

CLASSIFICATION OF THE FIRE RESISTANCE ACCORDING TO EN 13501-2: 2007 + A1:2009 OF A THEUMA DOOR SET WITH THREE 3-D ARGENTA INVISIBLE HINGES, HUNG IN A THEUMA MDF FRAME WITH A 12 MM GAP WIDTH UNDER THE DOOR LEAF, IN A LIGHTWEIGHT PLASTERBOARD FACED STEEL STUD PARTITION

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Issued by: Efectis Nederland BV
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Notified Body number: 1234

Product name: Fire resistant THEUMA door set in MDF frame with three 3-D Argenta Invisible ARGENT ALU hinges

Classification document: 2010-Efectis-R0880 E

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1. Introduction

This report gives the classification of the fire resistance according to en 13501-2: 2007 + A1:2009 of a Theuma door set with three 3-D Argenta invisible hinges, hung in a Theuma MDF frame with a 12 mm gap width under the door leaf, in a lightweight plasterboard faced steel stud partition.

2 Details of the classified product

2.1 General

A fire test was carried out on a Theuma door set with three 3-D Argenta invisible hinges, hung in a Theuma MDF frame with a 12 mm gap width under the door leaf, lightweight plasterboard faced steel stud partition, the so called element.

2.2 Product description

The element is described as in the test report, which is the base for the classification given in § 4.2.

Flexible supporting construction: lightweight plasterboard faced steel stud partition

The steel stud partition frame was assembled from two steel U head/floor tracks and steel C-studs, thickness 0.6 mm, with a maximum c.t.c. distance of 600 mm. On both sides of the frame two layers of gypsum board were fixed, type F, thickness 12.5 mm.

The partition was not insulated and had a thickness of 100 mm.

Construction in general

De door set was built from:

- MDF frame
- Pine framework
- Chipboard filling
- Wood fibre covering plate
- hardware
- Palusol strip.

MDF door frame

Door frame

The dimensions of the frame were: 2398.5 x 1071 x 114 mm. The frame had a rebate of 45 x 22.5 mm. Around the frame the steel profiles were filled with pine timber: 50 x 50 mm to fix the frame to the dry wall. The frame was fixed to the dry wall with high speed building screws \varnothing 3.5 x 45 mm and PU-foam from ODICE, type Firefoam 1 C.

Milled grooves for hardware

Grooves were milled to mount the hinges lowered, dimensions: 111 x 29 x 7.0 mm for the washer plate of the hinge and for the hinge housing, dimensions: 71 x 29 x 36 mm. For the lock plate a groove was milled with dimensions: 235 x 29 x 6 mm.

Finnish

The gap between the frame and the metal stud dry wall was filled with fire resistant PU foam from ODICE, type Firefoam 1 C.

Intumescent materials

In the milled grooves for the hinges, only behind the washer plate an intumescent strip was affixed, type Interdens, thickness 1 mm.

Wooden door leaf

Dimensions

- height: 2315 mm;
- width: 930 mm;
- thickness: 40 mm.

Weight of the door leaf without hardware was 41.44 kg.

The door leaf was built from:

- Pine framework
- Chipboard filling
- Wood fibre covering plate
- hardware
- Palusol strip.

Frame work

The frame work was built out of pine edgings, with a density of 420 kg/m³, dimensions 33 x 35 mm at the vertical sides and 33 x 32.5 mm at the horizontal sides.

Door filling

The door was filled with chipboard, thickness 33 mm, with a density of 370 kg/m³.

Wood fibre covering plate

The frame work was on both sides covered with wood fibre covering panels, thickness 2.5 mm, with a density of 800 kg/m³.

Milled grooves for hardware

Grooves were milled to mount the hinges lowered, dimensions: 111 x 29 x 7.0 mm for the washer plate of the hinge and for the hinge housing, dimensions: 71 x 31 x 36 mm. For the lock plate a groove was milled with dimensions: 168 x 93 x 18 mm.

Intumescent (pressure building) materials

The door leaf was at the bottom provided with an intumescent strip of Palusol P, 30 x 6 mm (w x t). In the pine frame work at the direct heated side, at 10 mm from the edges, an intumescent strip was affixed Palusol P, 26 x 2 mm (w x t).

In the milled grooves for the hinges, only behind the washer plate an intumescent strip was affixed, type Interdens, thickness 1 mm.

Hardware

Hinges

The door leaf was hung with three 3-D Argenta Invisible hinges from ARGENT ALU. The hinges were mounted at 250, 1157 en 2064 mm counted from the top of the door leaf.

Lock and ironwork

The door leaf was provided with a reversible lock, type e60/a72 INOX with Europrofile cylinder, dimensions: 165 x 15 mm, with a stainless steel door plate for the door handle: Ø 24 mm. The handle was placed at 1050 mm from the bottom side of the door leaf. The cylinder of the lock was not provided with a strike plate. The lock was five packed on five sides with intumescent strips of Interdens, thickness 1 mm.

3 Test report & test results in support of classification

3.1 Test report

Name of the laboratory	Name of the assignor	Test report Nr.	Test method & date
Efectis Nederland BV P.O. box 1090 2280 CB Rijswijk The Netherlands	Argent Alu N.V.	2010-Efectis-R0880	EN 1634-1:2008

3.2 Test results

Criterion	Time measured from the start of the test during which the criterion based on EN 1634-1:2008.
	EN 1634-1:2008
a) Integrity (E) <ul style="list-style-type: none"> – Cotton pad – Opening gauges <ul style="list-style-type: none"> ∅ 6 mm ∅ 25 mm – Flames longer than 10 sec. 	36 minutes, failure because of flames > 10 sec. 36 minutes, not measured* 36 minutes, not measured* 36 minutes, failure*
b) Thermal insulation (I) <ul style="list-style-type: none"> – Average temperature rise – Maximum temperature rise I₂ – Maximum temperature rise I₁ 	36 minutes, no failure* 36 minutes, no failure* 36 minutes, no failure*
c) Radiation (W)	36 minutes, no failure*
* Heating was terminated after 36 minutes in concurrence with the sponsor.	

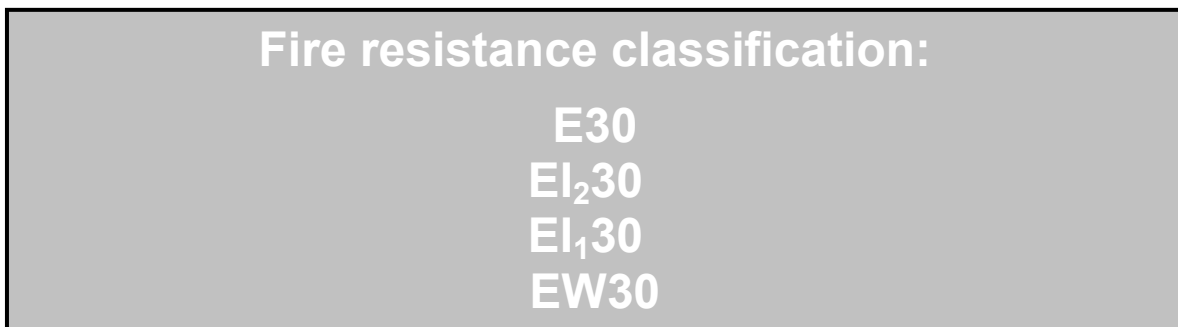
4 Classification and field of application

4.1 Reference of classification

This classification has been carried out in accordance with § 7 of EN 13501-2:2007 + A1:2009.

4.2 Classification

The element is classified according to the following combinations of performance parameters and classes as appropriate.



4.3 Field of application

These test results are only valid for door sets, which are the same in detail to the investigated construction, including materials and door hardware. The following requirements will have to be satisfied:

a) the Theuma door set with:

- dimensions of the door frame the same or smaller than 2398.5 x 1071 x 114 mm (w x h x t);
- dimensions of the door leaf the same or smaller than 2315 x 930 x 40 mm (w x h x t);
- the door set mounted in a lightweight plasterboard faced steel stud partition with a thickness of 100 mm;
- three 3-D Argenta Invisible hinges from ARGENT ALU;
- without strike plate for the lock cylinder;

b) the door leaf pivoting away from the fire.

4.4 Specific restrictions on materials and construction

4.4.1 General

The field of direct application of test results is restricted to doorsets. The field of direct application defines the allowable changes to the test specimen following a successful fire resistance test.

4.4.2 Materials and construction

4.4.2.1 Timber constructions

- The thickness of the door leaf or leaves shall not be reduced but may be increased.
- The door leaf thickness and/or density may be increased provided the total increase in weight is not greater than 25%.
- For timber based board products (e.g. particle board, blockboard, etc), the composition (e.g. type of resin) shall not change from that tested. The density shall not be reduced but may be increased.
- The cross-sectional dimensions and/or the density of the timber frames (including rebates) shall not be reduced but may be increased.

4.4.2.2 Decorative finishes

- Where the paint finish is not expected to contribute to the fire resistance of the doorset alternative paints are acceptable and may be added to leaves or frames for which unfinished test specimens were tested. Where the paint finish contributes to the fire resistance of the doorset (e.g. intumescent paints) then no change shall be permitted.
- Decorative laminates and timber veneers up to 1,5 mm thickness may be added to the faces (but not the edges) of leaves and frames in doorsets which satisfy the insulation criteria.

4.5 Fixings

- The number of fixings used to attach doorsets to supporting constructions may be increased but shall not be decreased and the distance between fixings may be reduced but shall not be increased.

4.6 Hardware

The number of any movement restrictors such as locks, latches and hinges may be increased but shall not be decreased. Where a doorset has been tested with a closing device fitted, but with the retention force released, the doorset may be provided either with or without that closing device, i.e. where self closing characteristics are not required.

NOTE Exchange of building hardware is not covered by the field of direct application.

4.7 Permissible size variations

4.7.1 Increase of size

As the doorset has been placed in category B overrun by fulfilling all the performance criteria for at least 36 minutes, the size of the doorset may be increased in height by 15%, in width by 15% and in surface area by 20% for fire resistance of 30 minutes. This only applies for the direction in which was tested.

4.7.2.1 Other changes

For smaller doorset sizes the relative positioning of movement restrictors (e.g. hinges, latches, etc.) shall remain the same as tested or any change to the distances between them will be limited to the same percentage reduction as the decrease of test specimen size.

For larger doorset sizes the following shall also apply:

- 1) the height of the latch above floor level shall be equal to or greater than the tested height, and the maximum of any change in height shall be proportional to the increase in doorset height;
- 2) the distance of the top hinge from the top of door leaf shall be equal to or less than that tested;
- 3) the distance of the bottom hinge from bottom of door leaf shall be equal to or less than that tested;
- 4) where three hinges or distortion preventers are used, the distance between the bottom of the door leaf and centre restraint shall be equal to or greater than that tested.

4.7.2.2 Timber constructions

- The number, size, location and orientation of any joints in the timber framing shall not be changed.

4.8 Direction of rotation

The result also applies to door structures that turn away from the fire, but only for the E and W criteria, not for I.

4.9 Supporting construction

- The door set was tested into a standard flexible supporting construction with a thickness of at least 100 mm and may for that reason be built in an aerated concrete wall of 100 mm.

5. Restrictions

This classification report does not represent a type approval or certification of the product.

SIGNED

S. Lutz

P.W.M. Kortekaas

Voor u ligt een rapport van Efectis Nederland BV (voorheen TNO Centrum voor Brandveiligheid). Efectis Nederland BV en het zusterbedrijf Efectis Frankrijk, zijn sinds 1 januari 2008 volle dochters van de Efectis Holding SAS, waarin TNO en het Franse CTICM, participeren. De activiteiten van het TNO Centrum voor Brandveiligheid zijn sinds 1 juli 2006 ondergebracht in Efectis Nederland BV. Dit is ingegeven door de internationale marktontwikkelingen en klantvragen. Om de klantvragen nog beter te kunnen beantwoorden, en een breder pakket aan diensten en faciliteiten van een hoge kwaliteit aan te kunnen bieden, is de internationale samenwerking verder uitgebreid. Dit is gedaan met ervaren, en in de brandveiligheids sector bekende, partners in Noorwegen (Sintef-NBL), Spanje (Afiti-Licof), Duitsland (IFT), de Verenigde Staten (South West Research Institute) en China (TFRI). Nadere informatie hierover is te vinden op onze website.

CLASSIFICATION OF THE FIRE RESISTANCE ACCORDING TO EN 13501-2: 2007 + A1:2009 OF A THEUMA DOOR SET WITH THREE 3-D ARGENTA ALU INVISIBLE HINGES AND BUILT IN DOOR CLOSER IN A TWO PIECE STAINLESS STEEL FRAME IN A LIGHTWEIGHT PLASTERBOARD FACED STEEL STUD PARTITION

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Product name: Fire resistant THEUMA door set in RVS frame with three 3-D Argenta Invisible ARGENT ALU hinges

Classification document: 2010-Efectis-R0882 E

Report number: 2010-Efectis-R0804

Project number: 2010236

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1. Introduction

This report gives the classification of the fire resistance according to en 13501-2: 2007 + A1:2009 of a single leaf door set of THEUMA, type BENOR 2287 model B, hung in a two piece stainless steel frame of Complete Door Constructions with three 3-D Argenta invisible hinges and built in DORMA door closer, in a lightweight plasterboard faced steel stud partition.

2 Details of the classified product

2.1 General

A fire test was carried out on a single leaf door set of THEUMA, type BENOR 2287 model B, hung in a two piece stainless steel frame of Complete Door Constructions with three 3-D Argenta invisible hinges and built in DORMA door closer mounted in a lightweight plasterboard faced steel stud partition, the so called element.

2.2 Product description

The element is described as in the test report, which is the base for the classification given in § 4.2.

Flexible supporting construction: lightweight plasterboard faced steel stud partition

The steel stud partition frame was assembled from two steel U head/floor tracks and steel C-studs, thickness 0.6 mm, with a maximum c.t.c. distance of 600 mm. On both sides of the frame one layer of gypsum board were fixed, type F, thickness 12.5 mm.

The partition was not insulated and had a thickness of 100 mm.

Construction in general

De door set was built from:

- RVS frame
- Pine framework
- Chipboard filling
- Wood fibre covering plate
- Hardwood edge
- hardware
- Palusol strip.

RVS door frame

Door frame

The two piece door frame of Complete Door Constructions was made of stainless steel with a thickness of 1.5 mm. The dimensions of the frame were: 2254 mm x 1135 mm (l x w) en 130 mm x 58,5 mm (w x t). The frame was factory provided with gypsum strips, thickness 10 mm, at the back in the rebate and in the architrave. De frame rebate was provided with a rubber frame profile from CDC, material EPDM.

Around the frame the steel profiles were filled with pine timber: 50 x 50 mm to fix the frame to the dry wall. The two halves of the frame were wrapped around the partition and were fixed together with screws. After that the frame was filled up with PU-foam from ODICE, type Firefoam 1 C.

Milled grooves for hardware

To mount the hinges lowered grooves were milled, dimensions: 111 x 29 x 7.0 mm for the washer plate of the hinge and for the hinge housing, dimensions: 71 x 29 x 36 mm. For the lock plate a groove was milled with dimensions: 235 x 29 x 6 mm. For the mounting plate of the door closer a groove was milled with dimensions: 440 x 12 x 21 mm.

Finnish

The gap between the frame and the metal stud dry wall was filled with fire resistant PU foam from ODICE, type Firefoam 1 C.

Intumescent materials

In the milled grooves for the hinges, only behind the washer plate an intumescent strip was affixed, type Interdens, thickness 1 mm. The milled groove for the conductor rod of the door closer was provided with intumescent graphite strip, thickness 1 mm.

Wooden door leaf

Dimensions

- height: 2200 mm;
- width: 1030 mm;
- thickness: 40 mm.

Weight of the door leaf without hardware was 45.15 kg.

The door leaf was built from:

- Pine framework
- Chipboard filling
- Wood fibre covering plate
- Hardwood edge
- hardware
- Palusol strip.

Frame work

The frame work was built out of pine edgings, with a density of 420 kg/m³, dimensions 33 x 35 mm at the vertical sides and 33 x 32,5 mm at the horizontal sides. At the vertical sides the frame work was lined with hard wood, thickness 8 mm, density 450 kg/m³

Door filling

The door was filled with chipboard, thickness 33 mm, with a density of 370 kg/m³.

Wood fibre covering plate

The frame work was on both sides covered with wood fibre covering panels, thickness 3 mm, with a density of 800 kg/m³. The covering panels were decorated with coloured HPL laminate, thickness 0.7 mm.

Milled grooves for hardware

Grooves were milled to mount the hinges lowered, dimensions: 111 x 29 x 7.0 mm for the washer plate of the hinge and for the hinge housing, dimensions: 71 x 31 x 36 mm. For the lock plate a groove was milled with dimensions: 168 x 93 x 18 mm.

Intumescent (pressure building) materials

The door leaf was at the bottom provided with an intumescent strip of Palusol P, 30 x 6 mm (w x t). In the pine frame work at the direct heated side, at 10 mm from the edges, an intumescent strip was affixed Palusol P, 26 x 2 mm (w x t).

In the milled grooves for the hinges, only behind the washer plate an intumescent strip was affixed, type Interdens, thickness 1 mm.

Hardware

Hinges

The door leaf was hung with three 3-D Argenta Invisible hinges from ARGENT ALU. The hinges were mounted at 250, 1100 en 1950 mm counted from the top of the door leaf.

Lock and ironwork

The door leaf was provided with a reversible lock, type e60/a72 INOX with Europrofile cylinder, dimensions: 165 x 15 mm, with a stainless steel door plate for the door handle: Ø 24 mm. The handle was placed at 1050 mm from the bottom side of the door leaf. The cylinder of the lock was not provided with a strike plate. The lock was on five sides packed with intumescent strips of Interdens, thickness 1 mm.

Built in door closer

The door set was provided with a built in door closer of Dorma, type ITS 96 EN2-4. The door closer was mounted with the set of flame retardant strips provided by the supplier.

3 Test report & test results in support of classification

3.1 Test report

Name of the laboratory	Name of the assignor	Test report Nr.	Test method & date
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Efectis Nederland BV P.O. box 1090 2280 CB Rijswijk The Netherlands	Argent Alu N.V.	2010-Efectis-R0882	EN 1634-1:2008
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3.2 Test results

Criterion	Time measured from the start of the test during which the criterion based on EN 1634-1:2008.
	EN 1634-1:2008
a) Integrity (E) – Cotton pad – Opening gauges ∅ 6 mm ∅ 25 mm – Flames longer than 10 sec.	36 minutes, no failure* 36 minutes, not measured* 36 minutes, not measured* 36 minutes, failure*
b) Thermal insulation (I) – Average temperature rise – Maximum temperature rise I ₂ – Maximum temperature rise I ₁	36 minutes, no failure* 36 minutes, no failure* 36 minutes, no failure*
c) Radiation (W)	36 minutes, no failure*
* Heating was terminated after 36 minutes in concurrence with the sponsor.	

4 Classification and field of application

4.1 Reference of classification

This classification has been carried out in accordance with § 7 of EN 13501-2:2007 + A1:2009.

4.2 Classification

The element is classified according to the following combinations of performance parameters and classes as appropriate.

Fire resistance classification:

E30

EI₂30

EI₁30

EW30

4.3 Field of application

These test results are only valid for door sets, which are the same in detail to the investigated construction, including materials and door hardware. The following requirements will have to be satisfied:

a) the Theuma door set with:

- dimensions of the door frame the same or smaller than 2254 x 1135 x 114 mm (w x h x t);
- dimensions of the door leaf the same or smaller than 2200 x 1030 x 40 mm (w x h x t);
- the door set mounted in a lightweight plasterboard faced steel stud partition with a thickness of 100 mm;
- with built in door closer of Dorma, type ITS 96 EN2-4;
- three 3-D Argenta Invisible hinges from ARGENT ALU;
- without strike plate for the lock cylinder;

b) the door leaf pivoting away from the fire.

4.4 Specific restrictions on materials and construction

4.4.1 General

The field of direct application of test results is restricted to doorsets. The field of direct application defines the allowable changes to the test specimen following a successful fire resistance test.

4.4.2 Materials and construction

4.4.2.1 Timber constructions

- The thickness of the door leaf or leaves shall not be reduced but may be increased.
- The door leaf thickness and/or density may be increased provided the total increase in weight is not greater than 25%.
- For timber based board products (e.g. particle board, blockboard, etc), the composition (e.g. type of resin) shall not change from that tested. The density shall not be reduced but may be increased.
- The cross-sectional dimensions and/or the density of the timber frames (including rebates) shall not be reduced but may be increased.

4.4.2.2 Stainless steel door frame

- The dimensions of metal wrap around frames may be increased to accommodate increased supporting construction thickness. The thickness of the metal may also be increased by up to 25 %.
- The type of metal shall not be changed from that tested.

4.4.2.3 Decorative finishes

- Where the paint finish is not expected to contribute to the fire resistance of the doorset alternative paints are acceptable and may be added to leaves or frames for which unfinished test specimens were tested. Where the paint finish contributes to the fire resistance of the doorset (e.g. intumescent paints) then no change shall be permitted.
- Decorative laminates and timber veneers up to 1,5 mm thickness may be added to the faces (but not the edges) of leaves and frames in doorsets which satisfy the insulation criteria.

4.5 Fixing of the door frame

- The number of fixings used to attach doorsets to supporting constructions may be increased but shall not be decreased and the distance between fixings may be reduced but shall not be increased.

4.6 Hardware

The number of any movement restrictors such as locks, latches and hinges may be increased but shall not be decreased. Where a doorset has been tested with a closing device fitted, but with the retention force released, the doorset may be provided either with or without that closing device, i.e. where self closing characteristics are not required.

NOTE Exchange of building hardware is not covered by the field of direct application.

4.7 Permissible size variations

4.7.1 Increase of size

As the doorset has been placed in category B overrun by fulfilling all the performance criteria for at least 36 minutes, the size of the doorset may be increased in height by 15%, in width by 15% and in surface area by 20% for fire resistance of 30 minutes. This only applies for the direction in which was tested.

4.7.2.1 Other changes

For smaller doorset sizes the relative positioning of movement restrictors (e.g. hinges, latches, etc.) shall remain the same as tested or any change to the distances between them will be limited to the same percentage reduction as the decrease of test specimen size.

For larger doorset sizes the following shall also apply:

- 1) the height of the latch above floor level shall be equal to or greater than the tested height, and the maximum of any change in height shall be proportional to the increase in doorset height;
- 2) the distance of the top hinge from the top of door leaf shall be equal to or less than that tested;

- 3) the distance of the bottom hinge from bottom of door leaf shall be equal to or less than that tested;
- 4) where three hinges or distortion preventers are used, the distance between the bottom of the door leaf and centre restraint shall be equal to or greater than that tested.

4.7.2.2 Timber constructions

- The number, size, location and orientation of any joints in the timber framing shall not be changed.

4.8 Direction of rotation

The result also applies to door structures that turn away from the fire, but only for the E and W criteria, not for I.

4.9 Supporting construction

- The door set was tested into a standard flexible supporting construction with a thickness of at least 100 mm and may for that reason be built in an aerated concrete wall of 100 mm.

5. Restrictions

This classification report does not represent a type approval or certification of the product.

SIGNED

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Voor u ligt een rapport van Efectis Nederland BV (voorheen TNO Centrum voor Brandveiligheid). Efectis Nederland BV en het zusterbedrijf Efectis Frankrijk, zijn sinds 1 januari 2008 volle dochters van de Efectis Holding SAS, waarin TNO en het Franse CTICM, participeren. De activiteiten van het TNO Centrum voor Brandveiligheid zijn sinds 1 juli 2006 ondergebracht in Efectis Nederland BV. Dit is ingegeven door de internationale marktontwikkelingen en klantvragen. Om de klantvragen nog beter te kunnen beantwoorden, en een breder pakket aan diensten en faciliteiten van een hoge kwaliteit aan te kunnen bieden, is de internationale samenwerking verder uitgebreid. Dit is gedaan met ervaren, en in de brandveiligheids sector bekende, partners in Noorwegen (Sintef-NBL), Spanje (Afiti-Licof), Duitsland (IFT), de Verenigde Staten (South West Research Institute) en China (TFRI). Nadere informatie hierover is te vinden op onze website.