.209	0.218	0.227	0.244				
1 1/8	0.209	0.214	0.223	0.231	0.240	0.249	0.266				
1 1/4	0.231	0.236	0.244	0.253	0.262	0.271	0.288	0.305			
1 3/8	0.253	0.257	0.266	0.275	0.284	0.292	0.310	0.327			
1 1/2	0.275	0.279	0.288	0.297	0.305	0.314	0.332	0.349	0.366		
1 5/8	0.297	0.301	0.310	0.318	0.327	0.336	0.353	0.371	0.388		
1 3/4	0.318	0.323	0.332	0.340	0.349	0.358	0.375	0.393	0.410		
1 7/8	0.340	0.345	0.353	0.362	0.371	0.380	0.397	0.414	0.432		
2	0.362	0.366	0.375	0.384	0.393	0.401	0.419	0.436	0.454	0.489	
2 1/8	0.384	0.388	0.397	0.406	0.414	0.423	0.441	0.458	0.476	0.510	
2 1/4	0.406	0.410	0.419	0.428	0.436	0.445	0.462	0.480	0.497	0.532	
2 3/8	0.428	0.432	0.441	0.449	0.458	0.467	0.484	0.502	0.519	0.554	
2 1/2	0.449	0.454	0.462	0.471	0.480	0.489	0.506	0.524	0.541	0.576	
2 5/8	0.471	0.476	0.484	0.493	0.502	0.510	0.528	0.545	0.563	0.598	
2 3/4	0.493	0.497	0.506	0.515	0.524	0.532	0.550	0.567	0.585	0.620	
2 7/8	0.515	0.519	0.528	0.537	0.545	0.554	0.572	0.589	0.606	0.641	
3	0.537	0.541	0.550	0.558	0.567	0.576	0.593	0.611	0.628	0.663	
3 1/8	0.558	0.563	0.572	0.580	0.589	0.598	0.615	0.633	0.650	0.685	
3 1/4	0.580	0.585	0.593	0.602	0.611	0.620	0.637	0.654	0.672	0.707	
3 3/8	0.602	0.606	0.615	0.624	0.633	0.641	0.659	0.676	0.694	0.729	
3 1/2	0.624	0.628	0.637	0.646	0.654	0.663	0.681	0.698	0.716	0.750	
3 5/8	0.646	0.650	0.659	0.668	0.676	0.685	0.702	0.720	0.737	0.772	
3 3/4	0.668	0.672	0.681	0.689	0.698	0.707	0.724	0.742	0.759	0.794	
3 7/8	0.689	0.694	0.702	0.711	0.720	0.729	0.746	0.764	0.781	0.816	
4	0.711	0.716	0.724	0.733	0.742	0.750	0.768	0.785	0.803	0.838	
4 1/8	0.733	0.737	0.746	0.755	0.764	0.772	0.790	0.807	0.825	0.860	
4 1/4	0.755	0.759	0.768	0.777	0.785	0.794	0.812	0.829	0.846	0.881	
4 3/8	0.777	0.781	0.790	0.798	0.807	0.816	0.833	0.851	0.868	0.903	
4 1/2	0.798	0.803	0.812	0.820	0.829	0.838	0.855	0.873	0.890	0.925	
4 5/8	0.820	0.825	0.833	0.842	0.851	0.860	0.877	0.894	0.912	0.947	
4 3/4	0.842	0.846	0.855	0.864	0.873	0.881	0.899	0.916	0.934	0.969	
4 7/8	0.864	0.868	0.877	0.886	0.894	0.903	0.921	0.938	0.955	0.990	
5	0.886	0.890	0.899	0.908	0.916	0.925	0.942	0.960	0.977	1.012	
5 1/8	0.908	0.912	0.921	0.929	0.938	0.947	0.964	0.982	0.999	1.034	
5 1/4	0.929	0.934	0.942	0.951	0.960	0.969	0.986	1.003	1.021	1.056	
5 3/8	0.951	0.955	0.964	0.973	0.982	0.990	1.008	1.025	1.043	1.078	
5 1/2	0.973	0.977	0.986	0.995	1.003	1.012	1.030	1.047	1.065	1.099	
5 5/8	0.995	0.999	1.008	1.017	1.025	1.034	1.051	1.069	1.086	1.121	
5 3/4	1.017	1.021	1.030	1.038	1.047	1.056	1.073	1.091	1.108	1.143	
5 7/8	1.038	1.043	1.051	1.060	1.069	1.078	1.095	1.113	1.130	1.165	
6	1.060	1.065	1.073	1.082	1.091	1.099	1.117	1.134	1.152	1.187	

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Approved by <b>TRB</b>	Date (MMDDYYYY) <b>12142009</b>		Name <b>ENGINEERING SPECIFICATION, FORMED &amp; FLAT</b>	Mass (Unit) <b>Mass (unit)</b>	Sheet (# / #) <b>11 / 13</b>	Revision <b>B</b>
Drawn by <b>YCY</b>	Date (MMDDYYYY) <b>12142009</b>	Third angle projection		Drawing Number <b>ESN-0003</b>		

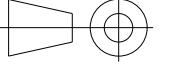
1	2	3	4	5	6						
DEG Bend Allowance Angle - A		Material Thickness (in) - T		EO Number							
45	3/16	1/4	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	2	090794
Radius (in) - R											Drawn/Changed
3/16	0.206										Date (MMDDYYYY)
1/4	0.255	0.275									YCY
5/16	0.304	0.324									12/14/2009
3/8	0.353	0.373	0.412								Approved
7/16	0.402	0.422	0.461								TRB
1/2	0.452	0.471	0.510	0.550							Date (MMDDYYYY)
5/8	0.550	0.569	0.609	0.648	0.687						12/14/2009
3/4	0.648	0.668	0.707	0.746	0.785	0.825					Position
7/8	0.746	0.766	0.805	0.844	0.884	0.923					Description
1	0.844	0.864	0.903	0.942	0.982	1.021	1.099				- Released
1 1/8	0.942	0.962	1.001	1.041	1.080	1.119	1.198				
1 1/4	1.041	1.060	1.099	1.139	1.178	1.217	1.296	1.374			
1 3/8	1.139	1.158	1.198	1.237	1.276	1.315	1.394	1.473			
1 1/2	1.237	1.257	1.296	1.335	1.374	1.414	1.492	1.571	1.649		
1 5/8	1.335	1.355	1.394	1.433	1.473	1.512	1.590	1.669	1.747		
1 3/4	1.433	1.453	1.492	1.531	1.571	1.610	1.688	1.767	1.846		
1 7/8	1.531	1.551	1.590	1.630	1.669	1.708	1.787	1.865	1.944		
2	1.630	1.649	1.688	1.728	1.767	1.806	1.885	1.963	2.042	2.199	
2 1/8	1.728	1.747	1.787	1.826	1.865	1.904	1.983	2.062	2.140	2.297	
2 1/4	1.826	1.846	1.885	1.924	1.963	2.003	2.081	2.160	2.238	2.395	
2 3/8	1.924	1.944	1.983	2.022	2.062	2.101	2.179	2.258	2.336	2.493	
2 1/2	2.022	2.042	2.081	2.120	2.160	2.199	2.277	2.356	2.435	2.592	
2 5/8	2.120	2.140	2.179	2.219	2.258	2.297	2.376	2.454	2.533	2.690	
2 3/4	2.219	2.238	2.277	2.317	2.356	2.395	2.474	2.552	2.631	2.788	
2 7/8	2.317	2.336	2.376	2.415	2.454	2.493	2.572	2.651	2.729	2.886	
3	2.415	2.435	2.474	2.513	2.552	2.592	2.670	2.749	2.827	2.984	
3 1/8	2.513	2.533	2.572	2.611	2.651	2.690	2.768	2.847	2.925	3.082	
3 1/4	2.611	2.631	2.670	2.709	2.749	2.788	2.866	2.945	3.024	3.181	
3 3/8	2.709	2.729	2.768	2.808	2.847	2.886	2.965	3.043	3.122	3.279	
3 1/2	2.808	2.827	2.866	2.906	2.945	2.984	3.063	3.141	3.220	3.377	
3 5/8	2.906	2.925	2.965	3.004	3.043	3.082	3.161	3.240	3.318	3.475	
3 3/4	3.004	3.024	3.063	3.102	3.141	3.181	3.259	3.338	3.416	3.573	
3 7/8	3.102	3.122	3.161	3.200	3.240	3.279	3.357	3.436	3.514	3.671	
4	3.200	3.220	3.259	3.298	3.338	3.377	3.455	3.534	3.613	3.770	
4 1/8	3.298	3.318	3.357	3.397	3.436	3.475	3.554	3.632	3.711	3.868	
4 1/4	3.397	3.416	3.455	3.495	3.534	3.573	3.652	3.730	3.809	3.966	
4 3/8	3.495	3.514	3.554	3.593	3.632	3.671	3.750	3.829	3.907	4.064	
4 1/2	3.593	3.613	3.652	3.691	3.730	3.770	3.848	3.927	4.005	4.162	
4 5/8	3.691	3.711	3.750	3.789	3.829	3.868	3.946	4.025	4.103	4.260	
4 3/4	3.789	3.809	3.848	3.887	3.927	3.966	4.045	4.123	4.202	4.359	
4 7/8	3.887	3.907	3.946	3.986	4.025	4.064	4.143	4.221	4.300	4.457	
5	3.986	4.005	4.045	4.084	4.123	4.162	4.241	4.319	4.398	4.555	
5 1/8	4.084	4.103	4.143	4.182	4.221	4.260	4.339	4.418	4.496	4.653	
5 1/4	4.182	4.202	4.241	4.280	4.319	4.359	4.437	4.516	4.594	4.751	
5 3/8	4.280	4.300	4.339	4.378	4.418	4.457	4.535	4.614	4.692	4.849	
5 1/2	4.378	4.398	4.437	4.476	4.516	4.555	4.634	4.712	4.791	4.948	
5 5/8	4.476	4.496	4.535	4.575	4.614	4.653	4.732	4.810	4.889	5.046	
5 3/4	4.575	4.594	4.634	4.673	4.712	4.751	4.830	4.908	4.987	5.144	
5 7/8	4.673	4.692	4.732	4.771	4.810	4.849	4.928	5.007	5.085	5.242	
6	4.771	4.791	4.830	4.869	4.908	4.948	5.026	5.105	5.183	5.340	

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Approved by <b>TRB</b>	Date (MMDDYYYY) <b>12142009</b>		Name <b>ENGINEERING SPECIFICATION, FORMED &amp; FLAT</b>	Mass (Unit) <b>Mass (unit)</b>	Sheet (# / #) <b>12 / 13</b>	Revision <b>B</b>
Drawn by <b>YCY</b>	Date (MMDDYYYY) <b>12142009</b>	Third angle projection 	Drawing Number <b>ESN-0003</b>			

1	2	3	4	5	6						
DEG Bend Allowance Angle - A		Material Thickness (in) - T		EO Number							
Radius (in) - R	3/16	1/4	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	2	090794
3/16	0.412										
1/4	0.510	0.550									
5/16	0.609	0.648									
3/8	0.707	0.746	0.825								
7/16	0.805	0.844	0.923								
1/2	0.903	0.942	1.021	1.099							
5/8	1.099	1.139	1.217	1.296	1.374						
3/4	1.296	1.335	1.414	1.492	1.571	1.649					
7/8	1.492	1.531	1.610	1.688	1.767	1.846					
1	1.688	1.728	1.806	1.885	1.963	2.042	2.199				
1 1/8	1.885	1.924	2.003	2.081	2.160	2.238	2.395				
1 1/4	2.081	2.120	2.199	2.277	2.356	2.435	2.592	2.749			
1 3/8	2.277	2.317	2.395	2.474	2.552	2.631	2.788	2.945			
1 1/2	2.474	2.513	2.592	2.670	2.749	2.827	2.984	3.141	3.298		
1 5/8	2.670	2.709	2.788	2.866	2.945	3.024	3.181	3.338	3.495		
1 3/4	2.866	2.906	2.984	3.063	3.141	3.220	3.377	3.534	3.691		
1 7/8	3.063	3.102	3.181	3.259	3.338	3.416	3.573	3.730	3.887		
2	3.259	3.298	3.377	3.455	3.534	3.613	3.770	3.927	4.084	4.398	
2 1/8	3.455	3.495	3.573	3.652	3.730	3.809	3.966	4.123	4.280	4.594	
2 1/4	3.652	3.691	3.770	3.848	3.927	4.005	4.162	4.319	4.476	4.791	
2 3/8	3.848	3.887	3.966	4.045	4.123	4.202	4.359	4.516	4.673	4.987	
2 1/2	4.045	4.084	4.162	4.241	4.319	4.398	4.555	4.712	4.869	5.183	
2 5/8	4.241	4.280	4.359	4.437	4.516	4.594	4.751	4.908	5.065	5.380	
2 3/4	4.437	4.476	4.555	4.634	4.712	4.791	4.948	5.105	5.262	5.576	
2 7/8	4.634	4.673	4.751	4.830	4.908	4.987	5.144	5.301	5.458	5.772	
3	4.830	4.869	4.948	5.026	5.105	5.183	5.340	5.497	5.654	5.969	
3 1/8	5.026	5.065	5.144	5.223	5.301	5.380	5.537	5.694	5.851	6.165	
3 1/4	5.223	5.262	5.340	5.419	5.497	5.576	5.733	5.890	6.047	6.361	
3 3/8	5.419	5.458	5.537	5.615	5.694	5.772	5.929	6.086	6.243	6.558	
3 1/2	5.615	5.654	5.733	5.812	5.890	5.969	6.126	6.283	6.440	6.754	
3 5/8	5.812	5.851	5.929	6.008	6.086	6.165	6.322	6.479	6.636	6.950	
3 3/4	6.008	6.047	6.126	6.204	6.283	6.361	6.518	6.675	6.832	7.147	
3 7/8	6.204	6.243	6.322	6.401	6.479	6.558	6.715	6.872	7.029	7.343	
4	6.401	6.440	6.518	6.597	6.675	6.754	6.911	7.068	7.225	7.539	
4 1/8	6.597	6.636	6.715	6.793	6.872	6.950	7.107	7.264	7.421	7.736	
4 1/4	6.793	6.832	6.911	6.990	7.068	7.147	7.304	7.461	7.618	7.932	
4 3/8	6.990	7.029	7.107	7.186	7.264	7.343	7.500	7.657	7.814	8.128	
4 1/2	7.186	7.225	7.304	7.382	7.461	7.539	7.696	7.853	8.010	8.325	
4 5/8	7.382	7.421	7.500	7.579	7.657	7.736	7.893	8.050	8.207	8.521	
4 3/4	7.579	7.618	7.696	7.775	7.853	7.932	8.089	8.246	8.403	8.717	
4 7/8	7.775	7.814	7.893	7.971	8.050	8.128	8.285	8.442	8.599	8.914	
5	7.971	8.010	8.089	8.168	8.246	8.325	8.482	8.639	8.796	9.110	
5 1/8	8.168	8.207	8.285	8.364	8.442	8.521	8.678	8.835	8.992	9.306	
5 1/4	8.364	8.403	8.482	8.560	8.639	8.717	8.874	9.031	9.188	9.503	
5 3/8	8.560	8.599	8.678	8.757	8.835	8.914	9.071	9.228	9.385	9.699	
5 1/2	8.757	8.796	8.874	8.953	9.031	9.110	9.267	9.424	9.581	9.895	
5 5/8	8.953	8.992	9.071	9.149	9.228	9.306	9.463	9.620	9.777	10.092	
5 3/4	9.149	9.188	9.267	9.346	9.424	9.503	9.660	9.817	9.974	10.288	
5 7/8	9.346	9.385	9.463	9.542	9.620	9.699	9.856	10.013	10.170	10.484	
6	9.542	9.581	9.660	9.738	9.817	9.895	10.052	10.209	10.366	10.681	

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Approved by <b>TRB</b>	Date (MMDDYYYY) <b>12142009</b>	 <b>CARGOTEC</b> HIAB • KALMAR • MACGREGOR	Name <b>ENGINEERING SPECIFICATION, FORMED &amp; FLAT</b>	Mass (Unit) <b>Mass (unit)</b>	Sheet (# / #) <b>13 / 13</b>	Revision <b>B</b>
Drawn by <b>YCY</b>	Date (MMDDYYYY) <b>12142009</b>	Third angle projection 	Drawing Number <b>ESN-0003</b>			