

# ISO 3170:2025-06 (E)

## Hydrocarbon Liquids - Manual sampling

---

### Contents

Page

Foreword.....	vi
Introduction.....	vii
<b>1 Scope.....</b>	<b>1</b>
<b>2 Normative references.....</b>	<b>1</b>
<b>3 Terms and definitions.....</b>	<b>1</b>
<b>4 Safety.....</b>	<b>5</b>
4.1 General.....	5
4.2 Safety aspects of equipment.....	6
4.3 Safety at sampling points.....	6
4.4 Entry into enclosed (confined) spaces.....	7
4.5 Electrical safety.....	8
4.5.1 Static electricity.....	8
4.5.2 Electronic and electrical equipment.....	8
<b>5 Sampling.....</b>	<b>8</b>
5.1 General.....	8
5.2 Typical locations from where samples are drawn.....	9
5.2.1 Tank sampling.....	9
5.2.2 Line sampling.....	10
5.3 Restricted opening/vapour trap sampling.....	10
5.4 Representative samples.....	10
5.5 Homogeneity.....	10
<b>6 Equipment.....</b>	<b>11</b>
6.1 General.....	11
6.2 Types of tank samplers.....	11
6.2.1 General.....	11
6.2.2 Spot samplers.....	11
6.2.3 Zone samplers/flow-through samplers.....	11
6.2.4 Running samplers.....	11
6.2.5 All-level samplers.....	12
6.2.6 Bottom samplers.....	13
6.2.7 Dead bottom samplers.....	13
6.2.8 Residue samplers (sediment samplers).....	13
6.3 Samplers used for open sampling methods in tanks.....	13
6.3.1 General.....	13
6.3.2 Sampling can/thief.....	14
6.3.3 Sampling cage and bottle.....	14
6.3.4 Dead bottom sampler.....	16
6.3.5 Zone or core sampler.....	18
6.4 Samplers used for restricted and closed sampling methods in tanks.....	21
6.4.1 General.....	21
6.4.2 Sampler for vapour pressure analysis.....	23
6.4.3 Vapour control valves.....	23
6.5 Other sampling devices.....	23
6.5.1 Tank side samplers.....	23
6.5.2 Pipeline samplers.....	23
6.5.3 Drum samplers.....	24
6.5.4 Sludge/sediment samplers.....	25

<b>7</b>	<b>Sample container</b> .....	<b>28</b>
7.1	General container design.....	28
7.2	Sample container material and type.....	28
7.2.1	General.....	28
7.2.2	Glass bottle.....	28
7.2.3	Plastic container.....	29
7.2.4	Metal cans.....	29
7.3	Container closures.....	29
<b>8</b>	<b>Procedures</b> .....	<b>30</b>
8.1	General sampling practices.....	30
8.2	General principles of sampling.....	30
8.3	Tank sampling procedures.....	31
8.3.1	Shore tank sampling.....	31
8.3.2	Sampling from ships.....	35
8.4	Procedure for manual sampling on pipeline.....	38
8.4.1	General.....	38
8.4.2	Spot sampling of high vapour pressure liquids.....	38
8.5	Sampling from railcars.....	44
8.6	Sampling from road tankers.....	44
8.7	Sampling from drums or intermediate bulk containers.....	45
8.7.1	General.....	45
8.7.2	Tube sampling from drums.....	45
8.7.3	IBC sampling.....	45
8.7.4	Pump sampling.....	46
8.7.5	Batch sampling.....	46
8.8	Package sampling.....	46
8.8.1	Statistical aspects of sampling packages.....	46
8.8.2	Acceptable quality limit.....	47
8.8.3	Inspection level.....	47
8.8.4	Sampling plan.....	47
8.8.5	Procedures for sampling packages.....	50
8.9	Sampling from dispensers (retail).....	50
<b>9</b>	<b>Requirements for specific products</b> .....	<b>51</b>
9.1	General.....	51
9.2	Crude oil.....	51
9.3	Naphtha, gasoline and other volatile liquid.....	52
9.4	Aviation fuels.....	52
9.5	Distillate fuels (excluding jet fuel).....	53
9.6	Residual fuel oil (including marine bunker fuels).....	54
9.6.1	Fuel oil.....	54
9.6.2	Marine bunker fuel (residual fuel and marine distillates).....	54
9.7	Bitumen.....	55
9.8	Requirements for sampling for microbiological assay.....	55
9.8.1	General.....	55
9.8.2	General recommendations for sampling fuel facilities.....	55
9.8.3	Tank water phase sample.....	55
9.8.4	Bulk fuel phase sample.....	55
9.8.5	Sampling procedure.....	56
9.8.6	Monitoring regimes for terminals and distribution systems.....	56
<b>10</b>	<b>Sample handling</b> .....	<b>57</b>
10.1	General.....	57
10.2	Sample transfer.....	57
10.3	Labelling.....	57
10.4	Sample transportation.....	58
10.5	External influences.....	58
10.5.1	General.....	58
10.5.2	Temperature.....	58
10.5.3	Light.....	59
10.5.4	Time.....	59
10.5.5	First test requirements.....	60
10.6	Homogenizing samples.....	60
10.6.1	General.....	60

10.6.2	None (no mixing)	60
10.6.3	Shaking	60
10.6.4	Power mixers	60
10.7	Verification of mixing efficiency	62
10.7.1	General	62
10.7.2	Homogeneous liquids	62
10.7.3	Non-homogeneous liquids	62
10.7.4	Mixing efficiency verification test for non-homogeneous oils (injection/ recovery test)	62
10.8	Selection of sample mixing method	63
10.9	Compositing samples	64
10.10	Retained samples	64
<b>Bibliography</b>		<b>65</b>