



# BioMates

## Data Management Plan – Level 2 *Coding of identifiers for WP1-samples and -blends*

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## 1. Introduction

In the H2020-project BioMates ([www.biomates.eu](http://www.biomates.eu), see chapter 5 “Funding and disclaimer”), Fraunhofer UMSICHT produced samples from ablative fast pyrolysis of herbaceous biomass in a TRL 4-plant. A dedicated document provides identifiers for relevant liquid samples and their blends (Table 6, first row), containing information about the origin of the sample. The document at hand explains how to read them.

## 2. General identifiers

The first three digits of each identifier are set to “BM-”, standing for BioMates, in order to avoid mixing numbers up with data from other projects.

Digits 4-6 are “FH-”, indicating Fraunhofer as the generating party, where “Fraunhofer” is used abbreviately for Fraunhofer Institute for Environmental, Safety, and Energy Technology UMSICHT, Germany.

The next four digits of each identifier define the plant itself, followed by a “-“. The subsequent digits define the basic setting of the plant and are defined individually for each plant. Again, a “-“ follows, marking the end of the plant description.

## 3. AFP4: the TRL4-AFP-plant

### 3.1. Plant description and experiment’s identifiers

The TRL4-AFP-plant of Fraunhofer UMSICHT is an individually-built fast-pyrolysis-device of the rotating-disc-type, delivered in 2012 by PyTrade, Hamburg/Germany, based upon a technology of PyTec, Hamburg/Germany. The plant underwent several alterations and can now be considered as a unique prototype. More detailed descriptions are given in the final versions of the public deliverables

- D04/D1.1      Straight-run AFP products from straw & miscanthus, DOI: [10.24406/fordatis/156](https://doi.org/10.24406/fordatis/156)
- D06/D1.2      Advanced AFP products from straw & miscanthus<sup>3</sup>
- D17/D1.3      Advanced-AFP product after WP4+6-feedback<sup>3</sup>

The general identifier of this plant within the BioMates DMP is “AFP4”.

Therefore, the experiments are defined as:

**Table 1:** TRL4-AFP-plant: definition of experiment’s identifiers

Digits	Valid values	Meaning
01-02	BM	Part of BioMates
03	-	Machine-readable section-limiter
04-05	FH	Defines Fraunhofer as origin of the data set / sample
06	-	Machine-readable section-limiter
07-09	AFP4	Defines the TRL4-AFP-plant
10	-	Machine-readable section-limiter
11-15	5-digit integer	Number of the experiment

<sup>3</sup> To be published at <https://fordatis.fraunhofer.de>

The experiments are not serially numbered starting at 00001, but pick up Fraunhofer's internal identifiers in order to avoid mistakes. For example, BM-FH-AFP4-00141 describes the first TRL4-AFP-plant experiment conducted within BioMates on 18/10/2016, being experiment No. 141 in total conducted with this plant.

### 3.2. Liquid samples' and blends' identifiers

The plant has two outputs: the main-stream and a side-stream output, identified with "M" and "S".

Both the main-stream and a side-stream output can be operated either with total condensation or with a (two-)staged condensation (1<sup>st</sup> and 2<sup>nd</sup> stage: "1" and "2"), and there are electrostatic precipitators where product accrues, too. In addition, there is the last stage's sump product that again can divide into different phases. Additionally, there is the overall liquid output of the experiment.

Furthermore, there may be several samples drawn from each output, and each sample may form either a single phase ("S") or multiple phases ("1", "2", "3") that are enumerated from the heaviest to the lightest phase. For all products, "T" means the total amount of product, without taking into account any phase separations. "T" also describes samples that are collected without any individual assessment, like in most cases the main stream's sump product.

Apart from single sample, there are blends generated. These blends are defined by a blend number (normally the smallest sample-number involved).

The complete set of identifier-details and their meaning is given in Table 2.

**Table 2:** TRL4-AFP-plant: definition of liquid samples' identifiers

Digits	Valid values	Meaning
16	-	Machine-readable section-limiter
17	S, B	Single sample, Blend
18	-	Machine-readable section-limiter
19	M, S, X	Main stream, Side stream, Mixture of Main and Side stream)
20-21	ST, H1, 2, 3, ..., E1, 2, 3, ..., S1, 2, 3, ..., L1, 2, 3, ..., OT, XX	Sump total of total condensation, Heavy product of staged cond. column 1, 2, 3, ..., ESP-condensate after staged cond. column 1, 2, 3, ..., Total sump product (H+E) of staged cond. column 1, 2, 3, ..., ESP-vapour out after staged cond. column 1, 2, 3, ..., Overall liquid output, XX mixture of streams
22	-	Machine-readable section-limiter
23-25	3-digit integer	Number of the sample drawn (001 for total sample)
26	-	Defines the TRL4-AFP-plant
27	S, 1, 2, 3, ..., T	Single phase, heaviest (1) and lighter ones of multiple phases, Total amount

Using these Identifiers, all samples and blends are described in a dedicated document (DMP\_3\_FhG\_AFP4\_Identifiers\_BioMates, see Table 6).

### 3.3. Gaseous and solid by-products

In addition to the liquid products, the TRL4-AFP-plant delivers gaseous and solid by-products. A special deliverable of the BioMates project is dedicated to those by-products:

- D20/D1.5 Report on evaluation of by-product utilisation pathways

There is no interchange of liquid or solid TRL4-AFP-plant-products between partners, and the complete set of relevant data of these products is given in said deliverable. Therefore, coding can be restricted to the liquid products of this plant.

### 3.4. Short identifiers

#### 3.4.1. Background

For labelling of samples, unambiguous 5-digits-codes are required. Therefore, the identifiers are converted into a respective format, presuming a set of constrictions that are valid for the relevant data.

#### 3.4.2. Preliminary 7-digit decimal code

In a first step, a preliminary 7-digit decimal code is generated, like described below.

Table 3 provides some constrictions and their consequences for the data in Table 1 and Table 2 and their consequences for creating a 7-digit short decimal code.

**Table 3:** TRL4-AFP-plant: constrictions and consequences for creating a 7-digit short decimal code

Digits	Valid values	Meaning	Constriction	Consequence
07-10	AFP4	Defines the TRL4-AFP-plant	No other plant was used	Does not have to be taken into account
12-16	5-digit integer	Number of the experiment	Number does not exceed 300	3-digit integer is sufficient
18	S, B	Single sample, Blend	In total, only 6 combinations are possible	Can be merged into 1 digit
20	M, S, X	Main stream, Side stream, Mixture of Main and Side stream)		
21-22	ST, H1, 2, 3, ..., E1, 2, 3, ..., S1, 2, 3, ..., L1, 2, 3, ..., OT, XX	Sump total of total condensation, Heavy product of staged cond. column 1, 2, 3, ..., ESP-condensate after staged cond. column 1, 2, 3, ..., Total sump product (H+E) of staged cond. column 1, 2, 3, ..., ESP-vapour out after staged cond. column 1, 2, 3, ..., Overall liquid output, XX mixture of streams	Only 8 possibilities at digit 20, no more than 8 condensation columns at digit 21	Can be expressed with 2 digits
24-26	3-digit integer	Number of the sample drawn (001 for total sample)	No more than 1 sample drawn for each stream	Does not have to be taken into account
28	S, 1, 2, 3, ..., T	Single phase, heaviest (1) and lighter ones of multiple phases, Total amount	No more than 3 phases + 2 numbers for S and T	Only 1 digit needed, only 0-4 required

Following said consequences, a 7-digit short decimal code was derived like shown in Table 4.

**Table 4:** TRL<sub>4</sub>-AFP-plant: preliminary 7-digit short decimal code stage 1

Long code			⇒	Short decimal code (6 digits)	
Digits	Valid values	Meaning	Digits	Resulting value	
01-06	BM-FH-	Defines the BioMates project and Fraunhofer as sample generator	01-06	BM-FH-	
12-16	00109-00298	Number of the experiment	7-9	000-999	
18-20	S-M	Single sample, Blend	10	0	
	S-S	-		1	
	S-X	Main stream, Side stream, Mixture of Main and Side stream)		2	
	B-M			3	
	B-S			4	
B-X	5				
21	S	Sump	11	0	
	L	Light product		1	
	H	Heavy product		2	
	E	ESP-condensate		3	
	O	Overall liquid		4	
	X	Mixture		5	
22	T	Total, total condensation	12	0	
	1-8	Staged cond. column 1-8		1-8	
	X	Mixture (redundant)		9	
28	S	Single phase heaviest (1) and lighter ones of multiple phases,	13	0	
	1-3			1-3	
	T	Total amount		4	

### 3.4.1. 6-digit decimal code

In order to create a 5-digit hexadecimal code, the digital code's numbers must not exceed 1,048,575. Therefore, the 7-digit-code described in the former section was transferred into a 6-digit decimal code. Table 5 explains the transformation rules.

**Table 5:** TRL<sub>4</sub>-AFP-plant: short decimal code: transformation 7-digit to 6-digit decimal code

7-digit decimal		⇒	6-digit decimal		Number of experiment (= 7-digit code, digits 7-9)	
Digits	Valid values / remark	Digits	109-208	209-308		
7-9	00109-00298	7-8	0-99	0-99		
10-12	- unchanged, only moved -	9-11	- unchanged, only moved -			
13	S	12	0	5		
	1-3		1-3	6-8		
	T		4	9		

### 3.4.1. 5-digit Hexadecimal code

The resulting 6-digit decimal code now can be reversibly transformed into a 5-digit hexadecimal code.

For example, the mixture BM-FH-AFP4-00248-B-MS1-002-S is expressed as BM-FH-5FF37.

## 4. Data files

The first data files working with these codes are listed in Table 6. One or more files addressing samples mentioned in publications are scheduled to follow.

**Table 6:** Selected WP1-related data files

Title	File name	Content	DOI / source
BioMates - WP1: Novel pyrolysis oil from non-food/feed biomass - Data sheet: Identifiers for samples and blends	DMP_3_FhG_AFP4_Identifiers_BioMates	Level-3-DMP-file; Provides sample numbers for all main-output bio-oil- and water-phase-products derived in WP1 and their blends as well as shipping information (if applicable)	10.24406/fordatis/156
BioMates - Mapping of samples – Deliverables in WP1: Novel pyrolysis oil from non-food/feed biomass	BioMates_SampleMapping_Deliverables_WP1	Maps the samples described in deliverables D1.1 – D1.6 to samples and sample blends defined in the Level-3-DMP-file described above	Will be published on <a href="https://fordatis.fraunhofer.de/">https://fordatis.fraunhofer.de/</a>

## 5. Funding and disclaimer

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