

Contents

1	Introduction	1
1.1	Motivation	2
1.2	Background	7
1.3	Objectives	11
1.4	Thesis outline	13
	Chapter 1 bibliography	23
2	Condensation model for Long-Route EGR CFD simulation	25
2.1	Introduction	27
2.2	Background and model validation strategy	30
2.3	Description of proposed condensation model in STAR-CCM+®	33
2.4	Verification of the model	40
2.5	Validation of the model	44
2.6	Conclusions	60
	Chapter 2 bibliography	68
3	Influence of compressor on condensation generation	69
3.1	Introduction	70
3.2	Numerical configuration	71
3.3	Methodology	74
3.4	Results	75
3.5	Conclusions	89
	Chapter 3 bibliography	92
4	Experimental assessment of inlet geometry influence on compressor performance	93
4.1	Introduction	95
4.2	Materials and methods	98
4.3	Results	107
4.4	Conclusions	113
	Chapter 4 bibliography	118
5	3D-CFD assessment of inlet geometry influence on compressor performance	119

5.1	Introduction	120
5.2	Background and selection of geometries	120
5.3	CFD setup and methodology	122
5.4	Results and discussion	125
5.5	Conclusions	139
	Chapter 5 bibliography	144
6	Concluding remarks	145
6.1	Introduction	146
6.2	Summary of findings and contributions	146
6.3	Limitations	151
6.4	Suggestions for future studies	152
	Global bibliography	157