

LAMPIRAN

Tabel L.1 Jadwal Penelitian

No	Urutan Penelitian	Bulan Ke-					
		I	II	III	IV	V	VI
1.	Seminar proposal tugas akhir						
2.	Persiapan alat dan bahan turbin turgo <i>multi nozzle</i>						
3.	Pembuatan alat penelitian turbin turgo <i>multi nozzle</i> dengan variasi jumlah <i>Nozzle</i>						
4.	Pengambilan data						
5.	Pengolahan data dan analisa data						
6.	Seminar hasil						
7.	Ujian tugas akhir						

Tabel L. 2 Jurnal Referensi

No	Author	Publisher	Judul	Tujuan	Metode	Hasil
1.	Angga Nugraha ¹ , Zakwan Hilmy ² , Trisno Susilo ³ , Fajar Tyas Adi ⁴ .	Jurnal Sains Dan Teknologi Maritin (JSTM) Volume 25 Nomor 2 Maret 2025.	Pengaruh tinggi nozzle terhadap dimensi akhir dan kekerasan permukaan benda kerja pada proses pemotongan menggunakan plasma arc cutting.	Penelitian ini bertujuan untuk mengkaji pengaruh tinggi nozzle pada proses pemotongan menggunakan plasma Arc Cutting (PAC) terhadap dimensi akhir dan kekerasan permukaan benda kerja.	Metode pemotongan yang menggunakan busur plasma untuk memotong berbagai jenis material, yang populer dalam industri manufaktur.	Penelitian ini mengevaluasi perubahan dimensi potongan dan kekerasan permukaan benda kerja pada variasi tinggi nozzle yang berbeda, serta memberikan hubungan antara parameter tersebut dengan hasil pemotongan.
2.	Mochamad Riko Juliano, Priyo Heru Adiwibowo.	JTM. Volume 13 Nomor 01 Tahun 2024.	Studi Eksperimental Pengaruh Variasi Jumlah Sudu Berpenampang Segitiga Terhadap Daya Dan Efisiensi Turbin Pelton.	Tujuan penelitian ini adalah untuk mengetahui jumlah sudu segitiga turbin pelton yang memiliki daya dan efisiensi paling optimal.	Dalam penelitian ini menggunakan metode eksperimen yaitu memvariasikan jumlah sudu yakni 10, 12, dan 14 buah pada turbin pelton bersudu segitiga 1100.	Dari hasil penelitian, pengujian, dan analisis yang dilakukan, Daya keluaran terbesar yang diperoleh dari pengujian variasi jumlah sudu turbin pelton adalah 46,255 Watt. Hal ini dicapai oleh sudu 12 dengan beban 25 kg dan laju aliran 0,003114 m ³ /s. Turbin variasi 12 buah menghasilkan daya yang lebih besar dibanding turbin dengan 10 dan 14 buah. Hubungan

						antara kapasitas aliran air dan daya turbin berbanding lurus. Demikian pula, kapasitas aliran air berbanding lurus dengan beban yang dikonsumsi.
3.	Dharmacakra Ramaputra, dan Jusuf Haurissa.	Jurnal Dinamis Volume 19 Nomor 1 Juli Tahun 2022.	Analisa Kinerja Turbin Turgo Dan Turbin Pelton Skala Laboratorium.	Bertujuan untuk menganalisa perbandingan kinerja turbin turgo dan turbin pelton skala laboratorium.	Metode yang digunakan pada penelitian ini adalah eksperimen laboratorium. Turbin turgo dan turbin pelton dipasang ke simulator turbin dengan secara bergantian.	Hasil dari analisa perbandingan kinerja turbin turgo dan pelton daya dan efisiensi dari turbin turgo dan pelton yang terbesar pada masing masing bukaan nozzle 25%,50%,75% dan 100% , turbin turgo dan pelton dengan bukaan nozzle 25% daya yang dihasilkan turbin turgo 67,96 W dan efisiensi 35,49 sedangkan daya pada turbin pelton 83,72W dan efisiensi 41,71, pada bukaan nozzle 50% dari daya dan efisiensi turbin turgo dan pelton yang terbesar daya turbin turgo 87,37W dan efisiensi 44,75% sedangkan daya turbin pelton 95,5W dan efisiensi 46,66%.
4.	Nitha, Nofrianto Pasae , Fikran,	Journal Of Social Science	Efisiensi Turbin Air Gorlov Empat	Untuk mengukur torsi, daya, dan efisiensi maksimum dari	Metode eksperimen digunakan dalam	Pengujian turbin air Helical Gorlov dengan variasi pitch angle 30 °, 45 °, dan 60 °

	Yafet Bontong, Petrus Sampelawang.	Research Volume 4 Nomor 3 Tahun 2024.	Sudu Helical dengan Variasi <i>Pitch Angle</i> .	prototipe turbin air Gorlov 4 (empat) sudu helical dengan variasi pitch angle (sudut kemiringan) dan twist angle (sudut puntir) 60 derajat.	penelitian ini untuk menguji kinerja prototipe turbin air dengan variasi pitch angle (sudut kemiringan) untuk mengukur torsi, daya, dan efisiensi mekanis.	menghasilkan torsi maksimum sebesar 3,88Nm pada beban 11 kg, daya maksimum sebesar 19,1 Watt dengan putaran 93,9 rpm, dan efisiensi maksimum sebesar 7,24% dengan putaran 93,9 rpm.
5.	Muhammad Arsyad	Jurnal Andellin Reksa 12 Januari 2022	Analisis pengaruh variasi jumlah nozzle terhadap kinerja turbin air turgo.	Untuk menggantikan turbin pelton nozzle ganda dengan head rendah maupun turbin francis dengan head tinggi turbin turgo dapat bekerja pada head menengah antara 15 m-300 m.	Metode pengujian terdiri dari rumah turbin dan runner turbin atau roda jalan. Rumah turbin dilengkapi dengan nozzle berpenampang lingkaran, nozzle berfungsi untuk menghasilkan jet aliran dengan cara mengubah head tekanan menjadi kecepatan.	Hasil penelitian menunjukkan bahwa variasi jumlah nozzle sangat berpengaruh terhadap perputaran turbin air turgo, putaran terbesar di dapatkan pada jumlah nozzle 2 buah dengan nilai putaran yang dihasilkan sebesar 443,6 Rpm. Dari hasil penelitian diketahui bahwa variasi jumlah nozzle sangat berpengaruh terhadap nilai torsi dari turbin air turgo, dimana torsi terbesar didapatkan pada jumlah nozzle 2 buah dengan nilai torsi sebesar 0,053 Nm.

6.	Fina Andika Frida Astuti, Arif Rochman Fachudin ,,	Jurnal INTEKNA, Volume 22, No. 1, Mei 2022.	Optimasi Turbin Air Crossflow Dengan Menggunakan Metode Taguchi.	Tujuan penelitian ini adalah untuk mendapatkan desain yang optimum turbin air crossflow dalam menghasilkan daya listrik dengan menggunakan metode taguchi..	Metode Penelitian menggunakan system Rangkaian turbin air crossflow skala Laboratorium.	Dari hasil pengujian penelitian ini dihasilkan grafik respon dari jumlah sudu, sudut sudu dan debit air terhadap daya listrik yang dihasilkan Dari analisa menggunakan metode taguchi menunjukkan bahwa daya listrik terbesar dihasilkan pada turbin air crossflow pada sudu berjumlah 10, pada sudut 1000 dan debit air 0,005 m ³ /s hal ini dikarenakan, pada sudut berjumlah 10 distribusi tekanan air.
7.	Petrus Sampelawang, Nofrianto Pasae, Kristof Gerald Simon.	Jurnal Prosiding Universitas Kristen Indonesia Toraja 2(3), 71-78	Uji Eksperimental Turbin Aliran Vortex Dengan Case Berpenampang Persegi Tipis Sudu Propeller Akibat Variasi Jumlah Sudu.	Penelitian ini bertujuan untuk menghasilkan torsi, daya, dan efisiensi pada turbin vortex dengan cara memperoleh hasil dari debit aliran, putaran rpm dan beban. Untuk mengetahui rata-rata nilai yang dihasilkan,	Metode yang digunakan adalah metode eksperimen untuk melakukan uji coba terhdap turbin vortex model sudu propeller dengan variasi jumlah sudu 3, 4, dan 5	Torsi maksimum yang dihasilkan oleh turbin vortex dengan model sudu propeller 3 sudu adalah sebesar 4,91 Nm pada putaran 0 rpm, dan debit aliran 0,02/s dengan beban 20 kg. Gaya maksimum yang dihasilkan oleh turbin vortex dengan model sudu propeller 3 sudu adalah sebesar 32,17 Watt pada putaran 179,02 rpm

				dilihat dari setiap jumlah sudu yang divariasikan yaitu 3 sudu, 4 sudu, dan 5 sudu.	sudu untuk mendapatkan torsi, daya, dan efisiensi dengan melakukan pengukuran debit aliran putaran sudu dan beban. Untuk digunakan pada analisa perhitungan yang nantinya hasil perhitungan tersebut disajikan dalam bentuk grafik.	dan debit aliran 0,02/s dengan beban 7 kg. Efisiensi maksimum yang dihasilkan oleh turbin vortex dengan model sudu propeller 3 sudu adalah sebesar 20,45 % pada putaran 179,02 rpm dan debit aliran 0,02/s dengan beban 7 kg.
8.	Michael Handry ¹ , Steven Darmawan ² , M. Sobron Y. Lubis ³ .	Jurnal Teknik Industri Terintegrasi 2023.	Pengaruh nozzle dan pengaruh variasi terhadap mini turbin.	untuk mengubah energi kinetik air menjadi energi mekanik yang dapat digunakan untuk menggerakkan generator listrik.	Metode perancangan nozzle, berbagai parameter seperti bentuk nozzle, diameter, sudut, dan panjang nozzle diperhitungkan untuk mencapai	Hasil penelitian ini menunjukkan bahwa perancangan nozzle yang optimal dapat signifikan meningkatkan kinerja energi hidrokinetik pada turbin air. Desain nozzle yang efisien dapat meningkatkan kecepatan air, sehingga menghasilkan peningkatan daya yang

					performa yang optima.	dihasilkan oleh turbin. Selain itu, penggunaan algoritma genetik dalam optimasi desain nozzle membantu dalam mendapatkan desain yang optimal secara efisien.
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Tabel L. 3 Data Pengukuran Beban Dan Putaran Pada Variasi 2 *Nozzle*

No,	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu
1	211.6	07/08/2025 20:05	204.3	07/08/2025 20:09	197.6	07/08/2025 20:11	192.3	07/08/2025 20:14	179.8	07/08/2025 20:17	34.67	07/08/2025 20:19
2	211.9	08/08/2025 20:05	204.6	08/08/2025 20:09	197.6	08/08/2025 20:11	193.5	08/08/2025 20:14	179.8	08/08/2025 20:17	116.1	08/08/2025 20:19
3	211.9	09/08/2025 20:05	204.6	09/08/2025 20:09	198.1	09/08/2025 20:11	193.5	09/08/2025 20:14	179.8	09/08/2025 20:17	116.1	09/08/2025 20:19
4	212.4	10/08/2025 20:05	204.6	10/08/2025 20:09	198.1	10/08/2025 20:11	193.5	10/08/2025 20:14	179.9	10/08/2025 20:17	169.4	10/08/2025 20:19
5	212.4	11/08/2025 20:05	204.6	11/08/2025 20:09	197.9	11/08/2025 20:11	194.8	11/08/2025 20:14	179.9	11/08/2025 20:17	169.4	11/08/2025 20:19
6	212.8	12/08/2025 20:05	204.6	12/08/2025 20:09	197.9	12/08/2025 20:11	194.8	12/08/2025 20:14	180	12/08/2025 20:17	169.4	12/08/2025 20:19
7	212.8	13/08/2025 20:05	204.3	13/08/2025 20:09	197.4	13/08/2025 20:11	193.4	13/08/2025 20:14	180	13/08/2025 20:17	172.1	13/08/2025 20:19
8	212.9	14/08/2025 20:05	204.3	14/08/2025 20:09	197.4	14/08/2025 20:11	193.4	14/08/2025 20:14	179.9	14/08/2025 20:17	172.1	14/08/2025 20:19
9	212.9	15/08/2025 20:05	204	15/08/2025 20:09	197.4	15/08/2025 20:11	193.4	15/08/2025 20:14	179.9	15/08/2025 20:17	177	15/08/2025 20:19
10	212.9	16/08/2025 20:05	204	16/08/2025 20:09	198.2	16/08/2025 20:11	193	16/08/2025 20:14	179.9	16/08/2025 20:17	177	16/08/2025 20:19
11	211.8	17/08/2025 20:05	204	17/08/2025 20:09	198.2	17/08/2025 20:11	193	17/08/2025 20:14	181.1	17/08/2025 20:17	175.8	17/08/2025 20:19
12	211.8	18/08/2025 20:05	204	18/08/2025 20:09	197.9	18/08/2025 20:11	194.1	18/08/2025 20:14	181.1	18/08/2025 20:17	175.8	18/08/2025 20:19
13	210.7	19/08/2025 20:05	204	19/08/2025 20:09	197.9	19/08/2025 20:11	194.1	19/08/2025 20:14	181	19/08/2025 20:17	174.9	19/08/2025 20:19
14	210.7	20/08/2025 20:05	203.8	20/08/2025 20:09	197.9	20/08/2025 20:11	194.1	20/08/2025 20:14	181	20/08/2025 20:17	174.9	20/08/2025 20:19
15	211	21/08/2025 20:05	203.8	21/08/2025 20:09	198.4	21/08/2025 20:11	194.6	21/08/2025 20:14	181	21/08/2025 20:17	174.8	21/08/2025 20:19
16	211	22/08/2025 20:05	203.9	22/08/2025 20:09	198.4	22/08/2025 20:11	194.6	22/08/2025 20:14	180.7	22/08/2025 20:17	174.8	22/08/2025 20:19
17	211	23/08/2025 20:05	203.9	23/08/2025 20:09	198.6	23/08/2025 20:11	193.8	23/08/2025 20:14	180.7	23/08/2025 20:17	175.5	23/08/2025 20:19
18	212	24/08/2025 20:05	203.9	24/08/2025 20:09	198.6	24/08/2025 20:11	193.8	24/08/2025 20:14	180.4	24/08/2025 20:17	175.5	24/08/2025 20:19
19	212	25/08/2025 20:05	204.4	25/08/2025 20:09	198.6	25/08/2025 20:11	193.8	25/08/2025 20:14	180.4	25/08/2025 20:17	174.8	25/08/2025 20:19
20	212.2	26/08/2025 20:05	204.4	26/08/2025 20:09	196.1	26/08/2025 20:11	194.1	26/08/2025 20:14	180.4	26/08/2025 20:17	174.8	26/08/2025 20:19
21	212.2	27/08/2025 20:05	204.5	27/08/2025 20:09	196.1	27/08/2025 20:11	194.1	27/08/2025 20:14	180.6	27/08/2025 20:17	174	27/08/2025 20:19
22	212.6	28/08/2025 20:05	204.5	28/08/2025 20:09	193.4	28/08/2025 20:11	193.8	28/08/2025 20:14	180.6	28/08/2025 20:17	174	28/08/2025 20:19
23	212.6	29/08/2025 20:05	204.4	29/08/2025 20:09	193.4	29/08/2025 20:11	193.8	29/08/2025 20:14	181.3	29/08/2025 20:17	174.3	29/08/2025 20:19
24	212.3	30/08/2025 20:05	204.4	30/08/2025 20:09	193.4	30/08/2025 20:11	193.8	30/08/2025 20:14	181.3	30/08/2025 20:17	174.3	30/08/2025 20:19
25	212.3	31/08/2025 20:05	204.4	31/08/2025 20:09	189.9	31/08/2025 20:11	193.4	31/08/2025 20:14	181.3	31/08/2025 20:17	176.5	31/08/2025 20:19
26	212.3	01/09/2025 20:05	204.9	01/09/2025 20:09	189.9	01/09/2025 20:11	193.4	01/09/2025 20:14	180.6	01/09/2025 20:17	176.5	01/09/2025 20:19
27	211.5	02/09/2025 20:05	204.9	02/09/2025 20:09	190.1	02/09/2025 20:11	193.8	02/09/2025 20:14	180.6	02/09/2025 20:17	177.2	02/09/2025 20:19
28	211.5	03/09/2025 20:05	204.4	03/09/2025 20:09	190.1	03/09/2025 20:11	193.8	03/09/2025 20:14	180.6	03/09/2025 20:17	177.2	03/09/2025 20:19
29	212.5	04/09/2025 20:05	204.4	04/09/2025 20:09	190.1	04/09/2025 20:11	193.8	04/09/2025 20:14	180.4	04/09/2025 20:17	175.8	04/09/2025 20:19
30	212.5	05/09/2025 20:05	203.2	07/08/2025 20:09	193.3	07/08/2025 20:11	194	05/09/2025 20:14	180.4	05/09/2025 20:17	175.8	05/09/2025 20:19
	201,03		195,21		189,93		180,78		171,48		163,51	

Beban 3 Kg		Beban 3,5 Kg		Beban 4 Kg		Beban 4,5 Kg		Beban 5 Kg		Beban 5,5 Kg	
Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu
168.5	07/08/2025 20:20	159.7	07/08/2025 20:22	154.8	07/08/2025 20:24	94.91	07/08/2025 20:26	144.5	07/08/2025 20:28	136.8	07/08/2025 20:29
168.8	08/08/2025 20:20	159.1	08/08/2025 20:22	155	08/08/2025 20:24	54.17	08/08/2025 20:26	144.5	08/08/2025 20:28	136.8	08/08/2025 20:29
168.8	09/08/2025 20:20	159.1	09/08/2025 20:22	155	09/08/2025 20:24	54.17	09/08/2025 20:26	143	09/08/2025 20:28	136.8	09/08/2025 20:29
168.6	10/08/2025 20:20	159.1	10/08/2025 20:22	156.3	10/08/2025 20:24	54.17	10/08/2025 20:26	143	10/08/2025 20:28	139.2	10/08/2025 20:29
168.6	11/08/2025 20:20	159.6	11/08/2025 20:22	156.3	11/08/2025 20:24	54.17	11/08/2025 20:26	143	11/08/2025 20:28	139.2	11/08/2025 20:29
167.5	12/08/2025 20:20	159.6	12/08/2025 20:22	157.1	12/08/2025 20:24	47.91	12/08/2025 20:26	144.1	12/08/2025 20:28	139.2	12/08/2025 20:29
167.5	13/08/2025 20:20	160.3	13/08/2025 20:22	157.1	13/08/2025 20:24	47.91	13/08/2025 20:26	144.1	13/08/2025 20:28	118.5	13/08/2025 20:29
167.9	14/08/2025 20:20	160.3	14/08/2025 20:22	157.1	14/08/2025 20:24	47.91	14/08/2025 20:26	145.7	14/08/2025 20:28	118.5	14/08/2025 20:29
167.9	15/08/2025 20:20	161.4	15/08/2025 20:22	156.8	15/08/2025 20:24	96.18	15/08/2025 20:26	145.7	15/08/2025 20:28	115.9	15/08/2025 20:29
167.7	16/08/2025 20:20	161.4	16/08/2025 20:22	156.8	16/08/2025 20:24	96.18	16/08/2025 20:26	146.3	16/08/2025 20:28	115.9	16/08/2025 20:29
167.7	17/08/2025 20:20	160.6	17/08/2025 20:22	156.6	17/08/2025 20:24	96.18	17/08/2025 20:26	146.3	17/08/2025 20:28	115.9	17/08/2025 20:29
167.5	18/08/2025 20:20	160.6	18/08/2025 20:22	156.6	18/08/2025 20:24	101.9	18/08/2025 20:26	146.3	18/08/2025 20:28	136.7	18/08/2025 20:29
167.5	19/08/2025 20:20	160.6	19/08/2025 20:22	156.7	19/08/2025 20:24	101.9	19/08/2025 20:26	146.4	19/08/2025 20:28	136.7	19/08/2025 20:29
167.7	20/08/2025 20:20	160.4	20/08/2025 20:22	156.7	20/08/2025 20:24	88.31	20/08/2025 20:26	146.4	20/08/2025 20:28	136.7	20/08/2025 20:29
167.7	21/08/2025 20:20	160.4	21/08/2025 20:22	156.7	21/08/2025 20:24	88.31	21/08/2025 20:26	145.4	21/08/2025 20:28	138.3	21/08/2025 20:29
167.7	22/08/2025 20:20	160.9	22/08/2025 20:22	157.8	22/08/2025 20:24	88.31	22/08/2025 20:26	145.4	22/08/2025 20:28	138.3	22/08/2025 20:29
168.1	23/08/2025 20:20	160.9	23/08/2025 20:22	157.8	23/08/2025 20:24	121.7	23/08/2025 20:26	145.4	23/08/2025 20:28	139.8	23/08/2025 20:29
168.1	24/08/2025 20:20	160.4	24/08/2025 20:22	158.3	24/08/2025 20:24	121.7	24/08/2025 20:26	144.2	24/08/2025 20:28	139.8	24/08/2025 20:29
168.2	25/08/2025 20:20	160.4	25/08/2025 20:22	158.3	25/08/2025 20:24	121.7	25/08/2025 20:26	144.2	25/08/2025 20:28	139.8	25/08/2025 20:29
168.2	26/08/2025 20:20	162.2	26/08/2025 20:22	158.1	26/08/2025 20:24	123.3	26/08/2025 20:26	144	26/08/2025 20:28	139.4	26/08/2025 20:29
168.7	27/08/2025 20:20	162.2	27/08/2025 20:22	158.1	27/08/2025 20:24	123.3	27/08/2025 20:26	144	27/08/2025 20:28	139.4	27/08/2025 20:29
168.7	28/08/2025 20:20	163.4	28/08/2025 20:22	158.2	28/08/2025 20:24	123.3	28/08/2025 20:26	144	28/08/2025 20:28	139.5	28/08/2025 20:29
169.1	29/08/2025 20:20	163.4	29/08/2025 20:22	158.2	29/08/2025 20:24	117.9	29/08/2025 20:26	144.4	29/08/2025 20:28	139.5	29/08/2025 20:29
169.1	30/08/2025 20:20	163.4	30/08/2025 20:22	158.2	30/08/2025 20:24	117.9	30/08/2025 20:26	144.4	30/08/2025 20:28	139.5	30/08/2025 20:29
168.8	31/08/2025 20:20	160.6	31/08/2025 20:22	158.1	31/08/2025 20:24	138.4	31/08/2025 20:26	144.5	31/08/2025 20:28	139.3	31/08/2025 20:29
168.8	01/09/2025 20:20	160.6	01/09/2025 20:22	158.1	01/09/2025 20:24	138.4	01/09/2025 20:26	144.5	01/09/2025 20:28	139.3	01/09/2025 20:29
168.6	02/09/2025 20:20	159.5	02/09/2025 20:22	157.7	02/09/2025 20:24	138.4	02/09/2025 20:26	144.5	02/09/2025 20:28	139.3	02/09/2025 20:29
168.6	03/09/2025 20:20	159.5	03/09/2025 20:22	157.7	03/09/2025 20:24	148.1	03/09/2025 20:26	145.1	03/09/2025 20:28	138.8	03/09/2025 20:29
168.5	04/09/2025 20:20	160	04/09/2025 20:22	157.9	04/09/2025 20:24	148.1	04/09/2025 20:26	145.1	04/09/2025 20:28	138.8	04/09/2025 20:29
168.5	05/09/2025 20:20	160	05/09/2025 20:22	157.9	07/08/2025 20:24	148.3	05/09/2025 20:26	144.1	05/09/2025 20:28	139	05/09/2025 20:29
155,25		149,61		140,31		133,21		121,73		113,71	

Beban 6 Kg		Beban 6,5 Kg		Beban 7 Kg		Beban 7,5 Kg		Beban 8 Kg		Beban 8,5 Kg	
Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu
133.2	07/08/2025 20:31	114.9	07/08/2025 20:34	105.5	07/08/2025 20:37	73.59	07/08/2025 20:39	74.67	07/08/2025 20:41	49.83	07/08/2025 20:44
133.2	08/08/2025 20:31	114.9	08/08/2025 20:34	102	08/08/2025 20:37	73.59	08/08/2025 20:39	80	08/08/2025 20:41	49.83	08/08/2025 20:44
134.6	09/08/2025 20:31	116.2	09/08/2025 20:34	102	09/08/2025 20:37	46.85	09/08/2025 20:39	80	09/08/2025 20:41	49.83	09/08/2025 20:44
134.6	10/08/2025 20:31	116.2	10/08/2025 20:34	102	10/08/2025 20:37	46.85	10/08/2025 20:39	80	10/08/2025 20:41	49.83	10/08/2025 20:44
134.6	11/08/2025 20:31	115.8	11/08/2025 20:34	104.1	11/08/2025 20:37	46.85	11/08/2025 20:39	85.42	11/08/2025 20:41	49.83	11/08/2025 20:44
135.5	12/08/2025 20:31	115.8	12/08/2025 20:34	104.1	12/08/2025 20:37	67.42	12/08/2025 20:39	85.42	12/08/2025 20:41	59.1	12/08/2025 20:44
135.5	13/08/2025 20:31	116.4	13/08/2025 20:34	111	13/08/2025 20:37	67.42	13/08/2025 20:39	86.63	13/08/2025 20:41	59.1	13/08/2025 20:44
135.5	14/08/2025 20:31	116.4	14/08/2025 20:34	111	14/08/2025 20:37	94.85	14/08/2025 20:39	86.63	14/08/2025 20:41	59.1	14/08/2025 20:44
135.5	15/08/2025 20:31	118.8	15/08/2025 20:34	111.3	15/08/2025 20:37	94.85	15/08/2025 20:39	86.63	15/08/2025 20:41	44.36	15/08/2025 20:44
135.5	16/08/2025 20:31	118.8	16/08/2025 20:34	111.3	16/08/2025 20:37	94.85	16/08/2025 20:39	88.76	16/08/2025 20:41	44.36	16/08/2025 20:44
135.6	17/08/2025 20:31	119.4	17/08/2025 20:34	110.3	17/08/2025 20:37	98.24	17/08/2025 20:39	88.76	17/08/2025 20:41	44.36	17/08/2025 20:44
135.6	18/08/2025 20:31	119.4	18/08/2025 20:34	110.3	18/08/2025 20:37	98.24	18/08/2025 20:39	88.76	18/08/2025 20:41	44.36	18/08/2025 20:44
135.6	19/08/2025 20:31	118.4	19/08/2025 20:34	108.3	19/08/2025 20:37	98.65	19/08/2025 20:39	89.99	19/08/2025 20:41	46.89	19/08/2025 20:44
135.2	20/08/2025 20:31	118.4	20/08/2025 20:34	108.3	20/08/2025 20:37	98.65	20/08/2025 20:39	89.99	20/08/2025 20:41	46.89	20/08/2025 20:44
135.2	21/08/2025 20:31	118.4	21/08/2025 20:34	108.3	21/08/2025 20:37	98.65	21/08/2025 20:39	90.35	21/08/2025 20:41	46.89	21/08/2025 20:44
135.2	22/08/2025 20:31	119.4	22/08/2025 20:34	106.3	22/08/2025 20:37	98.6	22/08/2025 20:39	90.35	22/08/2025 20:41	46.89	22/08/2025 20:44
134.5	23/08/2025 20:31	119.4	23/08/2025 20:34	106.3	23/08/2025 20:37	98.6	23/08/2025 20:39	90.35	23/08/2025 20:41	59.61	23/08/2025 20:44
134.5	24/08/2025 20:31	119.4	24/08/2025 20:34	107.5	24/08/2025 20:37	98.86	24/08/2025 20:39	91.74	24/08/2025 20:41	59.61	24/08/2025 20:44
134.7	25/08/2025 20:31	120.5	25/08/2025 20:34	107.5	25/08/2025 20:37	98.86	25/08/2025 20:39	91.74	25/08/2025 20:41	59.61	25/08/2025 20:44
134.7	26/08/2025 20:31	120.5	26/08/2025 20:34	107.6	26/08/2025 20:37	98.86	26/08/2025 20:39	93.03	26/08/2025 20:41	59.61	26/08/2025 20:44
134.7	27/08/2025 20:31	120.5	27/08/2025 20:34	107.6	27/08/2025 20:37	100	27/08/2025 20:39	93.03	27/08/2025 20:41	59.61	27/08/2025 20:44
136	28/08/2025 20:31	121.1	28/08/2025 20:34	105.7	28/08/2025 20:37	100	28/08/2025 20:39	93.03	28/08/2025 20:41	57.09	28/08/2025 20:44
136	29/08/2025 20:31	121.1	29/08/2025 20:34	105.7	29/08/2025 20:37	98.59	29/08/2025 20:39	92.23	29/08/2025 20:41	57.09	29/08/2025 20:44
136	30/08/2025 20:31	121.1	30/08/2025 20:34	105.7	30/08/2025 20:37	98.59	30/08/2025 20:39	92.23	30/08/2025 20:41	55.77	30/08/2025 20:44
135.5	31/08/2025 20:31	122.4	31/08/2025 20:34	105.7	31/08/2025 20:37	97.75	31/08/2025 20:39	92.23	31/08/2025 20:41	55.77	31/08/2025 20:44
135.5	01/09/2025 20:31	122.4	01/09/2025 20:34	105.7	01/09/2025 20:37	97.75	01/09/2025 20:39	92.1	01/09/2025 20:41	54.01	01/09/2025 20:44
134.5	02/09/2025 20:31	117.7	02/09/2025 20:34	105.3	02/09/2025 20:37	97.75	02/09/2025 20:39	92.1	02/09/2025 20:41	54.01	02/09/2025 20:44
134.5	03/09/2025 20:31	117.7	03/09/2025 20:34	105.3	03/09/2025 20:37	99.97	03/09/2025 20:39	93.86	03/09/2025 20:41	54.01	03/09/2025 20:44
134.5	04/09/2025 20:31	117.7	04/09/2025 20:34	103.3	04/09/2025 20:37	99.97	04/09/2025 20:39	93.86	04/09/2025 20:41	45.93	04/09/2025 20:44
134.7	05/09/2025 20:31	121.2	05/09/2025 20:34	103.3	05/09/2025 20:37	99.32	05/09/2025 20:39	93.86	05/09/2025 20:41	45.93	07/08/2025 20:44
102,01		90,61		82,61		73,43		63,98		55,30	

Beban 9 Kg		Beban 9,5 Kg		Beban 10 Kg		Beban 10,5 Kg	
Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu
53.2	07/08/2025 20:46	38.08	07/08/2025 20:48	31.05	07/08/2025 21:03	0	07/08/2025 20:48
53.2	08/08/2025 20:46	38.08	08/08/2025 20:48	31.05	08/08/2025 21:03	0	08/08/2025 20:48
53.2	09/08/2025 20:46	38.08	09/08/2025 20:48	31.05	09/08/2025 21:03	0	09/08/2025 20:48
52.18	10/08/2025 20:46	38.08	10/08/2025 20:48	31.05	10/08/2025 21:03	0	10/08/2025 20:48
52.18	11/08/2025 20:46	32.98	11/08/2025 20:48	39.41	11/08/2025 21:03	0	11/08/2025 20:48
49.37	12/08/2025 20:46	32.98	12/08/2025 20:48	39.41	12/08/2025 21:03	0	12/08/2025 20:48
49.37	13/08/2025 20:46	32.98	13/08/2025 20:48	39.41	13/08/2025 21:03	0	13/08/2025 20:48
49.03	14/08/2025 20:46	37.34	14/08/2025 20:48	39.41	14/08/2025 21:03	0	14/08/2025 20:48
49.03	15/08/2025 20:46	37.34	15/08/2025 20:48	39.41	15/08/2025 21:03	0	15/08/2025 20:48
49.03	16/08/2025 20:46	43.9	16/08/2025 20:48	39.4	16/08/2025 21:03	0	16/08/2025 20:48
52.22	17/08/2025 20:46	43.9	17/08/2025 20:48	39.4	17/08/2025 21:03	0	17/08/2025 20:48
52.22	18/08/2025 20:46	43.9	18/08/2025 20:48	39.4	18/08/2025 21:03	0	18/08/2025 20:48
55.51	19/08/2025 20:46	47.51	19/08/2025 20:48	39.4	19/08/2025 21:03	0	19/08/2025 20:48
55.51	20/08/2025 20:46	47.51	20/08/2025 20:48	39.4	20/08/2025 21:03	0	20/08/2025 20:48
55.51	21/08/2025 20:46	49.52	21/08/2025 20:48	45.28	21/08/2025 21:03	0	21/08/2025 20:48
55.51	22/08/2025 20:46	49.52	22/08/2025 20:48	45.28	22/08/2025 21:03	0	22/08/2025 20:48
55.54	23/08/2025 20:46	49.52	23/08/2025 20:48	45.28	23/08/2025 21:03	0	23/08/2025 20:48
55.54	24/08/2025 20:46	43.8	24/08/2025 20:48	45.28	24/08/2025 21:03	0	24/08/2025 20:48
55.54	25/08/2025 20:46	43.8	25/08/2025 20:48	42.5	25/08/2025 21:03	0	25/08/2025 20:48
54.01	26/08/2025 20:46	43.8	26/08/2025 20:48	42.5	26/08/2025 21:03	0	26/08/2025 20:48
54.01	27/08/2025 20:46	43.8	27/08/2025 20:48	42.5	27/08/2025 21:03	0	27/08/2025 20:48
49.45	28/08/2025 20:46	36.08	28/08/2025 20:48	42.5	28/08/2025 21:03	0	28/08/2025 20:48
49.45	29/08/2025 20:46	36.08	29/08/2025 20:48	42.5	29/08/2025 21:03	0	29/08/2025 20:48
49.45	30/08/2025 20:46	41.9	30/08/2025 20:48	42.5	30/08/2025 21:03	0	30/08/2025 20:48
42.59	31/08/2025 20:46	41.9	31/08/2025 20:48	42.5	31/08/2025 21:03	0	31/08/2025 20:48
42.59	01/09/2025 20:46	53.11	01/09/2025 20:48	27.61	01/09/2025 21:03	0	01/09/2025 20:48
42.59	02/09/2025 20:46	53.11	02/09/2025 20:48	27.61	02/09/2025 21:03	0	02/09/2025 20:48
41.58	03/09/2025 20:46	53.11	03/09/2025 20:48	27.61	03/09/2025 21:03	0	03/09/2025 20:48
41.58	04/09/2025 20:46	55.41	04/09/2025 20:48	27.61	04/09/2025 21:03	0	04/09/2025 20:48
50.14	07/08/2025 20:46	55.41	05/09/2025 20:48	27.61	05/09/2025 21:03	0	05/09/2025 20:48
43,47		37,61		24,83		0,00	

Tabel L. 4 Data Pengukuran Beban Dan Putaran Pada Variasi 3 *Nozzle*

Tanpa Beban			Beban 0,5 Kg		Beban 1 Kg		Beban 1,5 Kg	
No,	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu
1	194.3	10/08/2025 15:43	184	10/08/2025 15:47	179.3	10/08/2025 15:48	170.4	10/08/2025 15:50
2	194.3	11/08/2025 15:43	185.6	10/08/2025 15:47	179.7	11/08/2025 15:48	170.4	10/08/2025 15:50
3	194.2	12/08/2025 15:43	185.6	10/08/2025 15:47	179.7	12/08/2025 15:48	170.9	11/08/2025 15:50
4	194.2	13/08/2025 15:43	184.6	11/08/2025 15:47	178.6	13/08/2025 15:48	170.9	12/08/2025 15:50
5	194.2	14/08/2025 15:43	184.6	12/08/2025 15:47	178.6	14/08/2025 15:48	171.2	13/08/2025 15:50
6	194.2	15/08/2025 15:43	184.6	13/08/2025 15:47	178.7	15/08/2025 15:48	171.2	14/08/2025 15:50
7	194.2	16/08/2025 15:43	183.5	14/08/2025 15:47	178.7	16/08/2025 15:48	171.2	15/08/2025 15:50
8	193.9	17/08/2025 15:43	183.5	15/08/2025 15:47	178	17/08/2025 15:48	171.9	16/08/2025 15:50
9	193.9	18/08/2025 15:43	184.6	16/08/2025 15:47	178	18/08/2025 15:48	171.9	17/08/2025 15:50
10	193.8	19/08/2025 15:43	184.6	17/08/2025 15:47	178.1	19/08/2025 15:48	171.2	18/08/2025 15:50
11	193.8	20/08/2025 15:43	182.2	18/08/2025 15:47	178.1	20/08/2025 15:48	171.2	19/08/2025 15:50
12	193.8	21/08/2025 15:43	182.2	19/08/2025 15:47	179.6	21/08/2025 15:48	170.3	20/08/2025 15:50
13	194.4	22/08/2025 15:43	182.2	20/08/2025 15:47	179.6	22/08/2025 15:48	170.3	21/08/2025 15:50
14	194.4	23/08/2025 15:43	182.9	21/08/2025 15:47	179.9	23/08/2025 15:48	170.6	22/08/2025 15:50
15	194.6	24/08/2025 15:43	182.9	22/08/2025 15:47	179.9	24/08/2025 15:48	170.6	23/08/2025 15:50
16	194.6	25/08/2025 15:43	182.9	23/08/2025 15:47	179.7	25/08/2025 15:48	170.7	24/08/2025 15:50
17	194.3	26/08/2025 15:43	185.6	24/08/2025 15:47	179.7	26/08/2025 15:48	170.7	25/08/2025 15:50
18	194.3	27/08/2025 15:43	185.6	25/08/2025 15:47	179.4	27/08/2025 15:48	171.2	26/08/2025 15:50
19	194.3	28/08/2025 15:43	184.9	26/08/2025 15:47	179.4	28/08/2025 15:48	171.2	27/08/2025 15:50
20	194.1	29/08/2025 15:43	184.9	27/08/2025 15:47	180	29/08/2025 15:48	171.8	28/08/2025 15:50
21	194.1	30/08/2025 15:43	184.9	28/08/2025 15:47	180	30/08/2025 15:48	171.8	29/08/2025 15:50
22	194.7	31/08/2025 15:43	181.7	29/08/2025 15:47	179.6	31/08/2025 15:48	171.1	30/08/2025 15:50
23	194.7	01/09/2025 15:43	181.7	30/08/2025 15:47	179.6	01/09/2025 15:48	171.1	31/08/2025 15:50
24	194.7	02/09/2025 15:43	160.5	31/08/2025 15:47	178.1	02/09/2025 15:48	171.7	01/09/2025 15:50
25	194.6	03/09/2025 15:43	160.5	01/09/2025 15:47	178.1	03/09/2025 15:48	171.7	02/09/2025 15:50
26	194.6	04/09/2025 15:43	160.4	02/09/2025 15:47	178.1	04/09/2025 15:48	172.6	03/09/2025 15:50
27	193.9	05/09/2025 15:43	160.4	03/09/2025 15:47	179.1	05/09/2025 15:48	172.6	04/09/2025 15:50
28	193.9	06/09/2025 15:43	160.4	04/09/2025 15:47	179.1	06/09/2025 15:48	172.6	05/09/2025 15:50
29	193.9	07/09/2025 15:43	181.8	05/09/2025 15:47	179.5	07/09/2025 15:48	172.3	06/09/2025 15:50
30	193.9	08/09/2025 15:43	181.8	06/09/2025 15:47	179.5	10/08/2025 15:49	172.3	07/09/2025 15:50
	219,23		208,85		200,11		192,32	

Beban 2 Kg		Beban 2,5 Kg		Beban 3 Kg		Beban 3,5 Kg	
Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu
163.5	10/08/2025 15:53	159	10/08/2025 15:55	148.2	10/08/2025 15:57	146.9	10/08/2025 15:59
163.5	10/08/2025 15:53	159	10/08/2025 15:55	148.6	10/08/2025 15:57	146.6	10/08/2025 15:59
164	10/08/2025 15:53	160	10/08/2025 15:55	148.6	11/08/2025 15:57	146.6	11/08/2025 15:59
164	11/08/2025 15:53	160	11/08/2025 15:55	150.1	12/08/2025 15:57	146.6	12/08/2025 15:59
164.3	12/08/2025 15:53	159.9	12/08/2025 15:55	150.1	13/08/2025 15:57	146.9	13/08/2025 15:59
164.3	13/08/2025 15:53	159.9	13/08/2025 15:55	150.1	14/08/2025 15:57	146.9	14/08/2025 15:59
164.6	14/08/2025 15:53	159.9	14/08/2025 15:55	150.1	15/08/2025 15:57	147.4	15/08/2025 15:59
164.6	15/08/2025 15:53	159.3	15/08/2025 15:55	150.1	16/08/2025 15:57	147.4	16/08/2025 15:59
164.6	16/08/2025 15:53	159.3	16/08/2025 15:55	150.2	17/08/2025 15:57	147.4	17/08/2025 15:59
164.7	17/08/2025 15:53	160.4	17/08/2025 15:55	150.2	18/08/2025 15:57	148.1	18/08/2025 15:59
164.7	18/08/2025 15:53	160.4	18/08/2025 15:55	150.2	19/08/2025 15:57	148.1	19/08/2025 15:59
164.7	19/08/2025 15:53	161.8	19/08/2025 15:55	149.8	20/08/2025 15:57	148.7	20/08/2025 15:59
164.7	20/08/2025 15:53	161.8	20/08/2025 15:55	149.8	21/08/2025 15:57	148.7	21/08/2025 15:59
162.8	21/08/2025 15:53	161.4	21/08/2025 15:55	149.4	22/08/2025 15:57	149.2	22/08/2025 15:59
162.8	22/08/2025 15:53	161.4	22/08/2025 15:55	149.4	23/08/2025 15:57	149.2	23/08/2025 15:59
163.8	23/08/2025 15:53	161.4	23/08/2025 15:55	148.5	24/08/2025 15:57	149.2	24/08/2025 15:59
163.8	24/08/2025 15:53	160.6	24/08/2025 15:55	148.5	25/08/2025 15:57	149.3	25/08/2025 15:59
165.8	25/08/2025 15:53	160.6	25/08/2025 15:55	148.5	26/08/2025 15:57	149.3	26/08/2025 15:59
165.8	26/08/2025 15:53	161.4	26/08/2025 15:55	148	27/08/2025 15:57	149	27/08/2025 15:59
165.5	27/08/2025 15:53	161.4	27/08/2025 15:55	148	28/08/2025 15:57	149	28/08/2025 15:59
165.5	28/08/2025 15:53	161.6	28/08/2025 15:55	149.5	29/08/2025 15:57	149	29/08/2025 15:59
165.5	29/08/2025 15:53	161.6	29/08/2025 15:55	149.5	30/08/2025 15:57	148.8	30/08/2025 15:59
165.9	30/08/2025 15:53	162.2	30/08/2025 15:55	149.5	31/08/2025 15:57	148.8	31/08/2025 15:59
165.9	31/08/2025 15:53	162.2	31/08/2025 15:55	150.3	01/09/2025 15:57	149.2	01/09/2025 15:59
165.8	01/09/2025 15:53	162.2	01/09/2025 15:55	150.3	02/09/2025 15:57	149.2	02/09/2025 15:59
165.8	02/09/2025 15:53	162	02/09/2025 15:55	150.4	03/09/2025 15:57	149.2	03/09/2025 15:59
165	03/09/2025 15:53	162	03/09/2025 15:55	150.4	04/09/2025 15:57	149.8	04/09/2025 15:59
165	04/09/2025 15:53	161.6	04/09/2025 15:55	150.7	05/09/2025 15:57	149.8	05/09/2025 15:59
165.4	05/09/2025 15:53	161.6	05/09/2025 15:55	150.7	06/09/2025 15:57	149.7	06/09/2025 15:59
165.4	06/09/2025 15:53	162.4	06/09/2025 15:55	150.7	10/08/2025 15:57	149.7	10/08/2025 15:59
183,72		176,94		172,61		164,42	

Beban 4 Kg		Beban 4,5 Kg		Beban 5 Kg		Beban 5,5 Kg	
Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu
139	10/08/2025 16:00	136.1	10/08/2025 16:03	126.9	10/08/2025 16:04	121.3	10/08/2025 16:06
139.5	10/08/2025 16:00	136.1	10/08/2025 16:03	126.9	11/08/2025 16:04	121.3	11/08/2025 16:06
139.5	11/08/2025 16:00	136.1	11/08/2025 16:03	127.6	12/08/2025 16:04	121.3	12/08/2025 16:06
139.5	12/08/2025 16:00	136.1	12/08/2025 16:03	127.6	13/08/2025 16:04	121.1	13/08/2025 16:06
139.9	13/08/2025 16:00	136.1	13/08/2025 16:03	127.6	14/08/2025 16:04	121.1	14/08/2025 16:06
139.9	14/08/2025 16:00	136.2	14/08/2025 16:03	127.3	15/08/2025 16:04	121.1	15/08/2025 16:06
139.9	15/08/2025 16:00	136.2	15/08/2025 16:03	127.3	16/08/2025 16:04	121	16/08/2025 16:06
139.9	16/08/2025 16:00	136.1	16/08/2025 16:03	128.7	17/08/2025 16:04	121	17/08/2025 16:06
139.9	17/08/2025 16:00	136.1	17/08/2025 16:03	128.7	18/08/2025 16:04	121	18/08/2025 16:06
140.8	18/08/2025 16:00	136.1	18/08/2025 16:03	128.7	19/08/2025 16:04	122.7	19/08/2025 16:06
140.8	19/08/2025 16:00	136.7	19/08/2025 16:03	128.9	20/08/2025 16:04	122.7	20/08/2025 16:06
141.1	20/08/2025 16:00	136.7	20/08/2025 16:03	128.9	21/08/2025 16:04	122.7	21/08/2025 16:06
141.1	21/08/2025 16:00	136.7	21/08/2025 16:03	128.9	22/08/2025 16:04	122.8	22/08/2025 16:06
141.1	22/08/2025 16:00	137	22/08/2025 16:03	128.6	23/08/2025 16:04	122.8	23/08/2025 16:06
142	23/08/2025 16:00	137	23/08/2025 16:03	128.6	24/08/2025 16:04	122.8	24/08/2025 16:06
142	24/08/2025 16:00	137.7	24/08/2025 16:03	128.6	25/08/2025 16:04	122.6	25/08/2025 16:06
142.9	25/08/2025 16:00	137.7	25/08/2025 16:03	128.9	26/08/2025 16:04	122.6	26/08/2025 16:06
142.9	26/08/2025 16:00	137.7	26/08/2025 16:03	128.9	27/08/2025 16:04	123.8	27/08/2025 16:06
142.9	27/08/2025 16:00	137.7	27/08/2025 16:03	128.9	28/08/2025 16:04	123.8	28/08/2025 16:06
142.8	28/08/2025 16:00	137.7	28/08/2025 16:03	129.3	29/08/2025 16:04	123.8	29/08/2025 16:06
142.8	29/08/2025 16:00	137.6	29/08/2025 16:03	129.3	30/08/2025 16:04	124.3	30/08/2025 16:06
142.2	30/08/2025 16:00	137.6	30/08/2025 16:03	128.9	31/08/2025 16:04	124.3	31/08/2025 16:06
142.2	31/08/2025 16:00	137.6	31/08/2025 16:03	128.9	01/09/2025 16:04	124.3	01/09/2025 16:06
142.2	01/09/2025 16:00	137.8	01/09/2025 16:03	128.9	02/09/2025 16:04	124.3	02/09/2025 16:06
142.1	02/09/2025 16:00	137.8	02/09/2025 16:03	128.8	03/09/2025 16:04	124.3	03/09/2025 16:06
142.1	03/09/2025 16:00	137.8	03/09/2025 16:03	128.8	04/09/2025 16:04	124.3	04/09/2025 16:06
142.1	04/09/2025 16:00	137.6	04/09/2025 16:03	128.8	05/09/2025 16:04	123.1	05/09/2025 16:06
142.9	05/09/2025 16:00	137.6	05/09/2025 16:03	129.1	06/09/2025 16:04	123.1	06/09/2025 16:06
142.9	06/09/2025 16:00	137.7	06/09/2025 16:03	129.1	07/09/2025 16:04	123.1	07/09/2025 16:06
143.4	07/09/2025 16:00	137.7	07/09/2025 16:03	129.1	08/09/2025 16:04	122.8	10/08/2025 16:06
157,41		152,02		146,52		138,71	

Beban 6 Kg		Beban 6,5 Kg		Beban 7 Kg		Beban 7,5 Kg	
Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu
110.9	10/08/2025 16:11	109.9	10/08/2025 16:14	96.5	10/08/2025 16:16	87.37	10/08/2025 16:18
110.9	11/08/2025 16:11	107	11/08/2025 16:14	96.5	11/08/2025 16:16	87.37	11/08/2025 16:18
111.9	12/08/2025 16:11	107	12/08/2025 16:14	96.5	12/08/2025 16:16	87.37	12/08/2025 16:18
111.9	13/08/2025 16:11	107	13/08/2025 16:14	95.8	13/08/2025 16:16	87.82	13/08/2025 16:18
112.5	14/08/2025 16:11	106.8	14/08/2025 16:14	95.8	14/08/2025 16:16	87.82	14/08/2025 16:18
112.5	15/08/2025 16:11	106.8	15/08/2025 16:14	96.73	15/08/2025 16:16	87.82	15/08/2025 16:18
112.5	16/08/2025 16:11	109	16/08/2025 16:14	96.73	16/08/2025 16:16	89.37	16/08/2025 16:18
113	17/08/2025 16:11	109	17/08/2025 16:14	96.73	17/08/2025 16:16	89.37	17/08/2025 16:18
113	18/08/2025 16:11	108	18/08/2025 16:14	96.95	18/08/2025 16:16	89.37	18/08/2025 16:18
111.3	19/08/2025 16:11	108	19/08/2025 16:14	96.95	19/08/2025 16:16	89.79	19/08/2025 16:18
111.3	20/08/2025 16:11	107	20/08/2025 16:14	96.64	20/08/2025 16:16	89.79	20/08/2025 16:18
110.7	21/08/2025 16:11	107	21/08/2025 16:14	96.64	21/08/2025 16:16	90.01	21/08/2025 16:18
110.7	22/08/2025 16:11	108.7	22/08/2025 16:14	96.64	22/08/2025 16:16	90.01	22/08/2025 16:18
111.1	23/08/2025 16:11	108.7	23/08/2025 16:14	97.44	23/08/2025 16:16	90.01	23/08/2025 16:18
111.1	24/08/2025 16:11	108.7	24/08/2025 16:14	97.44	24/08/2025 16:16	90.01	24/08/2025 16:18
111.4	25/08/2025 16:11	108.6	25/08/2025 16:14	97.75	25/08/2025 16:16	90.01	25/08/2025 16:18
111.4	26/08/2025 16:11	108.6	26/08/2025 16:14	97.75	26/08/2025 16:16	90.71	26/08/2025 16:18
111.8	27/08/2025 16:11	108.5	27/08/2025 16:14	97.75	27/08/2025 16:16	90.71	27/08/2025 16:18
111.8	28/08/2025 16:11	108.5	28/08/2025 16:14	96.91	28/08/2025 16:16	90.71	28/08/2025 16:18
111.8	29/08/2025 16:11	108.8	29/08/2025 16:14	96.91	29/08/2025 16:16	91.29	29/08/2025 16:18
112.1	30/08/2025 16:11	108.8	30/08/2025 16:14	96.13	30/08/2025 16:16	91.29	30/08/2025 16:18
112.1	31/08/2025 16:11	109.8	31/08/2025 16:14	96.13	31/08/2025 16:16	91.29	31/08/2025 16:18
112.9	01/09/2025 16:11	109.8	01/09/2025 16:14	96.13	01/09/2025 16:16	91.74	01/09/2025 16:18
112.9	02/09/2025 16:11	110.2	02/09/2025 16:14	96.75	02/09/2025 16:16	91.74	02/09/2025 16:18
113.5	03/09/2025 16:11	110.2	03/09/2025 16:14	96.75	03/09/2025 16:16	92.38	03/09/2025 16:18
113.5	04/09/2025 16:11	110.2	04/09/2025 16:14	97.36	04/09/2025 16:16	92.38	04/09/2025 16:18
114.4	05/09/2025 16:11	110.4	05/09/2025 16:14	97.36	05/09/2025 16:16	92.38	05/09/2025 16:18
114.4	06/09/2025 16:11	110.4	06/09/2025 16:14	96.99	06/09/2025 16:16	93.07	06/09/2025 16:18
114.1	07/09/2025 16:11	111.4	07/09/2025 16:14	96.99	07/09/2025 16:16	93.07	07/09/2025 16:18
114.1	08/09/2025 16:11	111.4	08/09/2025 16:14	96.99	08/09/2025 16:16	93.83	08/09/2025 16:18
132,25		124,81		115,82		101,84	

Beban 8 Kg		Beban 8,5 Kg		Beban 9 Kg		Beban 9,5 Kg	
Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu
82.06	10/08/2025 16:20	75.66	10/08/2025 16:24	64.86	10/08/2025 16:27	53.42	10/08/2025 16:30
82.06	11/08/2025 16:20	75.66	11/08/2025 16:24	64.86	11/08/2025 16:27	53.5	11/08/2025 16:30
82.42	12/08/2025 16:20	75.66	12/08/2025 16:24	64.86	12/08/2025 16:27	53.5	12/08/2025 16:30
82.42	13/08/2025 16:20	74.3	13/08/2025 16:24	64.84	13/08/2025 16:27	52.32	13/08/2025 16:30
82.42	14/08/2025 16:20	74.3	14/08/2025 16:24	64.84	14/08/2025 16:27	52.32	14/08/2025 16:30
83.42	15/08/2025 16:20	74.3	15/08/2025 16:24	64.84	15/08/2025 16:27	52.32	15/08/2025 16:30
83.42	16/08/2025 16:20	74.22	16/08/2025 16:24	64.84	16/08/2025 16:27	52.02	16/08/2025 16:30
83.69	17/08/2025 16:20	74.22	17/08/2025 16:24	65.71	17/08/2025 16:27	52.02	17/08/2025 16:30
83.69	18/08/2025 16:20	74.22	18/08/2025 16:24	65.71	18/08/2025 16:27	53.03	18/08/2025 16:30
83.69	19/08/2025 16:20	74.22	19/08/2025 16:24	65.71	19/08/2025 16:27	53.03	19/08/2025 16:30
83.81	20/08/2025 16:20	69.58	20/08/2025 16:24	65.51	20/08/2025 16:27	53.06	20/08/2025 16:30
83.81	21/08/2025 16:20	69.58	21/08/2025 16:24	65.51	21/08/2025 16:27	53.06	21/08/2025 16:30
83.81	22/08/2025 16:20	69.58	22/08/2025 16:24	65.51	22/08/2025 16:27	54.04	22/08/2025 16:30
83.93	23/08/2025 16:20	71.09	23/08/2025 16:24	65.51	23/08/2025 16:27	54.04	23/08/2025 16:30
83.93	24/08/2025 16:20	71.09	24/08/2025 16:24	64.92	24/08/2025 16:27	54.04	24/08/2025 16:30
83.93	25/08/2025 16:20	71.09	25/08/2025 16:24	64.92	25/08/2025 16:27	54.42	25/08/2025 16:30
83.65	26/08/2025 16:20	80.99	26/08/2025 16:24	64.92	26/08/2025 16:27	54.42	26/08/2025 16:30
83.65	27/08/2025 16:20	80.99	27/08/2025 16:24	64.92	27/08/2025 16:27	54	27/08/2025 16:30
83.65	28/08/2025 16:20	68.53	28/08/2025 16:24	65.65	28/08/2025 16:27	54	28/08/2025 16:30
84.72	29/08/2025 16:20	68.53	29/08/2025 16:24	65.65	29/08/2025 16:27	53.94	29/08/2025 16:30
84.72	30/08/2025 16:20	68.53	30/08/2025 16:24	65.65	30/08/2025 16:27	53.94	30/08/2025 16:30
84.72	31/08/2025 16:20	68.86	31/08/2025 16:24	66.22	31/08/2025 16:27	53.1	31/08/2025 16:30
86.49	01/09/2025 16:20	68.86	01/09/2025 16:24	66.22	01/09/2025 16:27	53.1	01/09/2025 16:30
86.49	02/09/2025 16:20	68.86	02/09/2025 16:24	66.22	02/09/2025 16:27	53.1	02/09/2025 16:30
86.44	03/09/2025 16:20	80.79	03/09/2025 16:24	66.22	03/09/2025 16:27	52.71	03/09/2025 16:30
86.44	04/09/2025 16:20	80.79	04/09/2025 16:24	65.09	04/09/2025 16:27	52.71	04/09/2025 16:30
86.44	05/09/2025 16:20	80.79	05/09/2025 16:24	65.09	05/09/2025 16:27	52.84	05/09/2025 16:30
86.6	06/09/2025 16:20	78.77	06/09/2025 16:24	65.09	06/09/2025 16:27	52.84	06/09/2025 16:30
86.6	07/09/2025 16:20	78.77	07/09/2025 16:24	65.09	07/09/2025 16:27	52.86	07/09/2025 16:30
86.6	08/09/2025 16:20	78.77	08/09/2025 16:24	64.66	08/09/2025 16:27	52.86	08/09/2025 16:30
84,32		74,05		65,32		56,22	

Beban 10 Kg		Beban 10,5 Kg		Beban 11 Kg	
Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu
46.59	10/08/2025 16:33	30.06	10/08/2025 16:35	0	10/08/2025 16:35
47.2	11/08/2025 16:33	30.06	11/08/2025 16:35	0	11/08/2025 16:35
47.2	12/08/2025 16:33	30.74	12/08/2025 16:35	0	12/08/2025 16:35
47.2	13/08/2025 16:33	30.74	13/08/2025 16:35	0	13/08/2025 16:35
47.87	14/08/2025 16:33	30.74	14/08/2025 16:35	0	14/08/2025 16:35
47.87	15/08/2025 16:33	30.74	15/08/2025 16:35	0	15/08/2025 16:35
47.93	16/08/2025 16:33	32.56	16/08/2025 16:35	0	16/08/2025 16:35
47.93	17/08/2025 16:33	32.56	17/08/2025 16:35	0	17/08/2025 16:35
47.93	18/08/2025 16:33	32.56	18/08/2025 16:35	0	18/08/2025 16:35
47.38	19/08/2025 16:33	34.49	19/08/2025 16:35	0	19/08/2025 16:35
47.38	20/08/2025 16:33	34.49	20/08/2025 16:35	0	20/08/2025 16:35
47.38	21/08/2025 16:33	34.49	21/08/2025 16:35	0	21/08/2025 16:35
47.2	22/08/2025 16:33	34.49	22/08/2025 16:35	0	22/08/2025 16:35
47.2	23/08/2025 16:33	35.69	23/08/2025 16:35	0	23/08/2025 16:35
47.46	24/08/2025 16:33	35.69	24/08/2025 16:35	0	24/08/2025 16:35
47.46	25/08/2025 16:33	35.69	25/08/2025 16:35	0	25/08/2025 16:35
47.46	26/08/2025 16:33	36.99	26/08/2025 16:35	0	26/08/2025 16:35
47.72	27/08/2025 16:33	36.99	27/08/2025 16:35	0	27/08/2025 16:35
47.72	28/08/2025 16:33	36.99	28/08/2025 16:35	0	28/08/2025 16:35
47.79	29/08/2025 16:33	36.92	29/08/2025 16:35	0	29/08/2025 16:35
47.79	30/08/2025 16:33	36.92	30/08/2025 16:35	0	30/08/2025 16:35
47.79	31/08/2025 16:33	36.92	31/08/2025 16:35	0	31/08/2025 16:35
48.26	01/09/2025 16:33	36.92	01/09/2025 16:35	0	01/09/2025 16:35
48.26	02/09/2025 16:33	36.17	02/09/2025 16:35	0	02/09/2025 16:35
47.92	03/09/2025 16:33	36.17	03/09/2025 16:35	0	03/09/2025 16:35
47.92	04/09/2025 16:33	36.17	04/09/2025 16:35	0	04/09/2025 16:35
47.92	05/09/2025 16:33	36.16	05/09/2025 16:35	0	05/09/2025 16:35
47.89	06/09/2025 16:33	36.16	06/09/2025 16:35	0	06/09/2025 16:35
47.89	07/09/2025 16:33	36.16	07/09/2025 16:35	0	07/09/2025 16:35
47.21	08/09/2025 16:33	37.14	08/09/2025 16:35	0	08/09/2025 16:35
47,62		34,62		0,00	

Tabel L.5 Data Pengukuran Beban Dan Putaran Pada Variasi 4 *Nozzle*

Tanpa Beban			Beban 0,5 Kg		Beban 1 Kg		Beban 1,5 Kg	
No.	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu
1	225.7	10/08/2025 23:14	215.1	10/08/2025 23:18	205.9	10/08/2025 23:20	193.9	10/08/2025 23:26
2	225.4	10/08/2025 23:14	215.1	10/08/2025 23:18	205.5	10/08/2025 23:20	193.9	11/08/2025 23:26
3	225.4	10/08/2025 23:14	215.1	10/08/2025 23:18	205.5	10/08/2025 23:20	193.9	12/08/2025 23:26
4	225.5	10/08/2025 23:14	214.8	10/08/2025 23:18	205.5	10/08/2025 23:20	194	13/08/2025 23:26
5	225.5	10/08/2025 23:14	214.8	10/08/2025 23:18	205.5	10/08/2025 23:20	194	14/08/2025 23:26
6	226.4	10/08/2025 23:14	213.5	10/08/2025 23:18	206.1	10/08/2025 23:20	193.4	15/08/2025 23:26
7	226.4	10/08/2025 23:14	213.5	10/08/2025 23:18	206.1	10/08/2025 23:20	193.4	16/08/2025 23:26
8	226.4	10/08/2025 23:14	213.7	10/08/2025 23:18	206.1	11/08/2025 23:20	193.4	17/08/2025 23:26
9	226	10/08/2025 23:14	213.7	10/08/2025 23:18	206	12/08/2025 23:20	193.1	18/08/2025 23:26
10	226	10/08/2025 23:14	213.1	10/08/2025 23:18	206	13/08/2025 23:20	193.1	19/08/2025 23:26
11	224.8	10/08/2025 23:14	213.1	10/08/2025 23:18	205.8	14/08/2025 23:20	192.9	20/08/2025 23:26
12	224.8	10/08/2025 23:14	213.1	10/08/2025 23:18	205.8	15/08/2025 23:20	192.9	21/08/2025 23:26
13	225.4	10/08/2025 23:14	212.1	10/08/2025 23:19	205.7	16/08/2025 23:20	192.9	22/08/2025 23:26
14	225.4	10/08/2025 23:14	212.1	10/08/2025 23:19	205.7	17/08/2025 23:20	192.9	23/08/2025 23:26
15	226.2	10/08/2025 23:14	212.1	10/08/2025 23:19	205.7	18/08/2025 23:20	192.9	24/08/2025 23:26
16	226.2	10/08/2025 23:14	212.1	10/08/2025 23:19	204.8	19/08/2025 23:20	193.2	25/08/2025 23:26
17	225.8	10/08/2025 23:14	211.5	10/08/2025 23:19	204.8	20/08/2025 23:20	193.2	26/08/2025 23:26
18	225.8	10/08/2025 23:14	211.5	10/08/2025 23:19	203.6	10/08/2025 23:20	193.2	27/08/2025 23:26
19	225.1	10/08/2025 23:14	211.9	10/08/2025 23:19	203.6	10/08/2025 23:20	193.6	28/08/2025 23:26
20	225.1	10/08/2025 23:14	211.9	10/08/2025 23:19	201.7	10/08/2025 23:20	193.6	29/08/2025 23:26
21	224.5	10/08/2025 23:14	211.9	10/08/2025 23:19	201.7	10/08/2025 23:20	193.9	30/08/2025 23:26
22	224.5	10/08/2025 23:14	211.9	10/08/2025 23:19	201.7	10/08/2025 23:20	193.9	31/08/2025 23:26
23	224.6	10/08/2025 23:14	211.9	10/08/2025 23:19	202.4	10/08/2025 23:20	193.9	01/09/2025 23:26
24	224.6	10/08/2025 23:14	211.9	10/08/2025 23:19	202.4	10/08/2025 23:20	193.5	02/09/2025 23:26
25	224.6	10/08/2025 23:14	211.9	10/08/2025 23:19	204.9	10/08/2025 23:20	193.5	03/09/2025 23:26
26	225.7	10/08/2025 23:14	211.9	10/08/2025 23:19	204.9	10/08/2025 23:20	193.2	04/09/2025 23:26
27	225.7	10/08/2025 23:14	211.9	10/08/2025 23:19	205.7	10/08/2025 23:20	193.2	05/09/2025 23:26
28	225.9	10/08/2025 23:14	211.9	10/08/2025 23:19	205.7	10/08/2025 23:20	193.2	06/09/2025 23:26
29	225.9	10/08/2025 23:14	211.9	10/08/2025 23:19	205.7	10/08/2025 23:20	193.4	07/09/2025 23:26
30	225.8	10/08/2025 23:14	211.9	10/08/2025 23:19	206.5	10/08/2025 23:20	193.4	08/09/2025 23:26
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187.8	10/08/2025 23:27	179	10/08/2025 23:28	175.8	10/08/2025 23:29	163	10/08/2025 23:31
187.8	10/08/2025 23:27	179	10/08/2025 23:28	175.8	10/08/2025 23:29	163	10/08/2025 23:31
188	10/08/2025 23:27	179.7	10/08/2025 23:28	177.1	10/08/2025 23:29	163.4	10/08/2025 23:31
188	10/08/2025 23:27	179.7	10/08/2025 23:28	177.1	10/08/2025 23:29	163.4	10/08/2025 23:31
188	11/08/2025 23:27	179.2	10/08/2025 23:28	177	10/08/2025 23:29	163.7	10/08/2025 23:31
187.7	12/08/2025 23:27	179.2	10/08/2025 23:28	177	11/08/2025 23:29	163.7	11/08/2025 23:31
187.7	13/08/2025 23:27	179.3	10/08/2025 23:28	177.1	12/08/2025 23:29	164.2	12/08/2025 23:31
187.3	14/08/2025 23:27	179.3	10/08/2025 23:28	177.1	13/08/2025 23:29	164.2	13/08/2025 23:31
187.3	15/08/2025 23:27	179.3	10/08/2025 23:28	177.3	14/08/2025 23:29	164.2	14/08/2025 23:31
187.3	16/08/2025 23:27	179.8	10/08/2025 23:28	177.3	15/08/2025 23:29	164.5	15/08/2025 23:31
187.4	17/08/2025 23:27	179.8	10/08/2025 23:28	177.6	16/08/2025 23:29	164.5	16/08/2025 23:31
187.4	18/08/2025 23:27	179.6	10/08/2025 23:28	177.6	17/08/2025 23:29	164.8	17/08/2025 23:31
187.4	19/08/2025 23:27	179.6	11/08/2025 23:28	178.1	18/08/2025 23:29	164.8	18/08/2025 23:31
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187.3	21/08/2025 23:27	179.3	13/08/2025 23:28	178.2	20/08/2025 23:29	165.4	20/08/2025 23:31
187.1	22/08/2025 23:27	179.3	14/08/2025 23:28	178.2	21/08/2025 23:29	165.9	21/08/2025 23:31
187.1	23/08/2025 23:27	180.2	15/08/2025 23:28	178.2	22/08/2025 23:29	165.9	22/08/2025 23:31
187.1	24/08/2025 23:27	180.2	16/08/2025 23:28	178.2	23/08/2025 23:29	166.1	23/08/2025 23:31
187.1	25/08/2025 23:27	181.1	17/08/2025 23:28	178.3	24/08/2025 23:29	166.1	24/08/2025 23:31
187.1	26/08/2025 23:27	181.1	18/08/2025 23:28	178.3	25/08/2025 23:29	166.4	25/08/2025 23:31
187.5	27/08/2025 23:27	181.1	19/08/2025 23:28	178.2	26/08/2025 23:29	166.4	26/08/2025 23:31
187.5	28/08/2025 23:27	181.2	20/08/2025 23:28	178.2	27/08/2025 23:29	166.4	27/08/2025 23:31
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188.2	10/08/2025 23:27	180.5	23/08/2025 23:28	179.3	30/08/2025 23:29	166.7	30/08/2025 23:31
188.1	10/08/2025 23:27	180.5	24/08/2025 23:28	179.3	31/08/2025 23:29	166.7	31/08/2025 23:31
188.1	10/08/2025 23:27	180.3	25/08/2025 23:28	179.7	01/09/2025 23:29	166.6	01/09/2025 23:31
188.1	10/08/2025 23:27	180.3	26/08/2025 23:28	179.7	02/09/2025 23:29	166.6	02/09/2025 23:31
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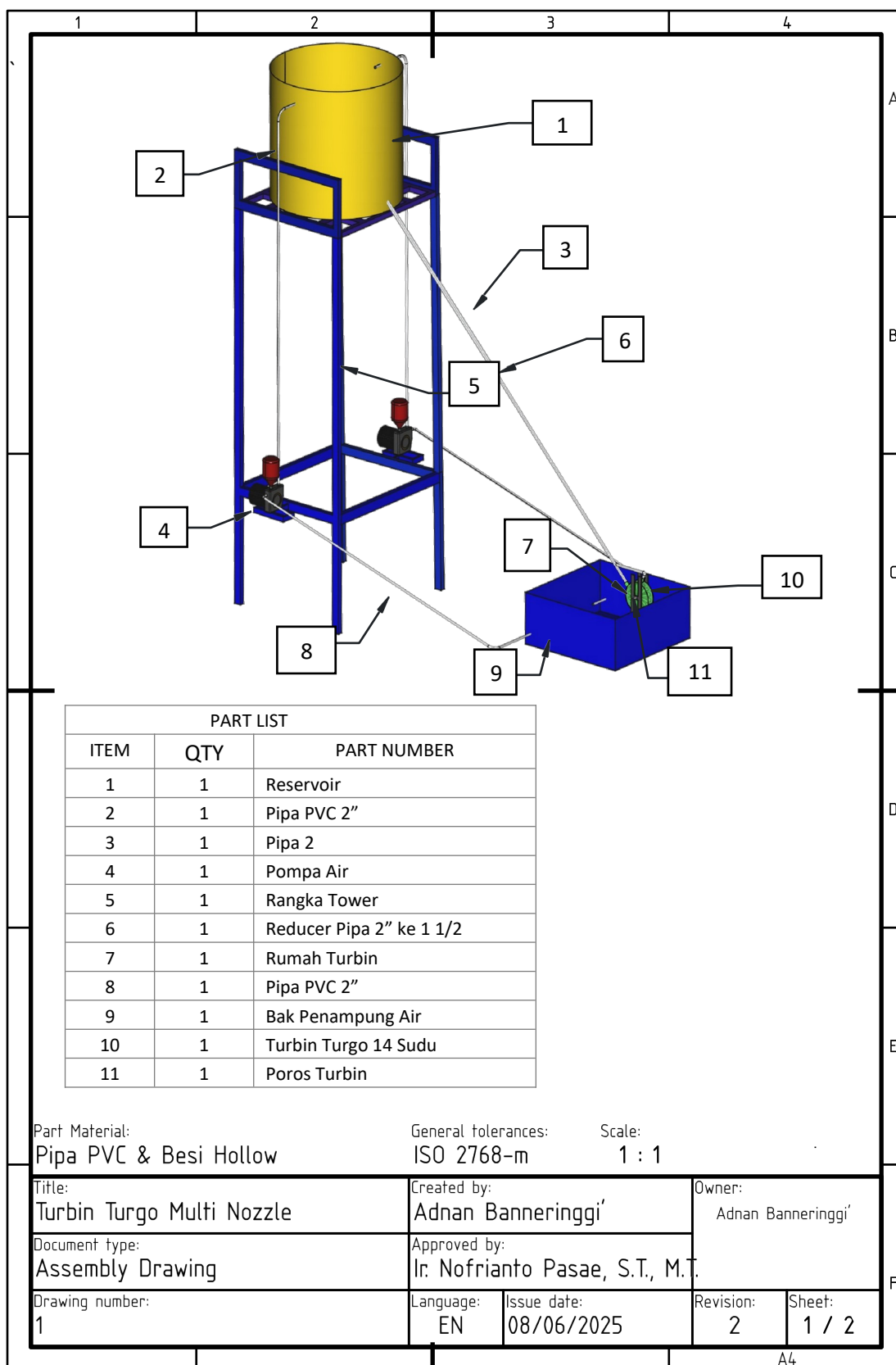
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158.3	10/08/2025 23:32	152.9	10/08/2025 23:33	146.7	11/08/2025 23:34	138.5	11/08/2025 23:37
158.3	10/08/2025 23:32	153.1	10/08/2025 23:33	146.7	12/08/2025 23:34	138.5	12/08/2025 23:37
158.3	10/08/2025 23:32	153.1	10/08/2025 23:33	147.3	13/08/2025 23:34	138.5	13/08/2025 23:37
157.9	10/08/2025 23:32	153.3	11/08/2025 23:33	147.3	14/08/2025 23:34	139.1	14/08/2025 23:37
157.9	10/08/2025 23:32	153.3	12/08/2025 23:33	147.3	15/08/2025 23:34	139.1	15/08/2025 23:37
158.4	10/08/2025 23:32	153.3	13/08/2025 23:33	147.4	16/08/2025 23:34	140.5	16/08/2025 23:37
158.4	10/08/2025 23:32	153.9	14/08/2025 23:33	147.4	17/08/2025 23:34	140.5	17/08/2025 23:37
159.2	10/08/2025 23:32	153.9	15/08/2025 23:33	147	18/08/2025 23:34	140.5	18/08/2025 23:37
159.2	10/08/2025 23:32	154	16/08/2025 23:33	147	19/08/2025 23:34	141.3	19/08/2025 23:37
159.2	10/08/2025 23:32	154	17/08/2025 23:33	147.5	20/08/2025 23:34	141.3	20/08/2025 23:37
159.5	10/08/2025 23:32	154	18/08/2025 23:33	147.5	21/08/2025 23:34	141.6	21/08/2025 23:37
159.5	10/08/2025 23:32	154.2	19/08/2025 23:33	147.5	22/08/2025 23:34	141.6	22/08/2025 23:37
159.7	10/08/2025 23:32	154.2	20/08/2025 23:33	147.8	23/08/2025 23:34	141.6	23/08/2025 23:37
159.7	10/08/2025 23:32	154.6	21/08/2025 23:33	147.8	24/08/2025 23:34	142.5	24/08/2025 23:37
159	10/08/2025 23:32	154.6	22/08/2025 23:33	147.9	25/08/2025 23:34	142.5	25/08/2025 23:37
159	10/08/2025 23:32	154.8	23/08/2025 23:33	147.9	26/08/2025 23:34	142.9	26/08/2025 23:37
159	10/08/2025 23:32	154.8	24/08/2025 23:33	147.9	27/08/2025 23:34	142.9	27/08/2025 23:37
159	10/08/2025 23:32	154.8	25/08/2025 23:33	147.9	28/08/2025 23:34	142.9	28/08/2025 23:37
159	10/08/2025 23:32	153.7	26/08/2025 23:33	147.9	29/08/2025 23:34	143.4	29/08/2025 23:37
159.3	10/08/2025 23:32	153.7	27/08/2025 23:33	148.1	30/08/2025 23:34	143.4	30/08/2025 23:37
159.3	10/08/2025 23:32	153	28/08/2025 23:33	148.1	31/08/2025 23:34	143.3	31/08/2025 23:37
159.5	10/08/2025 23:32	153	29/08/2025 23:33	148.1	01/09/2025 23:34	143.3	01/09/2025 23:37
159.5	10/08/2025 23:32	154.3	30/08/2025 23:33	148.3	02/09/2025 23:34	143.3	02/09/2025 23:37
159.8	10/08/2025 23:32	154.3	31/08/2025 23:33	148.3	03/09/2025 23:34	143.4	03/09/2025 23:37
159.8	10/08/2025 23:32	155.5	01/09/2025 23:33	148.3	04/09/2025 23:34	143.4	04/09/2025 23:37
159.4	10/08/2025 23:32	155.5	02/09/2025 23:33	148.3	05/09/2025 23:34	143.4	05/09/2025 23:37
159.4	10/08/2025 23:32	155.5	03/09/2025 23:33	149.3	06/09/2025 23:34	143.8	06/09/2025 23:37
159.4	10/08/2025 23:32	155.8	04/09/2025 23:33	149.3	07/09/2025 23:34	143.8	07/09/2025 23:37
159.7	10/08/2025 23:32	155.8	05/09/2025 23:33	149.3	08/09/2025 23:34	143.8	08/09/2025 23:37
169,01		160,13		153,81		146,80	

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138.4	11/08/2025 23:38		11/08/2025 23:39	126.9	11/08/2025 23:40	118.7	10/08/2025 23:42
138.2	12/08/2025 23:38	136.3	12/08/2025 23:39	126.9	12/08/2025 23:40	119.3	11/08/2025 23:42
138.2	13/08/2025 23:38	136.2	13/08/2025 23:39	127.2	13/08/2025 23:40	119.3	12/08/2025 23:42
138.2	14/08/2025 23:38	136.2	14/08/2025 23:39	127.2	14/08/2025 23:40	119.5	13/08/2025 23:42
138.5	15/08/2025 23:38	136.2	15/08/2025 23:39	127.2	15/08/2025 23:40	119.5	14/08/2025 23:42
138.5	16/08/2025 23:38	136.6	16/08/2025 23:39	127.7	16/08/2025 23:40	119.1	15/08/2025 23:42
139	17/08/2025 23:38	136.6	17/08/2025 23:39	127.7	17/08/2025 23:40	119.1	16/08/2025 23:42
139	18/08/2025 23:38	136.8	18/08/2025 23:39	127.7	18/08/2025 23:40	118.7	17/08/2025 23:42
139	19/08/2025 23:38	136.8	19/08/2025 23:39	128.2	19/08/2025 23:40	118.7	18/08/2025 23:42
139.3	20/08/2025 23:38	136.8	20/08/2025 23:39	128.2	20/08/2025 23:40	118.7	19/08/2025 23:42
139.3	21/08/2025 23:38	137.5	21/08/2025 23:39	128.2	21/08/2025 23:40	119.4	20/08/2025 23:42
139.6	22/08/2025 23:38	137.5	22/08/2025 23:39	128.5	22/08/2025 23:40	119.4	21/08/2025 23:42
139.6	23/08/2025 23:38	137.5	23/08/2025 23:39	128.5	23/08/2025 23:40	119.4	22/08/2025 23:42
139.6	24/08/2025 23:38	138	24/08/2025 23:39	128.7	24/08/2025 23:40	120.3	23/08/2025 23:42
139.9	25/08/2025 23:38	138	25/08/2025 23:39	128.7	25/08/2025 23:40	120.3	24/08/2025 23:42
139.9	26/08/2025 23:38	138.2	26/08/2025 23:39	128.7	26/08/2025 23:40	120.3	25/08/2025 23:42
139.8	27/08/2025 23:38	138.2	27/08/2025 23:39	129.2	27/08/2025 23:40	121.2	26/08/2025 23:42
139.8	28/08/2025 23:38	138.2	28/08/2025 23:39	129.2	28/08/2025 23:40	121.2	27/08/2025 23:42
139.8	29/08/2025 23:38	138.7	29/08/2025 23:39	129.2	29/08/2025 23:40	121.2	28/08/2025 23:42
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140.5	31/08/2025 23:38	138.9	31/08/2025 23:39	129.6	31/08/2025 23:40	121.8	30/08/2025 23:42
140.5	01/09/2025 23:38	138.9	01/09/2025 23:39	129.6	01/09/2025 23:40	121.8	31/08/2025 23:42
141	02/09/2025 23:38	138.9	02/09/2025 23:39	129.8	02/09/2025 23:40	121.1	01/09/2025 23:42
141	03/09/2025 23:38	139.1	03/09/2025 23:39	129.8	03/09/2025 23:40	121.1	02/09/2025 23:42
141.6	04/09/2025 23:38	139.1	04/09/2025 23:39	129.8	04/09/2025 23:40	121.1	03/09/2025 23:42
141.6	05/09/2025 23:38	139.3	05/09/2025 23:39	129.8	05/09/2025 23:40	121.1	04/09/2025 23:42
141.6	06/09/2025 23:38	139.3	06/09/2025 23:39	129.8	06/09/2025 23:40	121.1	05/09/2025 23:42
141.7	07/09/2025 23:38	139.3	07/09/2025 23:39	129.9	07/09/2025 23:40	121.7	06/09/2025 23:42
141.7	08/09/2025 23:38	139.4	08/09/2025 23:39	129.9	08/09/2025 23:40	121.7	07/09/2025 23:42
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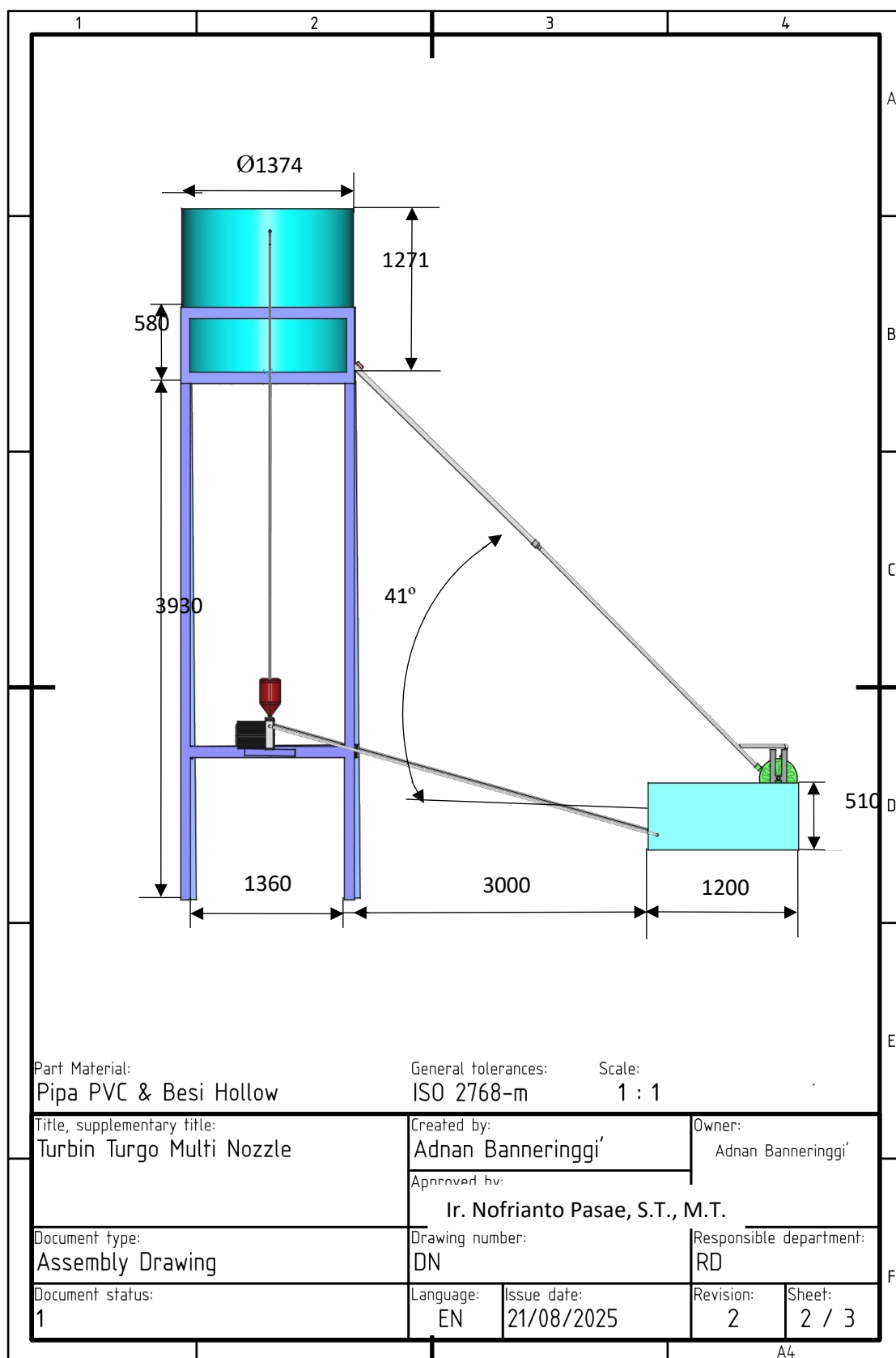
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115.2	14/08/2025 23:46	103.9	14/08/2025 23:48	102.2	14/08/2025 23:49	98.71	14/08/2025 23:50
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115.1	17/08/2025 23:46	106.8	17/08/2025 23:48	70.27	17/08/2025 23:49	98.71	17/08/2025 23:50
115.4	18/08/2025 23:46	99.54	18/08/2025 23:48	36.02	18/08/2025 23:49	71.71	18/08/2025 23:50
115.4	19/08/2025 23:46	99.54	19/08/2025 23:48	36.02	19/08/2025 23:49	71.71	19/08/2025 23:50
116	20/08/2025 23:46	109.3	20/08/2025 23:48	69.7	20/08/2025 23:49	71.71	20/08/2025 23:50
116	21/08/2025 23:46	109.3	21/08/2025 23:48	69.7	21/08/2025 23:49	60.48	21/08/2025 23:50
116.4	22/08/2025 23:46	118.8	22/08/2025 23:48	69.7	22/08/2025 23:49	60.48	22/08/2025 23:50
116.4	23/08/2025 23:46	118.8	23/08/2025 23:48	106.5	23/08/2025 23:49	60.48	23/08/2025 23:50
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116.6	25/08/2025 23:46	120.3	25/08/2025 23:48	106.9	25/08/2025 23:49	86.99	25/08/2025 23:50
117	26/08/2025 23:46	120.3	26/08/2025 23:48	106.9	26/08/2025 23:49	98.09	26/08/2025 23:50
117	27/08/2025 23:46	120.3	27/08/2025 23:48	106.2	27/08/2025 23:49	98.09	27/08/2025 23:50
117.8	28/08/2025 23:46	120.3	28/08/2025 23:48	106.2	28/08/2025 23:49	98.09	28/08/2025 23:50
117.8	29/08/2025 23:46	120.3	29/08/2025 23:48	107.5	29/08/2025 23:49	99	29/08/2025 23:50
117.9	30/08/2025 23:46	120.3	30/08/2025 23:48	107.5	30/08/2025 23:49	99	30/08/2025 23:50
117.9	31/08/2025 23:46	83.32	31/08/2025 23:48	107.5	31/08/2025 23:49	100.1	31/08/2025 23:50
117.3	01/09/2025 23:46	83.32	01/09/2025 23:48	107.6	01/09/2025 23:49	100.1	01/09/2025 23:50
117.3	02/09/2025 23:46	70.68	02/09/2025 23:48	107.6	02/09/2025 23:49	100.8	02/09/2025 23:50
117.2	03/09/2025 23:46	70.68	03/09/2025 23:48	107.9	03/09/2025 23:49	100.8	03/09/2025 23:50
117.2	04/09/2025 23:46	107.8	04/09/2025 23:48	107.9	04/09/2025 23:49	100.8	04/09/2025 23:50
117.8	05/09/2025 23:46	107.8	05/09/2025 23:48	108	05/09/2025 23:49	100.8	05/09/2025 23:50
117.8	06/09/2025 23:46	107.8	06/09/2025 23:48	108	06/09/2025 23:49	86.62	06/09/2025 23:50
118.5	07/09/2025 23:46	122.1	07/09/2025 23:48	108.4	07/09/2025 23:49	86.62	07/09/2025 23:50
118.5	08/09/2025 23:46	122.1	08/09/2025 23:48	108.4	08/09/2025 23:49	86.62	08/09/2025 23:50
111,61		104.13		97,28		91,41	

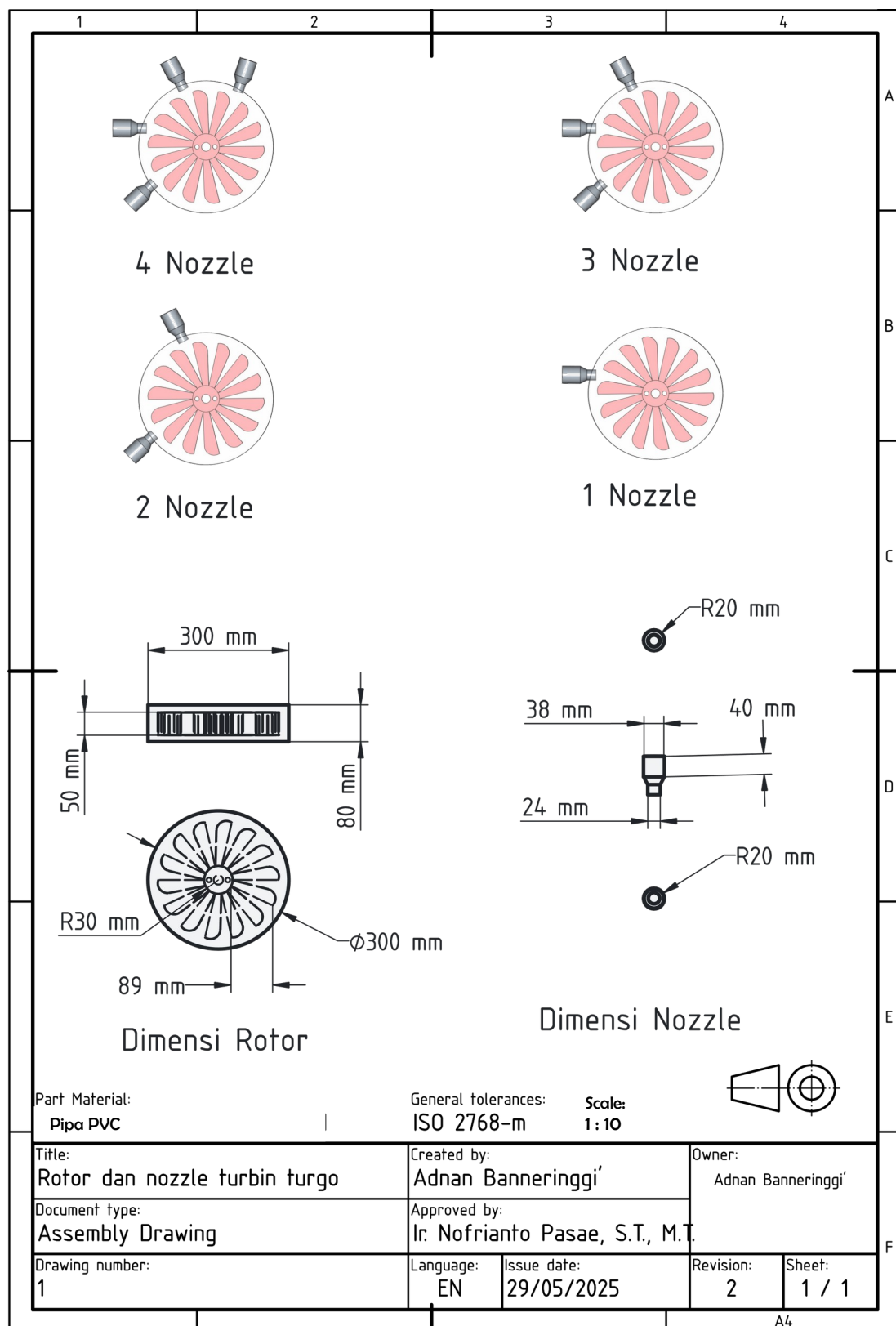
Beban 10 Kg		Beban 10,5 Kg		Beban 11 Kg		Beban 11,5 Kg	
Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu
80.98	10/08/2025 23:51	90.82	10/08/2025 23:52	0	12/07/2025 23:54	56.24	10/08/2025 23:55
80.98	11/08/2025 23:51	91.39	11/08/2025 23:52	0	13/07/2025 23:54	57.17	11/08/2025 23:55
82.12	12/08/2025 23:51	91.39	12/08/2025 23:52	0	14/07/2025 23:54	57.17	12/08/2025 23:55
82.12	13/08/2025 23:51	91.39	13/08/2025 23:52	0	15/07/2025 23:54	56.9	13/08/2025 23:55
82.12	14/08/2025 23:51	91.39	14/08/2025 23:52	92.75	16/07/2025 23:54	56.9	14/08/2025 23:55
83.81	15/08/2025 23:51	83.49	15/08/2025 23:52	92.75	17/07/2025 23:54	57.04	15/08/2025 23:55
83.81	16/08/2025 23:51	83.49	16/08/2025 23:52	92.75	18/07/2025 23:54	57.04	16/08/2025 23:55
83.81	17/08/2025 23:51	83.65	17/08/2025 23:52	90.39	19/07/2025 23:54	57.7	17/08/2025 23:55
85.12	18/08/2025 23:51	83.65	18/08/2025 23:52	90.39	20/07/2025 23:54	57.7	18/08/2025 23:55
85.12	19/08/2025 23:51	83.65	19/08/2025 23:52	90.39	21/07/2025 23:54	57.7	19/08/2025 23:55
85.73	20/08/2025 23:51	91.21	20/08/2025 23:52	77.08	22/07/2025 23:54	57.7	20/08/2025 23:55
85.73	21/08/2025 23:51	91.21	21/08/2025 23:52	77.08	23/07/2025 23:54	59.44	21/08/2025 23:55
85.73	22/08/2025 23:51	91.21	22/08/2025 23:52	77.08	24/07/2025 23:54	59.44	22/08/2025 23:55
86.83	23/08/2025 23:51	89.16	23/08/2025 23:52	58.3	25/07/2025 23:54	59.44	23/08/2025 23:55
86.83	24/08/2025 23:51	89.16	24/08/2025 23:52	58.3	26/07/2025 23:54	59.44	24/08/2025 23:55
86.83	25/08/2025 23:51	89.16	25/08/2025 23:52	71.86	27/07/2025 23:54	61.07	25/08/2025 23:55
87.35	26/08/2025 23:51	79.49	26/08/2025 23:52	71.86	28/07/2025 23:54	61.07	26/08/2025 23:55
87.35	27/08/2025 23:51	79.49	27/08/2025 23:52	74.33	29/07/2025 23:54	61.07	27/08/2025 23:55
87.35	28/08/2025 23:51	79.49	28/08/2025 23:52	74.33	30/07/2025 23:54	61.07	28/08/2025 23:55
87.38	29/08/2025 23:51	54.48	29/08/2025 23:52	74.33	31/07/2025 23:54	61.91	29/08/2025 23:55
87.38	30/08/2025 23:51	54.48	30/08/2025 23:52	73.91	01/08/2025 23:54	61.91	30/08/2025 23:55
87.03	31/08/2025 23:51	54.48	31/08/2025 23:52	73.91	02/08/2025 23:54	61.91	31/08/2025 23:55
87.03	01/09/2025 23:51	59.71	01/09/2025 23:52	73.91	03/08/2025 23:54	62.17	01/09/2025 23:55
87.03	02/09/2025 23:51	59.71	02/09/2025 23:52	92.19	04/08/2025 23:54	62.17	02/09/2025 23:55
87.53	03/09/2025 23:51	59.71	03/09/2025 23:52	92.19	05/08/2025 23:54	62.17	03/09/2025 23:55
87.53	04/09/2025 23:51	86.8	04/09/2025 23:52	92.67	06/08/2025 23:54	62.17	04/09/2025 23:55
87.53	05/09/2025 23:51	86.8	05/09/2025 23:52	92.67	07/08/2025 23:54	62.43	05/09/2025 23:55
88.81	06/09/2025 23:51	92.13	06/09/2025 23:52	92.67	08/08/2025 23:54	62.43	06/09/2025 23:55
88.81	07/09/2025 23:51	92.13	07/09/2025 23:52	92.67	09/08/2025 23:54	62.43	07/09/2025 23:55
88.81	08/09/2025 23:51	92.13	08/09/2025 23:52	83.2	10/08/2025 23:54	62.43	08/09/2025 23:55
84,82		75,33		64,80		49,85	

Beban 12 Kg		Beban 12,5 Kg		Beban 13 Kg		Beban 13,5 Kg	
Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu
48.62	12/07/2025 23:57	28.73	10/08/2025 23:58	25,07	10/08/2025 07:40	0	10/08/2025 07:40
48.62	13/07/2025 23:57	28.37	10/08/2025 23:58	25,08	10/08/2025 07:40	0	10/08/2025 07:40
48.62	14/07/2025 23:57	28.37	10/08/2025 23:58	25,09	10/08/2025 07:40	0	10/08/2025 07:40
48.69	15/07/2025 23:57	28.37	10/08/2025 23:58	25,10	10/08/2025 07:40	0	10/08/2025 07:40
48.69	16/07/2025 23:57	28.37	11/08/2025 23:58	25,11	10/08/2025 07:40	0	10/08/2025 07:40
49.38	17/07/2025 23:57	28.37	12/08/2025 23:58	25,12	10/08/2025 07:40	0	10/08/2025 07:40
49.38	18/07/2025 23:57	28.83	13/08/2025 23:58	25,13	10/08/2025 07:40	0	10/08/2025 07:40
49.38	19/07/2025 23:57	28.83	14/08/2025 23:58	25,14	10/08/2025 07:40	0	10/08/2025 07:40
49.93	20/07/2025 23:57	28.83	15/08/2025 23:58	25,15	10/08/2025 07:40	0	10/08/2025 07:40
49.93	21/07/2025 23:57	30.07	16/08/2025 23:58	25,16	10/08/2025 07:40	0	10/08/2025 07:40
49.98	22/07/2025 23:57	30.07	17/08/2025 23:58	25,17	10/08/2025 07:40	0	10/08/2025 07:40
49.98	23/07/2025 23:57	30.07	18/08/2025 23:58	25,18	10/08/2025 07:40	0	10/08/2025 07:40
49.98	24/07/2025 23:57	30.07	19/08/2025 23:58	25,19	10/08/2025 07:40	0	10/08/2025 07:40
49.98	25/07/2025 23:57	30.54	20/08/2025 23:58	25,20	10/08/2025 07:40	0	10/08/2025 07:40
49.98	26/07/2025 23:57	30.54	21/08/2025 23:58	25,21	10/08/2025 07:40	0	10/08/2025 07:40
37.99	27/07/2025 23:57	30.54	22/08/2025 23:58	25,22	10/08/2025 07:40	0	10/08/2025 07:40
37.99	28/07/2025 23:57	30.54	23/08/2025 23:58	25,23	10/08/2025 07:40	0	10/08/2025 07:40
37.99	29/07/2025 23:57	30.01	24/08/2025 23:58	25,24	10/08/2025 07:40	0	10/08/2025 07:40
37.99	30/07/2025 23:57	30.01	25/08/2025 23:58	25,25	10/08/2025 07:40	0	10/08/2025 07:40
26.84	31/07/2025 23:57	30.01	26/08/2025 23:58	25,26	10/08/2025 07:40	0	10/08/2025 07:40
26.84	01/08/2025 23:57	30.01	27/08/2025 23:58	25,27	10/08/2025 07:40	0	10/08/2025 07:40
26.84	02/08/2025 23:57	30.27	28/08/2025 23:58	25,28	10/08/2025 07:40	0	10/08/2025 07:40
33.08	03/08/2025 23:57	30.27	29/08/2025 23:58	25,29	10/08/2025 07:40	0	10/08/2025 07:40
33.08	04/08/2025 23:57	30.27	30/08/2025 23:58	25,30	10/08/2025 07:40	0	10/08/2025 07:40
44.86	05/08/2025 23:57	30.27	31/08/2025 23:58	25,31	10/08/2025 07:40	0	10/08/2025 07:40
44.86	06/08/2025 23:57	30	01/09/2025 23:58	25,32	10/08/2025 07:40	0	10/08/2025 07:40
44.86	07/08/2025 23:57	30	02/09/2025 23:58	25,33	10/08/2025 07:40	0	10/08/2025 07:40
51.17	08/08/2025 23:57	30	03/09/2025 23:58	25,34	10/08/2025 07:40	0	10/08/2025 07:40
51.17	09/08/2025 23:57	30	04/09/2025 23:58	25,35	10/08/2025 07:40	0	10/08/2025 07:40
51.43	10/08/2025 23:57	30.81	05/09/2025 23:58	25,36	10/08/2025 07:40	0	10/08/2025 07:40
38,27		29,71		20,28		0,00	



Gambar L.1 Turbin Turgo





Gambar L.3 Rotor Dan Nozzle Turbin Turgo

Dokumentasi Kegiatan:

Gambar L. 4 Pemotongan Pipa PVC Untuk Pembuatan Sudu



Gambar L. 5 Pemasangan Sudu Turbin Turgo



Gambar L. 6 Pemotongan Besi Untuk Dudukan Sudu



Gambar L. 7 Pembebanan



Gambar L. 8 Pengambilan Data Beban dan Putaran



Gambar L. 9 Proses Pembuatan Rumah Turbin



Gambar L. 10 Turbin Turgo Dengan 2 *Nozzle*



Gambar L. 11 Turbin Turgo Dengan 3 *Nozzle*



Gambar L. 12 Turbin Turgo Dengan 4 *Nozzle*