POLITEKNIK ATMI SURAKARTA
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Zwick / Roell

Tensile Test report

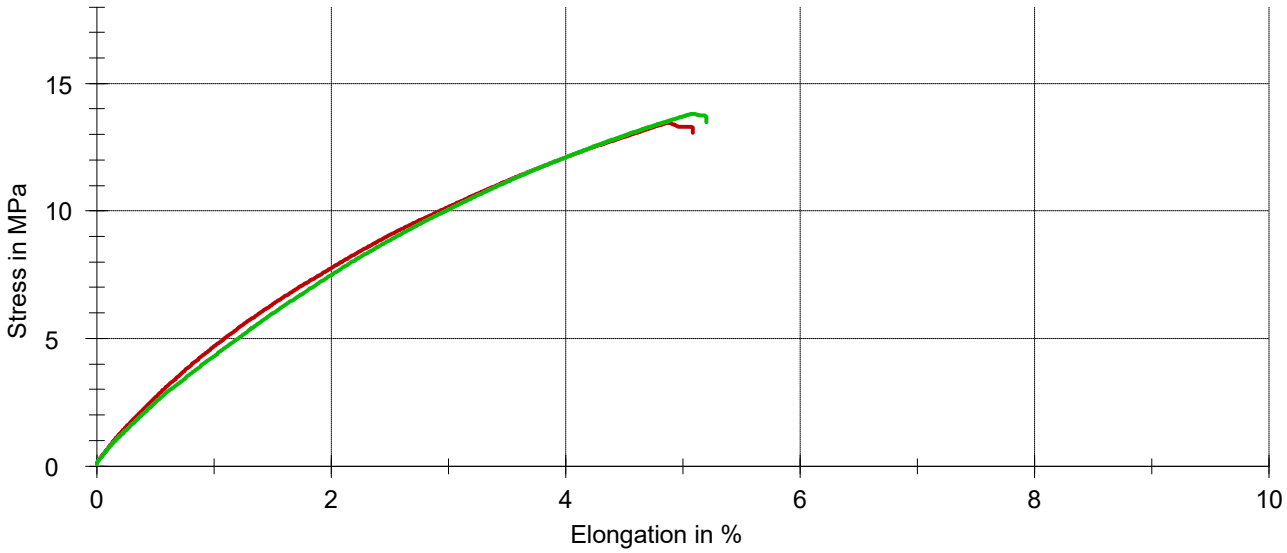
Customer	:	Rinto	Notes	:	Feed Rate 10 mm/menit
Test standard	:	ASTM D 638 Tipe 4	Machine data	:	Zwick Z020
Material	:	HDPE			

Pre-load	:	0,1	MPa
Speed, tensile modulus	:	5	mm/min
Test speed	:	5	mm/min
Grip to grip separation at the start position	:	65,00	mm
Elongation preset, secant modulus	:	1	%

Test results:

Legend	No.	Force N	E_t MPa	σ_M MPa	ε_M %	σ_B MPa	ε_B %	h mm	b mm
	1	385,16	552	13,5	4,9	13,5	4,9	4,56	6,27
	2	384,28	497	13,8	5,1	13,8	5,1	4,48	6,21

Series graph:



Statistics:

Series n = 2	Force N	E_t MPa	σ_M MPa	ε_M %	σ_B MPa	ε_B %	h mm	b mm
$\bar{x}$	384,72	525	13,6	5,0	13,6	5,0	4,52	6,24
s	0,62	38,9	0,241	0,14	0,241	0,14	0,05657	0,04243
ν [%]	0,16	7,41	1,77	2,89	1,77	2,89	1,25	0,68

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Zwick / Roell

Tensile Test report

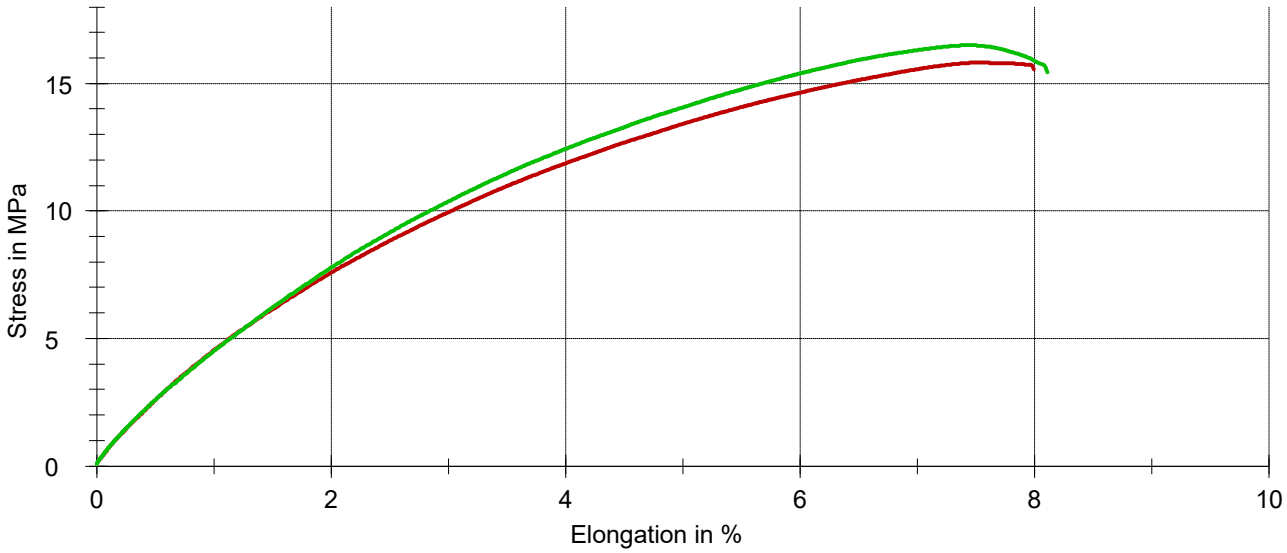
Customer	:	Rinto	Notes	:	Feed Rate 14 mm/menit
Test standard	:	ASTM D 638 Tipe 4	Machine data	:	Zwick Z020
Material	:	HDPE			

Pre-load	:	0,1	MPa
Speed, tensile modulus	:	5	mm/min
Test speed	:	5	mm/min
Grip to grip separation at the start position	:	65,00	mm
Elongation preset, secant modulus	:	1	%

Test results:

Legend	No.	Force N	E_t MPa	σ_M MPa	ε_M %	σ_B MPa	ε_B %	h mm	b mm
	1	465,66	531	15,8	7,5	15,8	7,5	4,7	6,26
	2	452,30	522	16,5	7,4	15,4	8,1	4,4	6,23

Series graph:



Statistics:

Series n = 2	Force N	E_t MPa	σ_M MPa	ε_M %	σ_B MPa	ε_B %	h mm	b mm
$\bar{x}$	458,98	526	16,2	7,5	15,6	7,8	4,55	6,245
s	9,45	5,97	0,476	0,057	0,283	0,41	0,2121	0,02121
ν [%]	2,06	1,13	2,95	0,76	1,81	5,30	4,66	0,34

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Zwick / Roell

Tensile Test report

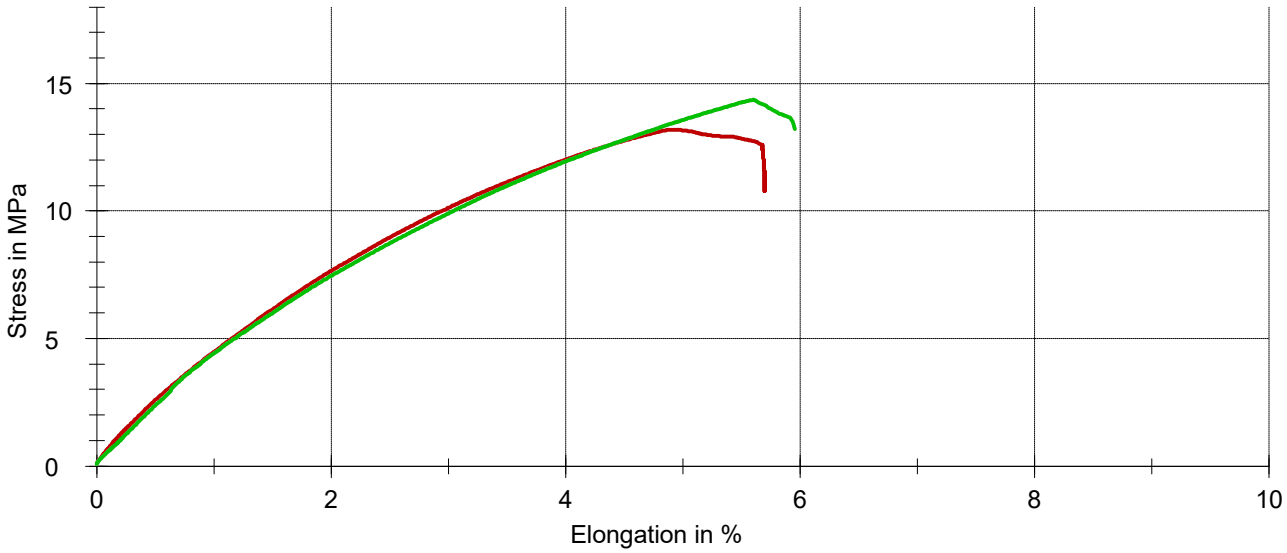
Customer	:	Rinto	Notes	:	Feed Rate 20 mm/menit
Test standard	:	ASTM D 638 Tipe 4	Machine data	:	Zwick Z020
Material	:	HDPE			

Pre-load	:	0,1	MPa
Speed, tensile modulus	:	5	mm/min
Test speed	:	5	mm/min
Grip to grip separation at the start position	:	65,00	mm
Elongation preset, secant modulus	:	1	%

Test results:

Legend	No.	Force N	E_t MPa	σ_M MPa	ε_M %	σ_B MPa	ε_B %	h mm	b mm
	1	378,37	527	13,2	4,9	10,8	5,7	4,64	6,18
	2	415,58	434	14,4	5,6	14,4	5,6	4,64	6,24

Series graph:



Statistics:

Series n = 2	Force N	E_t MPa	σ_M MPa	ε_M %	σ_B MPa	ε_B %	h mm	b mm
$\bar{x}$	396,98	481	13,8	5,3	12,6	5,7	4,64	6,21
s	26,31	65,2	0,819	0,48	2,52	0,072	0,000	0,04243
ν [%]	6,63	13,56	5,95	9,13	20,06	1,28	0,00	0,68

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Zwick / Roell

Flexural Test report

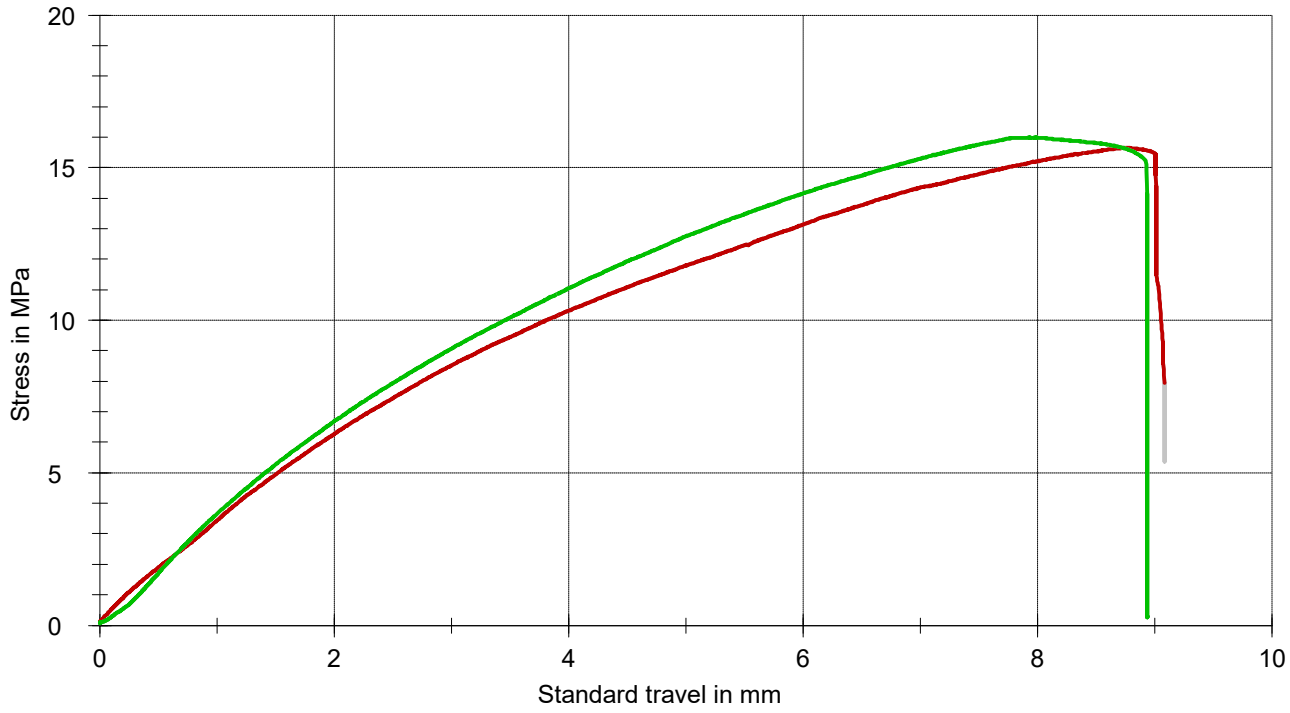
Customer : Rinto
Test standard : ASTM D 790
Material : HDPE
Notes : Feed Rate 10mm/menit
Machine data : Zwick Z020

Pre-load : 0,1 MPa
Test speed : 2 mm/min

Test results:

Legend	No.	Force N	E_H MPa	σ_1 MPa	σ_2 MPa	σ_{fM} MPa	ε_B %	σ_{fB} MPa	ε_f %	L mm	d mm	b mm
	1	82,71	700	6,46	10,5	15,7	4,4	7,74	4,4	80	5,14	24
	2	80,25	783	7,00	11,5	16,0	4,2	14,9	4,2	80	5,02	23,9

Series graph:



Statistics:

Series n = 2	Force N	E_H MPa	σ_1 MPa	σ_2 MPa	σ_{fM} MPa	ε_B %	σ_{fB} MPa	ε_f %	L mm	d mm	b mm
$\bar{x}$	81,48	742	6,73	11,0	15,8	4,3	11,3	4,3	80	5,08	23,95
s	1,75	59,0	0,385	0,670	0,236	0,12	5,07	0,12	0,000	0,08485	0,07071
ν [%]	2,14	7,95	5,72	6,09	1,49	2,85	44,75	2,85	0,00	1,67	0,30

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Zwick / Roell

Flexural Test report

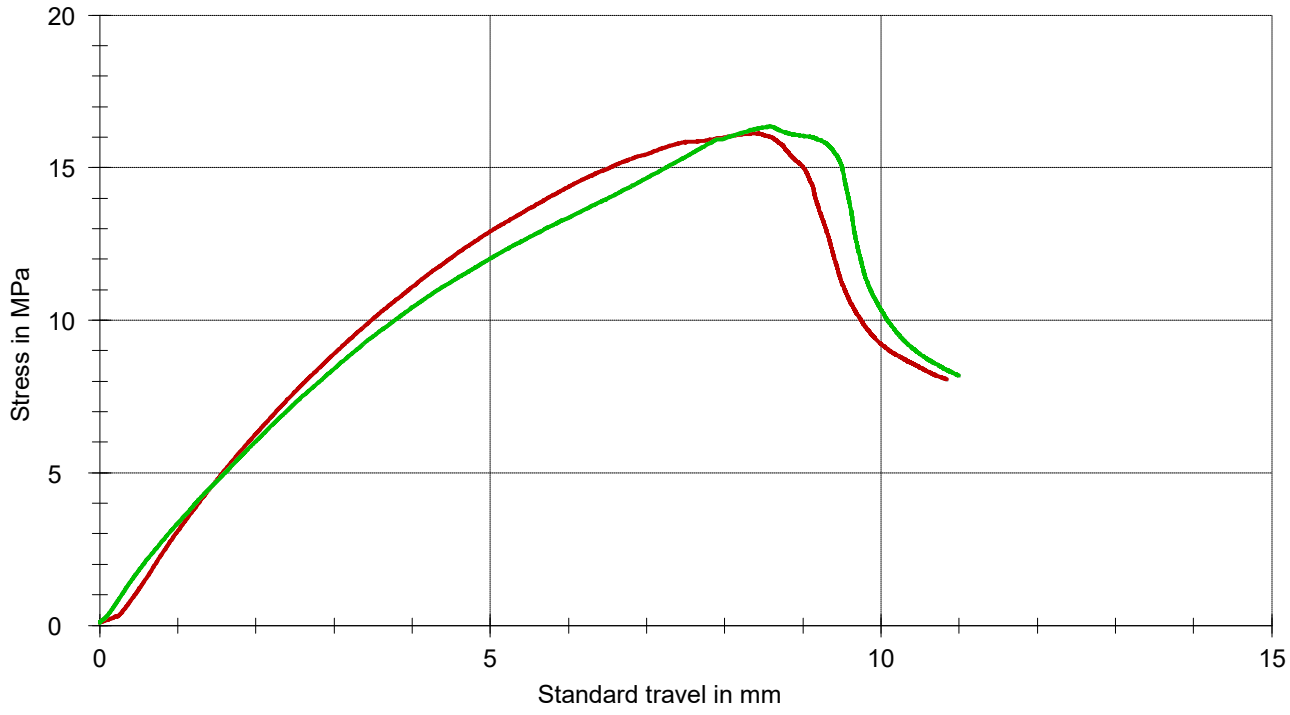
Customer : Rinto
Test standard : ASTM D 790
Material : HDPE
Notes : Feed Rate 14mm/menit
Machine data : Zwick Z020

Pre-load : 0,1 MPa
Test speed : 2 mm/min

Test results:

Legend	No.	Force N	E_H MPa	σ_1 MPa	σ_2 MPa	σ_{fM} MPa	ε_B %	σ_{fB} MPa	ε_f %	L mm	d mm	b mm
	1	84,94	555	6,49	11,4	16,1	5,2	8,06	5,2	80	5,13	24,02
	2	85,69	783	6,25	10,7	16,4	5,3	8,18	5,3	80	5,12	23,98

Series graph:



Statistics:

Series n = 2	Force N	E_H MPa	σ_1 MPa	σ_2 MPa	σ_{fM} MPa	ε_B %	σ_{fB} MPa	ε_f %	L mm	d mm	b mm
$\bar{x}$	85,32	669	6,37	11,1	16,2	5,2	8,12	5,2	80	5,125	24
s	0,53	161	0,172	0,492	0,164	0,046	0,0825	0,046	0,000	0,007071	0,02828
ν [%]	0,62	24,05	2,70	4,45	1,01	0,88	1,02	0,88	0,00	0,14	0,12

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Zwick / Roell

Flexural Test report

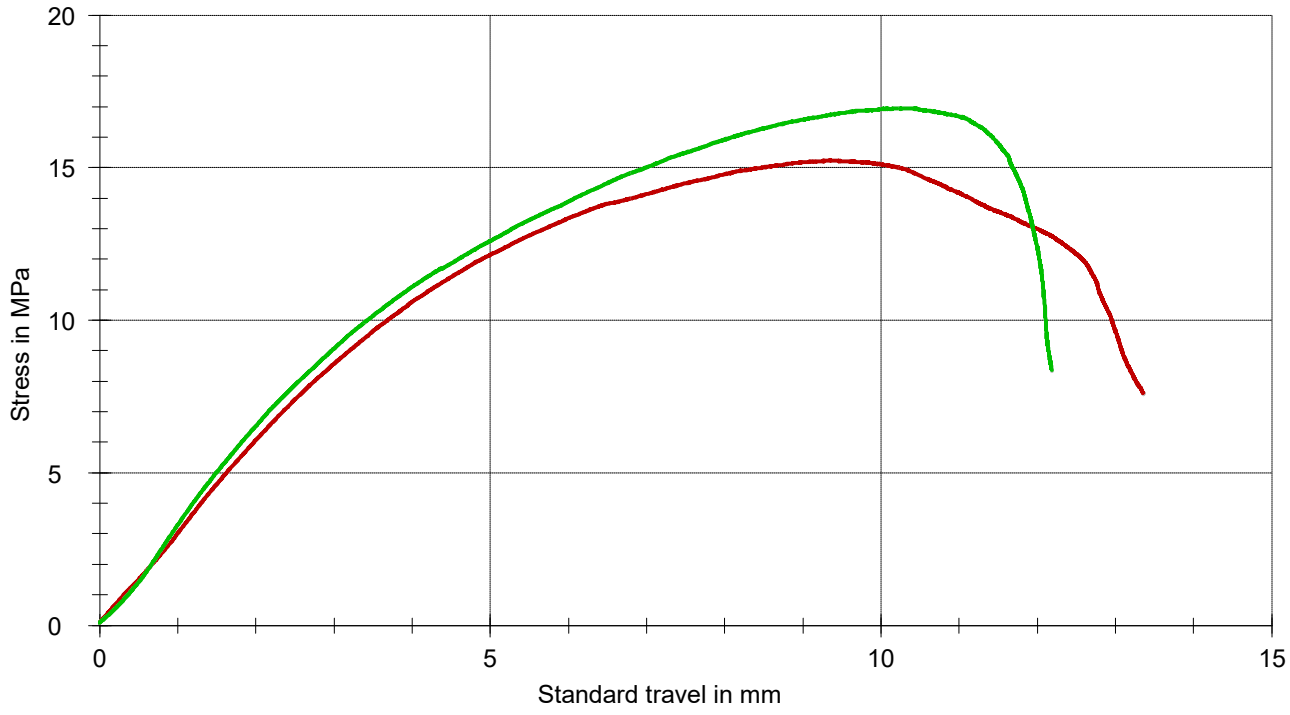
Customer : Rinto
Test standard : ASTM D 790
Material : HDPE
Notes : Feed Rate 20mm/menit
Machine data : Zwick Z020

Pre-load : 0,1 MPa
Test speed : 2 mm/min

Test results:

Legend	No.	Force N	E_H MPa	σ_1 MPa	σ_2 MPa	σ_{fM} MPa	ε_B %	σ_{fB} MPa	ε_f %	L mm	d mm	b mm
	1	79,43	582	6,32	10,9	15,2	6,4	7,62	6,4	80	5,1	24,04
	2	90,21	582	6,73	11,3	16,9	5,9	8,47	5,9	80	5,15	24,08

Series graph:



Statistics:

Series n = 2	Force N	E_H MPa	σ_1 MPa	σ_2 MPa	σ_{fM} MPa	ε_B %	σ_{fB} MPa	ε_f %	L mm	d mm	b mm
$\bar{x}$	84,82	582	6,53	11,1	16,1	6,1	8,05	6,1	80	5,125	24,06
s	7,62	0,219	0,294	0,307	1,21	0,36	0,600	0,36	0,000	0,03536	0,02828
ν [%]	8,98	0,04	4,50	2,76	7,49	5,81	7,46	5,81	0,00	0,69	0,12

Program Studi Teknik Mesin

Lembar Persetujuan Naskah Publikasi dan Abstrak Tugas Akhir (TA)

Judul TA :	**Pengaruh Feed Rate Terhadap Kekuatan Mekanik Pengelasan Friction Stir Welding Pada High Density Polyethlene (HDPE)**
Judul Naskah Publikasi :	**Pengaruh Feed Rate Terhadap Kekuatan Mekanik Pengelasan Friction Stir Welding Pada High Density Polyethlene (HDPE)**
Nama Mahasiswa:	**Rinto**
NIM :	**20140130035**
Pembimbing 1:	**Ir. Aris Widyo Nugroho, M.T., Ph.D.**
Pembimbing 2:	**Muhammad Budi Nur Rahman, S.T., M.Eng**

Hal yang dimintakan pesetujuan *:

☑ Abstrak berbahasa Indonesia	☑ Naskah Publikasi	☐	☐ .....
☑ Abstrak berbahasa Inggris	☐	☐	☐ .....

**beri tanda √ di kotak yang sesuai*

Tanda Tangan

Rinto — *Tanggal* 04 September 2019

Persetujuan Dosen Pembimbing dan Program Studi

☑ Disetujui

Tanda Tangan

Ir. Aris Widyo Nugroho, M.T., PhD. — *Tanggal* 04 September 2019

Tanda Tangan

Berli Paripurna Kamiel, S.T., M.Eng.Sc., Ph.D — *Tanggal* 04 September 2019.

Formulir persetujuan ini mohon diletakkan pada lampiran terakhir pada naskah TA.