

# CROSS SECTION: ALU\_1

## polygonal chains

[y,z]: node coordinates [s]: arc rise of the line to the following node (positive to left side)

nodes	y	z	s	nodes	y	z	s
-	mm	mm	mm	-	mm	mm	mm
<b>1. created manually (+)</b>				<b>82</b>	-866.69	70.05	0.000
<b>1</b>	-659.33	-227.92	-8.839	<b>86</b>	-852.55	84.19	0.000
<b>2</b>	-626.72	-234.41	0.000	<b>87</b>	-829.53	126.16	-0.999
<b>3</b>	-610.39	-218.08	0.000	<b>88</b>	-829.05	134.80	0.000
<b>4</b>	-596.24	-232.23	0.000	<b>89</b>	-840.72	162.97	-8.839
<b>5</b>	-640.43	-276.41	1.572	<b>90</b>	-873.33	169.46	0.000
<b>9</b>	-655.02	-282.47	0.000	<b>91</b>	-889.66	153.13	0.000
<b>10</b>	-717.52	-282.47	0.000	<b>92</b>	-903.81	167.28	0.000
<b>11</b>	-717.52	-262.47	0.000	<b>93</b>	-859.62	211.46	1.572
<b>12</b>	-694.44	-262.47	-8.843	<b>97</b>	-845.03	217.52	0.000
<b>13</b>	-675.96	-234.81	0.000	<b>98</b>	-782.53	217.52	0.000
<b>14</b>	-687.63	-206.64	-0.998	<b>99</b>	-782.53	197.52	0.000
<b>15</b>	-694.07	-200.87	0.000	<b>100</b>	-805.61	197.52	-8.843
<b>16</b>	-740.03	-187.46	0.000	<b>101</b>	-824.09	169.86	0.000
<b>20</b>	-760.02	-187.46	0.000	<b>102</b>	-812.42	141.69	-0.998
<b>21</b>	-805.98	-200.87	-0.998	<b>103</b>	-805.98	135.92	0.000
<b>22</b>	-812.42	-206.64	0.000	<b>104</b>	-760.02	122.51	0.000
<b>23</b>	-824.09	-234.81	-8.843	<b>108</b>	-740.03	122.51	0.000
<b>24</b>	-805.61	-262.47	0.000	<b>109</b>	-694.07	135.92	-0.998
<b>25</b>	-782.53	-262.47	0.000	<b>110</b>	-687.63	141.69	0.000
<b>26</b>	-782.53	-282.47	0.000	<b>111</b>	-675.96	169.86	-8.843
<b>27</b>	-845.03	-282.47	1.752	<b>112</b>	-694.44	197.52	0.000
<b>31</b>	-859.62	-276.41	0.000	<b>113</b>	-717.52	197.52	0.000
<b>32</b>	-903.81	-232.23	0.000	<b>114</b>	-717.52	217.52	0.000
<b>33</b>	-889.66	-218.08	0.000	<b>115</b>	-655.02	217.52	1.572
<b>34</b>	-873.33	-234.41	-8.839	<b>119</b>	-640.43	211.46	0.000
<b>35</b>	-840.72	-227.92	0.000	<b>120</b>	-596.24	167.28	0.000
<b>36</b>	-829.05	-199.75	-0.999	<b>121</b>	-610.39	153.13	0.000
<b>37</b>	-829.53	-191.11	0.000	<b>122</b>	-626.72	169.46	-8.839
<b>38</b>	-852.55	-149.14	0.000	<b>123</b>	-659.33	162.97	0.000
<b>42</b>	-866.69	-135.00	0.000	<b>124</b>	-671.00	134.80	-0.999
<b>43</b>	-908.66	-111.98	-0.999	<b>125</b>	-670.52	126.16	0.000
<b>44</b>	-917.30	-111.50	0.000	<b>126</b>	-647.50	84.19	0.000
<b>45</b>	-945.47	-123.17	-8.839	<b>130</b>	-633.36	70.05	0.000
<b>46</b>	-951.96	-155.78	0.000	<b>131</b>	-591.39	47.03	-0.999
<b>47</b>	-935.63	-172.11	0.000	<b>132</b>	-582.75	46.55	0.000
<b>48</b>	-949.78	-186.26	0.000	<b>133</b>	-554.58	58.22	-8.928
<b>49</b>	-993.96	-142.07	1.572	<b>134</b>	-548.09	90.83	0.000
<b>53</b>	-1000.02	-127.48	0.000	<b>135</b>	-564.42	107.16	0.000
<b>54</b>	-1000.02	-64.98	0.000	<b>136</b>	-550.27	121.31	0.000
<b>55</b>	-980.02	-64.98	0.000	<b>137</b>	-506.09	77.12	1.572
<b>56</b>	-980.02	-88.06	-8.843	<b>141</b>	-500.03	62.53	0.000
<b>57</b>	-952.36	-106.54	0.000	<b>142</b>	-500.03	0.03	0.000
<b>58</b>	-924.19	-94.87	-0.998	<b>143</b>	-520.03	0.03	0.000
<b>59</b>	-918.42	-88.43	0.000	<b>144</b>	-520.03	23.11	-8.843
<b>60</b>	-905.01	-42.47	0.000	<b>145</b>	-547.69	41.59	0.000
<b>64</b>	-905.01	-22.48	0.000	<b>146</b>	-575.86	29.92	-0.998
<b>65</b>	-918.42	23.48	-0.998	<b>147</b>	-581.63	23.48	0.000
<b>66</b>	-924.19	29.92	0.000	<b>148</b>	-595.04	-22.48	0.000
<b>67</b>	-952.36	41.59	-8.843	<b>152</b>	-595.04	-42.47	0.000
<b>68</b>	-980.02	23.11	0.000	<b>153</b>	-581.63	-88.43	-0.998
<b>69</b>	-980.02	0.03	0.000	<b>154</b>	-575.86	-94.87	0.000
<b>70</b>	-1000.02	0.03	0.000	<b>155</b>	-547.69	-106.54	-8.843
<b>71</b>	-1000.02	62.53	1.572	<b>156</b>	-520.03	-88.06	0.000
<b>75</b>	-993.96	77.12	0.000	<b>157</b>	-520.03	-64.98	0.000
<b>76</b>	-949.78	121.31	0.000	<b>158</b>	-500.03	-64.98	0.000
<b>77</b>	-935.63	107.16	0.000	<b>159</b>	-500.03	-127.48	1.572
<b>78</b>	-951.96	90.83	-8.839	<b>163</b>	-506.09	-142.07	0.000
<b>79</b>	-945.47	58.22	0.000	<b>164</b>	-550.27	-186.26	0.000
<b>80</b>	-917.30	46.55	-0.999	<b>165</b>	-564.42	-172.11	0.000
<b>81</b>	-908.66	47.03	0.000	<b>166</b>	-548.09	-155.78	-8.839

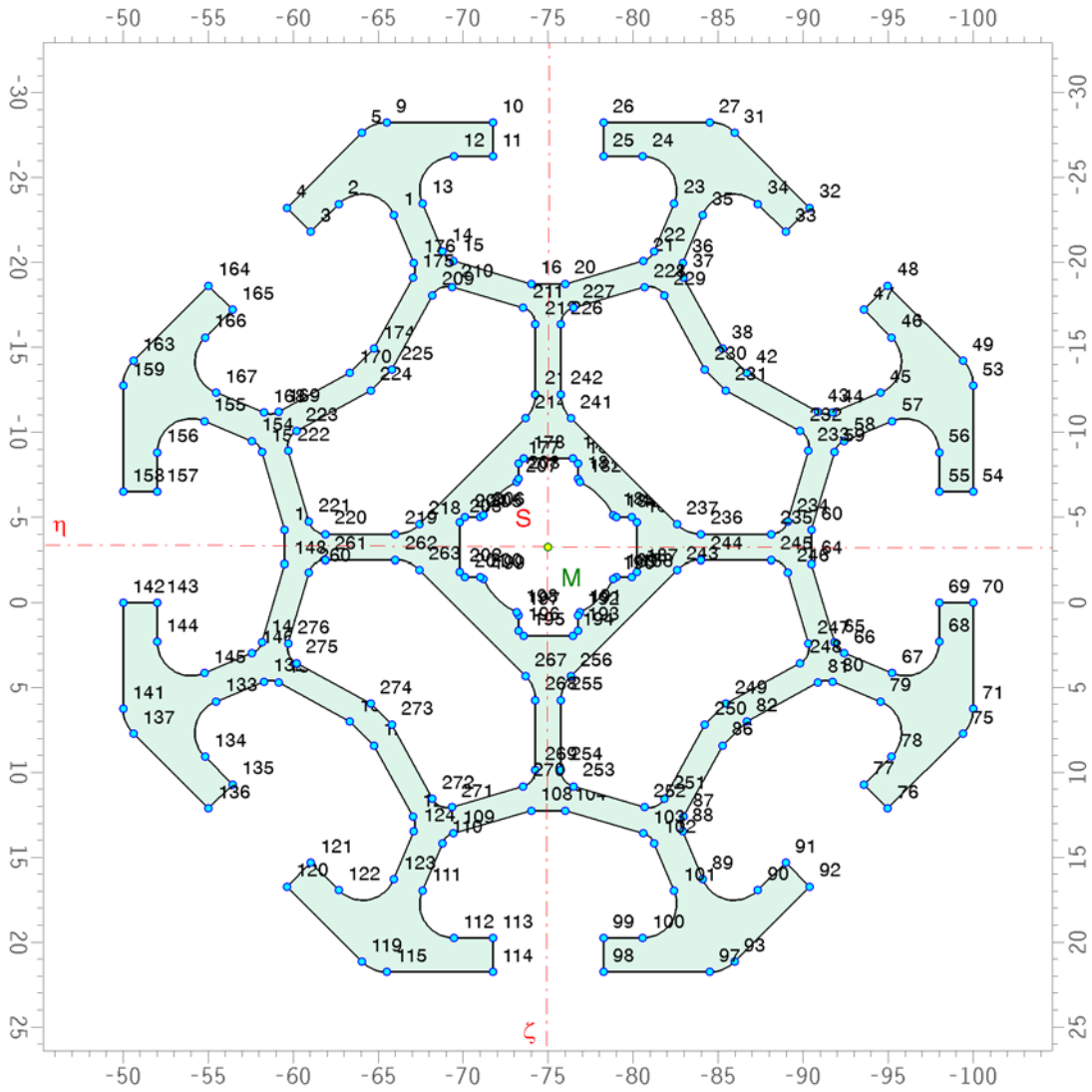


## polygonal chains

[y,z]: node coordinates [s]: arc rise of the line to the following node (positive to left side)

nodes	y	z	s	nodes	y	z	s
-	mm	mm	mm	-	mm	mm	mm
167	-554.58	-123.17	0.000	221	-609.29	-47.18	0.000
168	-582.75	-111.50	-0.999	222	-597.08	-89.05	2.126
169	-591.39	-111.98	0.000	223	-601.86	-100.62	0.000
170	-633.36	-135.00	0.000	224	-645.58	-124.59	0.000
174	-647.50	-149.14	0.000	225	-657.91	-136.92	0.000
175	-670.52	-191.11	-0.999	<b>4. created manually (-)</b>			
176	-671.00	-199.75	0.000	226	-757.52	-163.61	1.995
<b>2. created manually (-)</b>				227	-764.73	-173.21	0.000
177	-732.52	-81.47	0.000	228	-806.59	-185.42	2.126
178	-735.52	-84.48	0.000	229	-818.17	-180.64	0.000
179	-764.53	-84.48	0.000	230	-842.14	-136.92	0.000
180	-767.53	-81.47	0.000	231	-854.47	-124.59	0.000
181	-767.53	-72.47	0.000	232	-898.18	-100.62	2.126
182	-768.65	-70.68	2.304	233	-902.97	-89.05	0.000
183	-788.23	-51.10	0.000	234	-890.76	-47.18	1.972
184	-790.02	-49.98	0.000	235	-881.15	-39.97	0.000
185	-799.02	-49.98	0.000	236	-839.90	-39.97	1.523
186	-802.02	-46.98	0.000	237	-825.76	-45.83	0.000
187	-802.02	-17.97	0.000	241	-763.38	-108.21	1.523
188	-799.02	-14.97	0.000	242	-757.52	-122.36	0.000
189	-790.02	-14.97	0.000	<b>5. created manually (-)</b>			
190	-788.23	-13.85	2.288	243	-825.76	-19.12	1.523
191	-768.65	5.73	0.000	244	-839.90	-24.98	0.000
192	-767.53	7.51	0.000	245	-881.15	-24.98	2.023
193	-767.53	16.52	0.000	246	-890.76	-17.77	0.000
194	-764.53	19.52	0.000	247	-902.97	24.09	2.126
195	-735.52	19.52	0.000	248	-898.18	35.67	0.000
196	-732.52	16.52	0.000	249	-854.47	59.64	0.000
197	-732.52	7.51	0.000	250	-842.14	71.97	0.000
198	-731.40	5.73	2.359	251	-818.17	115.68	2.126
199	-711.82	-13.85	0.000	252	-806.59	120.47	0.000
200	-710.03	-14.97	0.000	253	-764.73	108.26	2.044
201	-701.03	-14.97	0.000	254	-757.52	98.65	0.000
202	-698.02	-17.97	0.000	255	-757.52	57.40	1.523
203	-698.02	-46.98	0.000	256	-763.38	43.26	0.000
204	-701.03	-49.98	0.000	<b>6. created manually (-)</b>			
205	-710.03	-49.98	0.000	260	-609.29	-17.77	1.919
206	-711.82	-51.10	2.310	261	-618.89	-24.98	0.000
207	-731.40	-70.68	0.000	262	-660.14	-24.98	1.523
208	-732.52	-72.47	0.000	263	-674.29	-19.12	0.000
<b>3. created manually (-)</b>				267	-736.67	43.26	1.523
209	-681.88	-180.64	2.126	268	-742.53	57.40	0.000
210	-693.45	-185.42	0.000	269	-742.53	98.65	2.020
211	-735.32	-173.21	2.032	270	-735.32	108.26	0.000
212	-742.53	-163.61	0.000	271	-693.45	120.47	2.126
213	-742.53	-122.36	1.523	272	-681.88	115.68	0.000
214	-736.67	-108.21	0.000	273	-657.91	71.97	0.000
218	-674.29	-45.83	1.523	274	-645.58	59.64	0.000
219	-660.14	-39.97	0.000	275	-601.86	35.67	2.126
220	-618.89	-39.97	1.922	276	-597.08	24.09	0.000

plotting



## gross characteristic values

area, centroid and angle of principal axis

A =	630.94 cm <sup>2</sup>	e <sub>y</sub> =	-75.00 cm	e <sub>z</sub> =	-3.25 cm	α =	-0.21 °
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spread

y <sub>max</sub> =	-50.00 cm	y <sub>min</sub> =	-100.00 cm	b =	50.00 cm	U <sub>a</sub> =	400.39 cm
Z <sub>max</sub> =	21.75 cm	Z <sub>min</sub> =	-28.25 cm	h =	50.00 cm	U <sub>i</sub> =	218.86 cm
						U =	619.25 cm

Imn-system: moments of inertia and section moduli, clearances and radii of gyration

I <sub>m</sub> =	122953.01 cm <sup>4</sup>	W <sub>m+</sub> =	4918.04 cm <sup>3</sup>	h <sub>m+</sub> =	25.00 cm	i <sub>m</sub> =	13.96 cm
I <sub>n</sub> =	122940.03 cm <sup>4</sup>	W <sub>m-</sub> =	4918.24 cm <sup>3</sup>	h <sub>m-</sub> =	-25.00 cm	i <sub>n</sub> =	13.96 cm
I <sub>mn</sub> =	0.05 cm <sup>4</sup>	W <sub>n+</sub> =	4917.60 cm <sup>3</sup>	h <sub>n+</sub> =	25.00 cm		
		W <sub>n-</sub> =	4917.94 cm <sup>3</sup>	h <sub>n-</sub> =	-25.00 cm		

ξηζ-system: moments of inertia and section moduli, clearances and radii of gyration

I <sub>η</sub> =	122953.01 cm <sup>4</sup>	W <sub>η+</sub> =	4911.32 cm <sup>3</sup>	h <sub>η+</sub> =	25.03 cm	i <sub>η</sub> =	13.96 cm
I <sub>ζ</sub> =	122940.03 cm <sup>4</sup>	W <sub>η-</sub> =	4911.42 cm <sup>3</sup>	h <sub>η-</sub> =	-25.03 cm	i <sub>ζ</sub> =	13.96 cm
I <sub>p</sub> =	245893.04 cm <sup>4</sup>	W <sub>ζ+</sub> =	4910.88 cm <sup>3</sup>	h <sub>ζ+</sub> =	25.03 cm	i <sub>p</sub> =	19.74 cm
		W <sub>ζ-</sub> =	4911.21 cm <sup>3</sup>	h <sub>ζ-</sub> =	-25.03 cm		

shear centre

y <sub>M</sub> =	-75.00 cm	y <sub>SM</sub> =	0.00 cm	η <sub>M</sub> =	0.00 cm		
Z <sub>M</sub> =	-3.25 cm	Z <sub>SM</sub> =	0.00 cm	ζ <sub>M</sub> =	0.00 cm		

shear area coefficient

κ <sub>m</sub> =	3.13 -	A <sub>m</sub> =	201.88 cm <sup>2</sup>	κ <sub>η</sub> =	3.13 -	A <sub>η</sub> =	201.88 cm <sup>2</sup>
κ <sub>n</sub> =	3.13 -	A <sub>n</sub> =	201.87 cm <sup>2</sup>	κ <sub>ζ</sub> =	3.13 -	A <sub>ζ</sub> =	201.87 cm <sup>2</sup>

torsion + warping

I <sub>T</sub> =	39229.18 cm <sup>4</sup>	I <sub>W</sub> =	1775909.50 cm <sup>6</sup>	R <sub>Sy</sub> =	171.89 cm <sup>5</sup>	R <sub>Sz</sub> =	-157.54 cm <sup>5</sup>
C <sub>s</sub> =	1775909.94 cm <sup>6</sup>	I <sub>pM</sub> =	245893.04 cm <sup>4</sup>	i <sub>ωM</sub> =	2.69 cm		
ω <sub>M+</sub> =	161.42 cm <sup>2</sup>	ω <sub>M-</sub> =	-161.37 cm <sup>2</sup>	W <sub>ω+</sub> =	11001.70 cm <sup>4</sup>	W <sub>ω-</sub> =	11005.35 cm <sup>4</sup>

section lines

i <sub>m</sub> =	19.74 cm	r <sub>η</sub> =	0.00 cm	r <sub>ζ</sub> =	0.00 cm	r <sub>ω</sub> =	0.00 cm
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