appendix f product grouping examples (2016-11).doc

Appendix F, *Product Grouping Examples*

Contents

1 Introduction

The definition of product groups is introduced in chapter 6. According to these definitions the INSULATION KEYMARK Scheme differentiates between product grouping according:

- Product by Product
- Property by Property.

The main aims of product grouping and the major principles are described in chapter 7.3 of the scheme rules.

The main reason for grouping more than one product in a Product Groups can be to obtain more statistical data for products which are identical with only one exception especially for $\lambda_{90/90}$. The reasons can be also marketing reasons for different names for different applications or markets or to reduce testing costs. Table 1 shows an example of a Property-table of different insulation products to show the difference of the product grouping according to Product by Product (horizontal) or Property by Property (vertical). For a grouping Product by Product you will get in the example of Table 1 six Groups (horizontal) and at least six KEYMARK Product Certificates. If the grouping of these insulation products will be Property by Property, the number of Groups (vertical) is 12. Only one KEYMARK Group Certificate will be issued.

Table 1: Difference of product grouping according to Product by Product or Property by Property

Grouping Product by Property, horizontal group	Product name	Grouping Property by Property vertical group ↓	↓	↓	↓
		Reaction to Fire	Compressive strength	λ 10°C	Chloride content
→ A	Product A	A1	50	0,030	CL10
→ B	Product B	A1	50	0,032	CL10
	Product B Alu	A2	50	0,032	CL10
	Product B Tissue	A2	50	0,032	CL10
→ C	Product C	B	80	0,033	CL10
→ D	Product D	B	80	0,040	CL10
→ E	Product E	B	100	0,040	CL10
→ F	Product F	C	100	0,040	CL10
Total number of Groups = 6 -> **6 Product Certificates**					
	Total number of Groups = 12 -> **1 Group Certificate**	4	3	4	1

In any case the product grouping is a task of the manufacturer but has to be agreed and accepted by the certification body.

2 Product grouping according to Product by Product

This type of grouping fits very good to producers which produce a small number of products in one production plant with a limited amount of Reaction to Fire classes, Thermal Conductivity classes and Compressive Strength classes. The premise is that each single product can be characterised and differentiated. Every product can be then certified individually with a KEYMARK Product Certificate.

2.1 Definition

Product or stringent Product Group with in principle identical declared properties (except of Reaction to Fire for different facings)

2.2 Example

Examples can be **Mineral Wool pipe sections** acc. EN 14303 with different facings and/or names or **Flexible Elastomeric Foam (FEF) tubes** or **sheet products** acc. EN 14304 with different colours and/or names for different applications. In both cases the products have the identical declared values for example Thermal Conductivity, Maximum Service Temperature and Chloride Content but not for Reaction to Fire.

Another example can be **Cellular Glass products** acc. EN 13167. Cellular Glass contains no combustible organic material. Therefore, Reaction to Fire is covered by the Commission Decision 96/603/EC. The material shows a good correlation between density, compressive strength and thermal conductivity for the same type of material. One Product Group has identical declared values for example for Thickness Tolerance, Thermal Conductivity, Compressive Strength, Water Absorption and Water Vapour Transmission but different facings and different Reaction to Fire classes with different facings.

3 Product grouping according to Property by Property

For the certification of production plants which produce a lot of different products the grouping property by property can be used. Normally the product names are clearly distinguished but the declaration contains only a limited combination of property classes.

3.1 Definition

Grouping of products in respect of declared properties of nearly the whole production, defined in values, steps and levels for one production site or one production line /unit.

3.2 Example

An example can be a **Mineral Wool** production plant which produces e.g. 150 to 200 different products which are clearly differentiated by names but the declaration contains only a limited combination of property classes.

The mineral wool products consist of

- Inorganic fibres and facings
- Organic binders, sometimes adhesives and facings with organic content.

Reaction to Fire strongly depends on the content of combustible organic materials in binders, facings and adhesives. Also Thermal Conductivity, Compressive Stress, Water Absorption and so on strongly depend on binder content, main fibre direction, but also on density, air flow resistance and more properties.

The grouping will follow EN 13172

1. Parameter Reaction to Fire
2. Parameter Thermal Conductivity groups

2a. Parameter Thickness Groups

3. Parameter mechanical groups like Compressive Strength
4. Parameter Water Absorption

The following Figure 1 shows a flow chart how to find suitable test candidates, the representative products of all declared property groups.

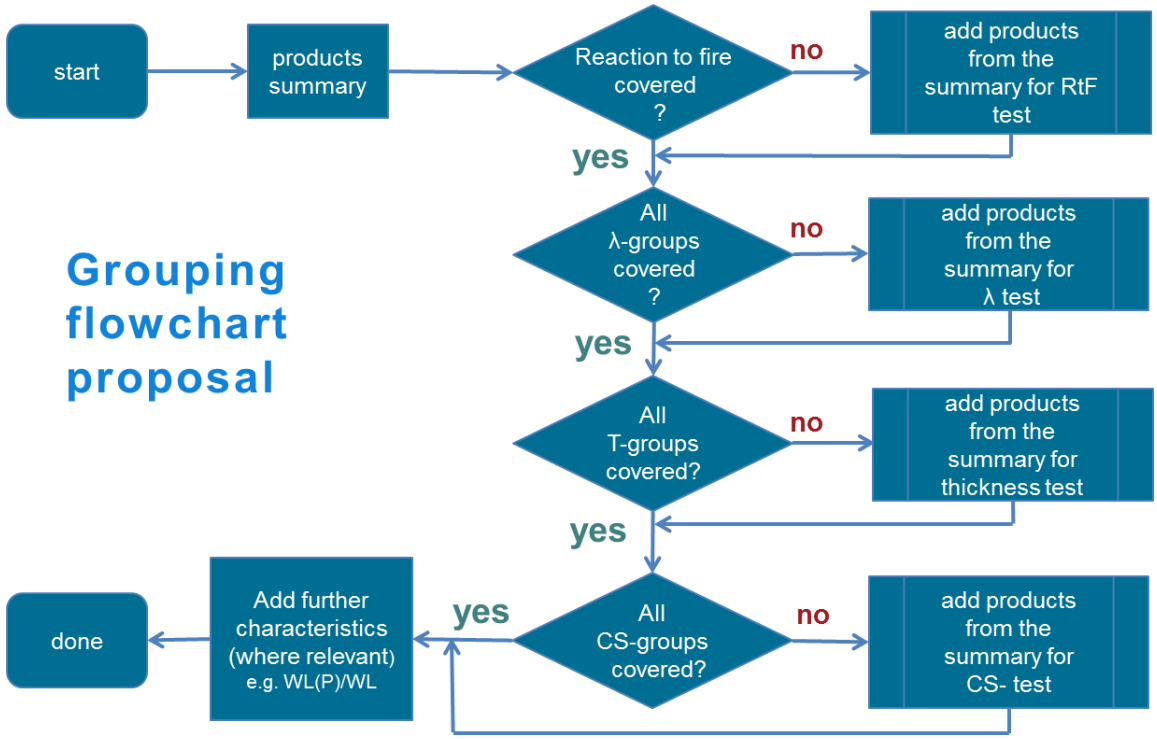

Figure 1: Flow chart to find suitable test candidates

The flow chart gives a general guidance for the certification body how to proceed with testing and certification in case of many different products.

To add or skip rhombs gives the possibility to add or skip properties if necessary.

Rectangular boxes represent an action to do. The action can be adapted to a specific insulation material or plant.

1. Grouping: Reaction to Fire

The property Reaction to Fire will lead according to table 2 to 3 different groups (A1 unfaced, A1 faced, A2-s1, d0 faced) and therefore 3 representative products shall be sampled.

Table 2: Example for product grouping Property by Property (Reaction to Fire)

Product	Form of delivery / Facings	Thermal Conductivity λ 10°C	Thickness range		Reaction to fire	Mechanical Properties CS / TR / PL
			Tolerance Class	mm		
1	Board / glass fleece, black, one-sided	0,035	T3	30 - 240	A1	-
2	Board / mineral fleece, white	0,040	T4	65 - 185	A2-s1, d0	CS(10)60-TR15-PL(5)600
3	Slab / none	0,040	T3	40 - 240	A1	-
Property Groups Reaction to Fire					3	

2. Grouping: Thermal Conductivity and 2.a Grouping Thickness Tolerances

The property Thermal conductivity will lead according to table 3 to 6 different Thermal Conductivity groups (0,032 / 0,033 / 0,035 / 0,036 / 0,040 / 0,045) and therefore 4 more representative products shall be sampled to cover all declared thermal conductivity groups and the 2 different Thickness Tolerances (T3 / T4).

Table 3: Example for product grouping Property by Property (Thermal Conductivity)

Product	Form if delivery / Facings	Thermal Conductivity λ 10°C	Thickness range		Reaction to fire	Mechanical Properties CS / TR / PL
			Tolerance Class	mm		
1	Board / glass fleece, black, one-sided	0,035	T3	30 - 240	A1	-
2	Board / mineral fleece, white	0,040	T4	65 - 185	A2-s1, d0	CS(10)60-TR15-PL(5)600
3	Slab / none	0,040	T3	40 - 240	A1	-
4	Slab / none	0,036	T4	60 - 180	A1	CS(10)50-TR5-PL(5)550
5	Board / glass fleece, natural, one-sided	0,032	T3	30 - 60	A1	CS(10)0,5-TR1
6	Board / glass fleece, black, one-sided	0,033	T3	60 - 200	A1	TR1
7	lamella, measured at 100 mm / none	0,045	T4	100	A1	CS(Y)60-TR90
Property Groups Thermal Conductivity / Thickness		6	2			

3. Grouping: Mechanical Properties

The grouping according to the mechanical properties lead to an extra needed product (8) due to the fact that the property group CS(10)5 is not covered by the first 7 products.

Table 3: Example for product grouping Property by Property (Mechanical Properties)

Product	Form if delivery / Facings	Thermal Conductivity λ 10°C	Thickness range		Reaction to fire	Mechanical Properties CS / TR / PL
			Tolerance Class	mm		
1	Board / glass fleece, black, one-sided	0,035	T3	30 - 240	A1	-
2	Board / mineral fleece, white	0,040	T4	65 - 185	A2-s1, d0	CS(10)60-TR15-PL(5)600
3	Slab / none	0,040	T3	40 - 240	A1	-
4	Slab / none	0,036	T4	60 - 180	A1	CS(10)50-TR5-PL(5)550
5	Board / glass fleece, natural, one-sided	0,032	T3	30 - 60	A1	CS(10)0,5-TR1
6	Board / glass fleece, black, one-sided	0,033	T3	60 - 200	A1	TR1
7	lamella, measured at 100 mm / none	0,045	T4	100	A1	CS(Y)60-TR90
8	Board / none	0,040	T4	80 - 120	A1	CS(10)5-TR1

CS = Compressive stress or compressive strength
TR = Tensile strength perpendicular to faces
PL = Point Load

More products maybe are necessary to cover other properties like Dimensional Stability, Water Absorption and Air Flow Resistance groups. The 8 sampled and tested products are representative for all certified products (much more then sampled) because all declared property groups are covered during testing.

NOTE 1 The certification body shall always choose critical products to cover all non-critical products in respect of conflicting properties.

NOTE 2 During certification over years, every year different available products shall be tested.

NOTE 3 In case not every critical product has been tested during first testing in a year, second sampling is necessary.

NOTE 4 In case of non-conformity during product testing the same rules can be used for testing more than one product.