

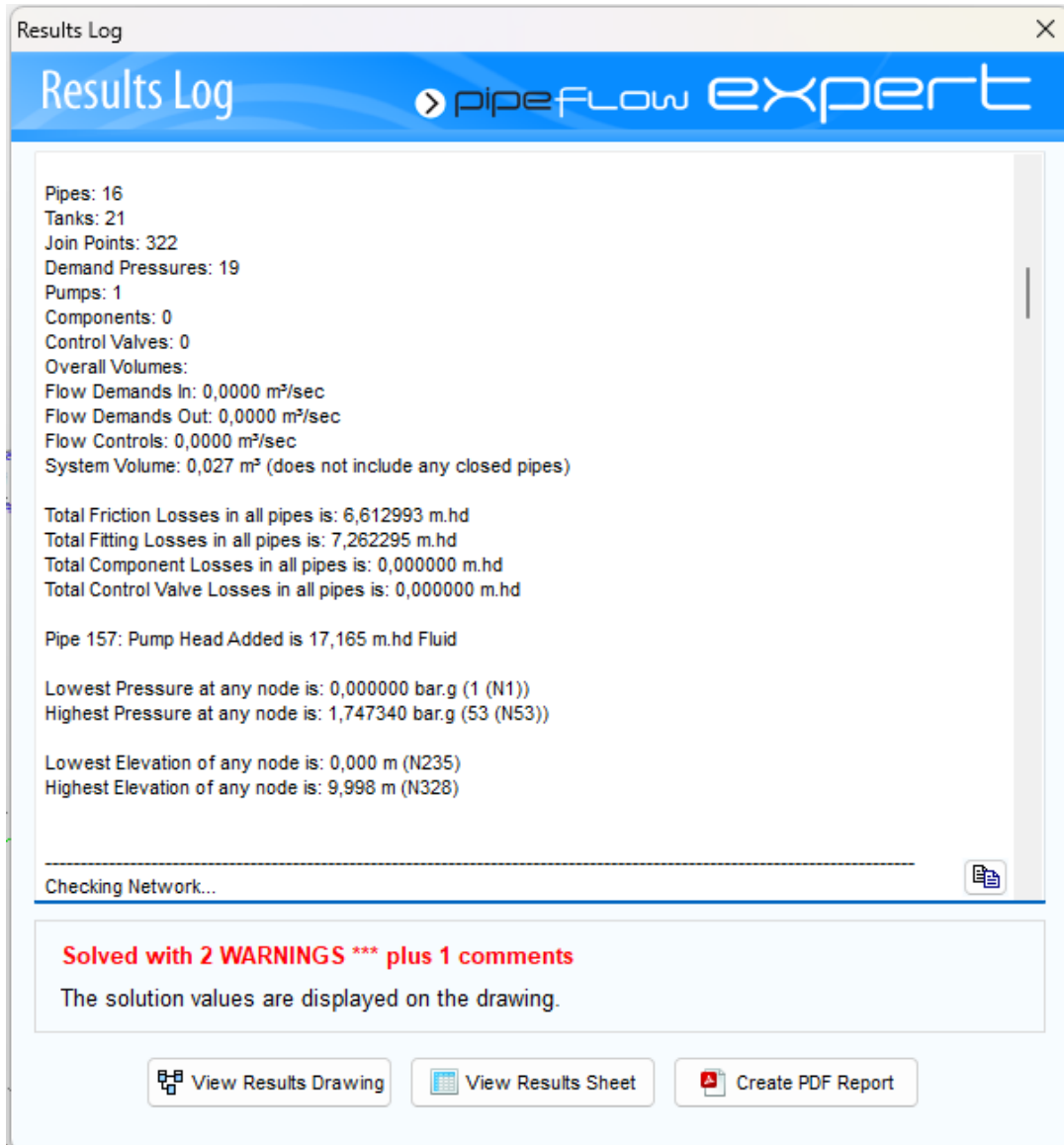
DAFTAR PUSTAKA

- Biro Klasifikasi Indonesia (2022). Volume III Peraturan Instalasi Mesin.
- Crawford, J. (1981). Marine and Offshore Pumping and Piping Systems. Billing & Sons Limited. London
- D. A. Taylor. (1996). Introduction to Marine Engineering: Second Edition. Great Britain.
- Djaja, Indra Kusna dan Moch. Sofi'i. (2008). Teknik Konstruksi Kapal Baja Jilid 2. Jakarta: Direktorat Pembinaan Sekolah Menengah Kejuruan.
- Japanese Industrial Standard (1994). Carbon Steel Pipes for Pressure Service (JIS G 3454-1988)
- Michael Volk. (2014). Pump Characteristics and Applications: Third Edition. London. New York
- PipeFlowSoftware. (2018, Jan 17). PIPE FLOW EXPERT SOFTWARE – QUICK TIPS [Video]. You Tube. <https://www.youtube.com/playlist?list=PLl-36KRLNl9JvEyXQYxMA5itGni8GafIc>.
- Raswari. (2007). Perencanaan dan Penggambaran Sistem Perpipaan. Jakarta: Universitas Indonesia.
- Rhino 6 Tutorial. (2018, May 21). Rhino 6 Tutorials in English [Video]. You Tube. <https://www.youtube.com/playlist?list=PLp2QfotsGoUWy76ahzSDYHTtevWaVQvRu>
- SF, Fathul Rahmat. (2018). Analisis Kebutuhan Material Pelat dan Profil pada Pembangunan Bangunan Atas Kapal Ferry 300 GT. Gowa: Universitas Hasanuddin.
- Sularso dan Haruo Tahara. (2018). Pompa dan Kompresor: Pemilihan, Pemakaian, dan Pemeliharaan. Jakarta. PT Pradnya Paramita.


Suryawan, Anak Agung Adi. (2019). Sistem Perpipaan di Kapal Laut pada Umumnya. Bali: Universitas Udayana.

LAMPIRAN

Lampiran 1 Hasil kalkulasi dari aplikasi perpipaan



Results Log

Results Log 


Pipes: 16
Tanks: 21
Join Points: 322
Demand Pressures: 19
Pumps: 1
Components: 0
Control Valves: 0
Overall Volumes:
Flow Demands In: 0,0000 m³/sec
Flow Demands Out: 0,0000 m³/sec
Flow Controls: 0,0000 m³/sec
System Volume: 0,027 m³ (does not include any closed pipes)

Total Friction Losses in all pipes is: 6,612993 m.hd
Total Fitting Losses in all pipes is: 7,262295 m.hd
Total Component Losses in all pipes is: 0,000000 m.hd
Total Control Valve Losses in all pipes is: 0,000000 m.hd




Pipe 157: Pump Head Added is 17,165 m.hd Fluid

Lowest Pressure at any node is: 0,000000 bar.g (1 (N1))
Highest Pressure at any node is: 1,747340 bar.g (53 (N53))

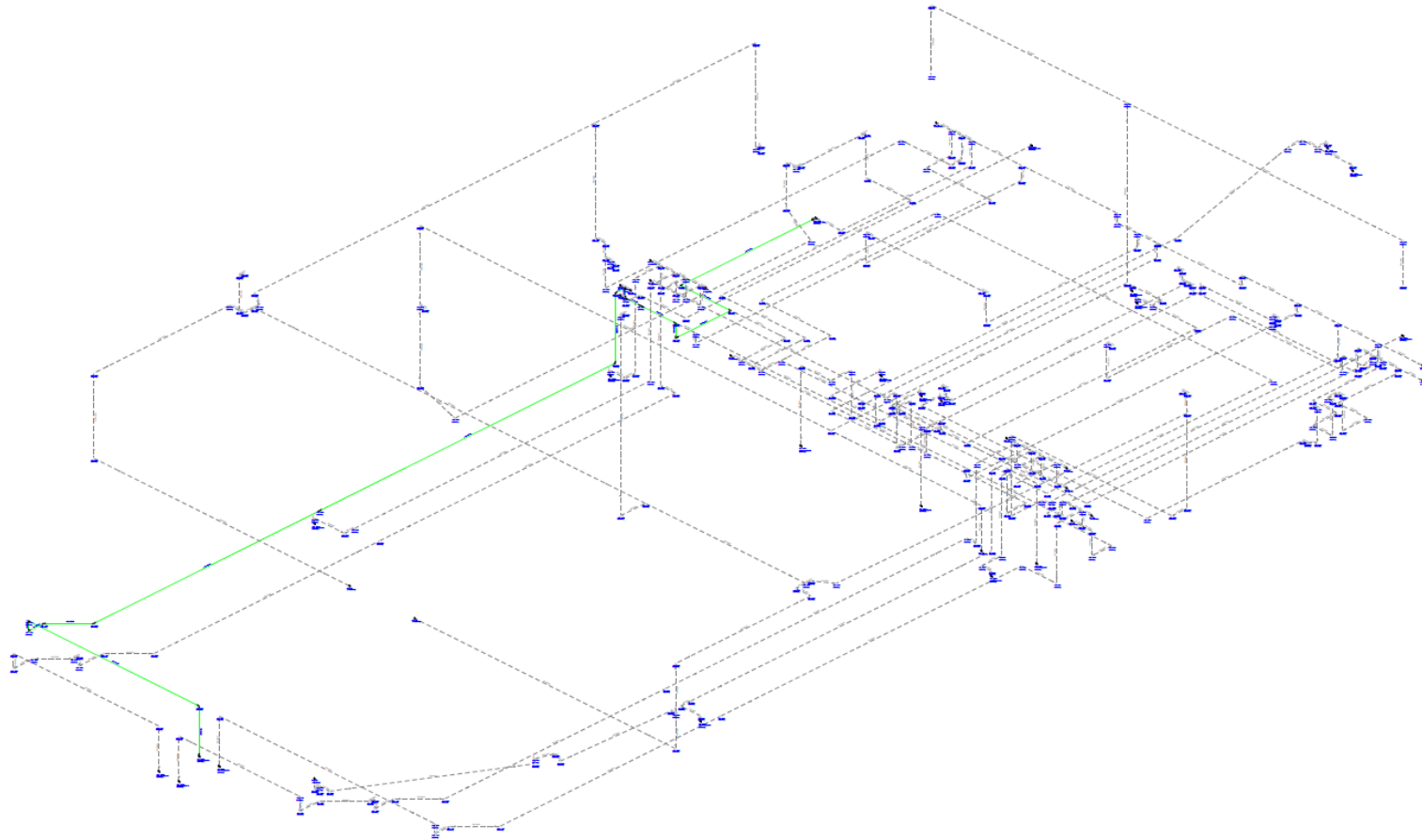
Lowest Elevation of any node is: 0,000 m (N235)
Highest Elevation of any node is: 9,998 m (N328)

Checking Network... 

Solved with 2 WARNINGS * plus 1 comments**
The solution values are displayed on the drawing.

 View Results Drawing  View Results Sheet  Create PDF Report

Lampiran 2 Gambar sistem perpipaan yang akan divalidasi



Lampiran 3 Tabel ukuran pipa yang digunakan untuk sistem pipa ballast, pemadam kebakaran dan saniter air laut

Pipe Id	Pipe Name	Material	Schedule Class	Diameter Dalam (mm)	Ketebalan (mm)	Diameter luar (mm)	Panjang (m)
1	P1	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.25
2	P2	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.319
3	P3	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	2.72
4	P4	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.533
5	P5	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.794
6	P6	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.114
7	P7	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.003
8	P8	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	2.445
9	P9	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	5.305
10	P10	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	2.856
11	P11	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.41
12	P12	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.114
13	P13	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.241
14	P14	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.151
15	P15	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.022
16	P16	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.524
17	P17	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.741
18	P18	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	4.202
19	P19	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.203
20	P20	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.152
21	P21	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.197
22	P22	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.675
23	P23	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.375
24	P24	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.336
25	P25	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.38
26	P26	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.329

Pipe Id	Pipe Name	Material	Schedule Class	Diameter Dalam (mm)	Ketebalan (mm)	Diameter luar (mm)	Panjang (m)
27	P27	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.463
28	P28	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	3.801
29	P29	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	2.004
30	P30	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	2.185
31	P31	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	2.785
32	P32	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.838
33	P33	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.303
34	P34	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.392
35	P35	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.206
36	P36	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.63
37	P37	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.1
38	P38	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.637
39	P39	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.114
40	P40	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.15
41	P41	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.432
42	P42	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	2.159
43	P43	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.34
44	P44	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.505
45	P45	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.34
46	P46	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.307
47	P47	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.58
48	P48	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.307
49	P49	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	12.531
50	P50	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.62
51	P51	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.303
52	P52	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.58
53	P53	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.62
54	P54	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.047

Pipe Id	Pipe Name	Material	Schedule Class	Diameter Dalam (mm)	Ketebalan (mm)	Diameter luar (mm)	Panjang (m)
55	P55	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.133
56	P56	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.318
57	P57	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.233
58	P58	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.312
59	P59	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.354
60	P60	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.213
61	P61	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	3.427
62	P62	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.336
63	P63	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.679
64	P64	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.62
65	P65	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.15
66	P66	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.15
67	P67	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.15
68	P68	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.15
69	P69	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.258
70	P70	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.29
71	P71	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.114
72	P72	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.32
73	P73	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.32
74	P74	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.32
75	P75	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.339
76	P76	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.901
77	P77	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.114
78	P78	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.15
79	P79	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.15
80	P80	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.154
81	P81	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.852
82	P82	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.357

Pipe Id	Pipe Name	Material	Schedule Class	Diameter Dalam (mm)	Ketebalan (mm)	Diameter luar (mm)	Panjang (m)
83	P83	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	6.098
84	P84	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.228
85	P85	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.205
86	P86	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.216
87	P87	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	6.098
88	P88	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	6.098
89	P89	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.35
90	P90	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.114
91	P91	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.327
92	P92	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.216
93	P93	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.15
94	P94	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	3.262
95	P95	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.35
96	P96	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.282
97	P97	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.282
98	P98	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.027
99	P99	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.706
100	P100	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.307
101	P101	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.706
102	P102	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.376
103	P103	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	2.613
104	P104	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	2.04
105	P105	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.376
106	P106	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	3.262
107	P107	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.315
108	P108	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.259
109	P109	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.15
110	P110	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.15

Pipe Id	Pipe Name	Material	Schedule Class	Diameter Dalam (mm)	Ketebalan (mm)	Diameter luar (mm)	Panjang (m)
111	P111	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	2.775
112	P112	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.332
113	P113	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.332
114	P114	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.332
115	P115	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.32
116	P116	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.32
117	P117	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.32
118	P118	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.114
119	P119	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	6.098
120	P120	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.196
121	P121	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.335
122	P122	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.1
123	P123	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.1
124	P124	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.114
125	P125	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.881
126	P126	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	6.098
127	P127	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.228
128	P128	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.21
129	P129	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.216
130	P130	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.327
131	P131	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.216
132	P132	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.283
133	P133	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	6.098
134	P134	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	3.048
135	P135	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.933
136	P136	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.404
137	P137	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.89
138	P138	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	3.163

Pipe Id	Pipe Name	Material	Schedule Class	Diameter Dalam (mm)	Ketebalan (mm)	Diameter luar (mm)	Panjang (m)
139	P139	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.933
140	P140	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.259
141	P141	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.283
142	P142	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	3.184
143	P143	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.89
144	P144	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	2.616
145	P145	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	3.184
146	P146	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.114
147	P147	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	2.04
148	P148	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	3.162
149	P149	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	3.362
150	P150	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.152
151	P151	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.18
152	P152	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.604
153	P153	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.167
154	P154	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	4.088
155	P155	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.208
156	P156	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.033
157	P157	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.909
158	P158	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.448
159	P159	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.15
160	P160	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.228
161	P161	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.893
162	P162	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.534
163	P163	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.142
164	P164	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.114
165	P165	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.317
166	P166	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.381

Pipe Id	Pipe Name	Material	Schedule Class	Diameter Dalam (mm)	Ketebalan (mm)	Diameter luar (mm)	Panjang (m)
167	P167	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.37
168	P168	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.171
169	P169	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.162
170	P170	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	2.974
171	P171	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.83
172	P172	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.114
173	P173	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.278
174	P174	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.984
175	P175	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.2
176	P176	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.376
177	P177	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.56
178	P178	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.264
179	P179	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.139
180	P180	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.476
181	P181	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.114
182	P182	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.2
183	P183	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.296
184	P184	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.383
185	P185	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.258
186	P186	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.373
187	P187	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.476
188	P188	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.114
189	P189	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.263
190	P190	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	3.196
191	P191	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.531
192	P192	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.114
193	P193	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.49
194	P194	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.395

Pipe Id	Pipe Name	Material	Schedule Class	Diameter Dalam (mm)	Ketebalan (mm)	Diameter luar (mm)	Panjang (m)
195	P195	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.333
196	P196	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.524
197	P197	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.676
198	P198	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.638
199	P199	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.457
200	P200	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	2.578
201	P201	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.227
202	P202	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.171
203	P203	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.589
204	P204	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.114
205	P205	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.297
206	P206	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	3.363
207	P207	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.297
208	P208	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.589
209	P209	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.114
210	P210	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.332
211	P211	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.254
212	P212	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	4.659
213	P213	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.381
214	P214	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.452
215	P215	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.095
216	P216	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.72
217	P217	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.465
218	P218	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.565
219	P219	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.114
220	P220	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.486
221	P221	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.191
222	P222	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.691

Pipe Id	Pipe Name	Material	Schedule Class	Diameter Dalam (mm)	Ketebalan (mm)	Diameter luar (mm)	Panjang (m)
223	P223	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.736
224	P224	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.127
225	P225	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.96
226	P226	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.83
227	P227	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.114
228	P228	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.555
229	P229	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.177
230	P230	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	2.63
231	P231	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.903
232	P232	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.114
233	P233	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.993
234	P234	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.76
235	P235	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.101
236	P236	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.171
237	P237	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	3.2
238	P238	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.251
239	P239	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.348
240	P240	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.569
241	P241	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	4.529
242	P242	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.095
243	P243	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.333
244	P244	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.324
245	P245	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.427
246	P246	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.666
247	P247	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.307
248	P248	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.037
249	P249	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	4.529
250	P250	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.259

Pipe Id	Pipe Name	Material	Schedule Class	Diameter Dalam (mm)	Ketebalan (mm)	Diameter luar (mm)	Panjang (m)
251	P251	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.027
252	P252	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.259
253	P253	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.332
254	P254	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.332
255	P255	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.114
256	P256	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.381
257	P257	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.332
258	P258	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.524
259	P259	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.1
260	P260	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	4.133
261	P261	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.114
262	P262	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.114
263	P263	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.114
264	P264	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.461
265	P265	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	2.664
266	P266	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.15
267	P267	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.42
268	P268	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.203
269	P269	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	3.585
270	P270	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.114
271	P271	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.582
272	P272	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.171
273	P273	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.269
274	P274	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	2.518
275	P275	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.218
276	P276	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.329
277	P277	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.146
278	P278	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.114

Pipe Id	Pipe Name	Material	Schedule Class	Diameter Dalam (mm)	Ketebalan (mm)	Diameter luar (mm)	Panjang (m)
279	P279	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	3.048
280	P280	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.237
281	P281	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.604
282	P282	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.419
283	P283	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.635
284	P284	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.011
285	P285	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.01
286	P286	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.01
287	P287	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.332
288	P288	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.332
289	P289	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.114
290	P290	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.114
291	P291	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	3.907
292	P292	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.135
293	P293	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.216
294	P294	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.573
295	P295	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.838
296	P296	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.579
297	P297	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	4.03
298	P298	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.108
299	P299	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.15
300	P300	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	6.102
301	P301	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.453
302	P302	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.298
303	P303	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.33
304	P304	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.157
305	P305	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.205
306	P306	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.274

Pipe Id	Pipe Name	Material	Schedule Class	Diameter Dalam (mm)	Ketebalan (mm)	Diameter luar (mm)	Panjang (m)
307	P307	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	4.227
308	P308	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.696
309	P309	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	2.967
310	P310	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.66
311	P311	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.102
312	P312	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.992
313	P313	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	3.048
314	P314	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.145
315	P315	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.25
316	P316	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.12
317	P317	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.293
318	P318	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	3.048
319	P319	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.711
320	P320	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.197
321	P321	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.195
322	P322	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	3.048
323	P323	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	3.683
324	P324	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	1.696
325	P325	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.129
326	P326	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.647
327	P327	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.228
328	P328	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.205
329	P329	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.145
330	P330	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.157
331	P331	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.33
332	P332	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	3.997
333	P333	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	5.937
334	P334	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	2.227

Pipe Id	Pipe Name	Material	Schedule Class	Diameter Dalam (mm)	Ketebalan (mm)	Diameter luar (mm)	Panjang (m)
335	P335	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	2.941
336	P336	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.114
337	P337	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.15
338	P338	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	4.631
339	P339	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.506
340	P340	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.335
341	P341	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.171
342	P342	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.114
343	P343	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.114
344	P344	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.114
345	P345	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.766
346	P346	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	4.311
347	P347	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.608
348	P348	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.375
349	P349	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.452
350	P350	Steel (ANSI)	Sch. 32	35.052	3.556	42.164	1.645
351	P351	Steel (ANSI)	Sch. 32	35.052	3.556	42.164	4.477
352	P352	Steel (ANSI)	Sch. 32	35.052	3.556	42.164	4.477
353	P353	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	2.253
354	P354	Steel (ANSI)	Sch. 32	35.052	3.556	42.164	1.645
355	P355	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	5.552
356	P356	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	4.371
357	P357	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	3.106
358	P358	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	4.371
359	P359	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	3.068
360	P360	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.114
361	P361	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	2.344
362	P362	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.696

Pipe Id	Pipe Name	Material	Schedule Class	Diameter Dalam (mm)	Ketebalan (mm)	Diameter luar (mm)	Panjang (m)
363	P363	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	5.523
364	P364	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.15
365	P365	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.15
366	P366	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.15
367	P367	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.15
368	P368	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.15
369	P369	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.15
370	P370	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.15
371	P371	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.15
372	P372	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.15
373	P373	Steel (ANSI)	Sch. 40	40.894	3.683	48.26	0.15

