

Universal Design

Criteria and influence on building elements



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Why Universal Design is getting important to the building industry

Market

- Demographic trend with a big need for senior friendly living space. In Germany for example 2.5 million dwellings
- Tenders from construction projects

Standards and regulations

- EU Régulation 305/2011 Construction Product Régulation (CPR) – demanded at July 2013
- DIN ISO 2600



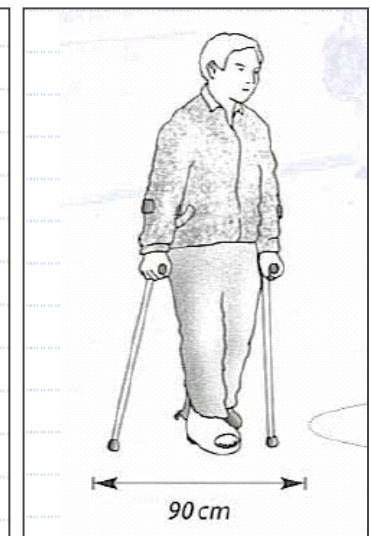
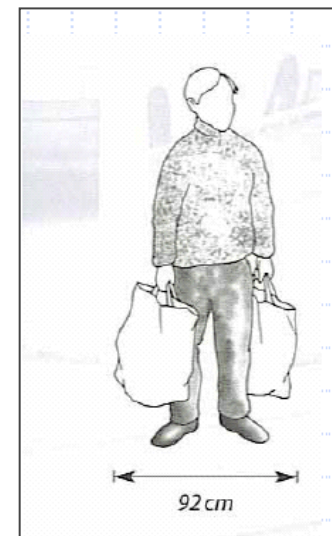
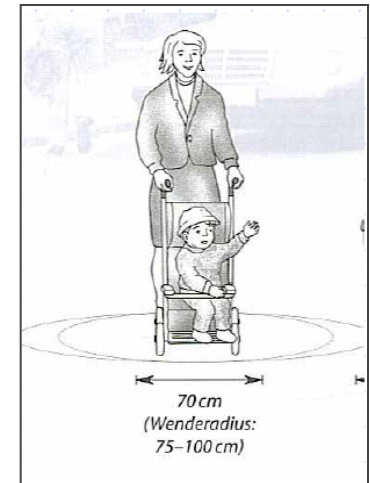
Universal Design (UD)

Universal Design wants products and services which are usable as many people as possible

Universal Design is an international design concept, which creates products, equipment, environments and systems in such a manner that they are usable for as many people as possible – independent from age and psychic/physical constitution – without any adaption or specialization.

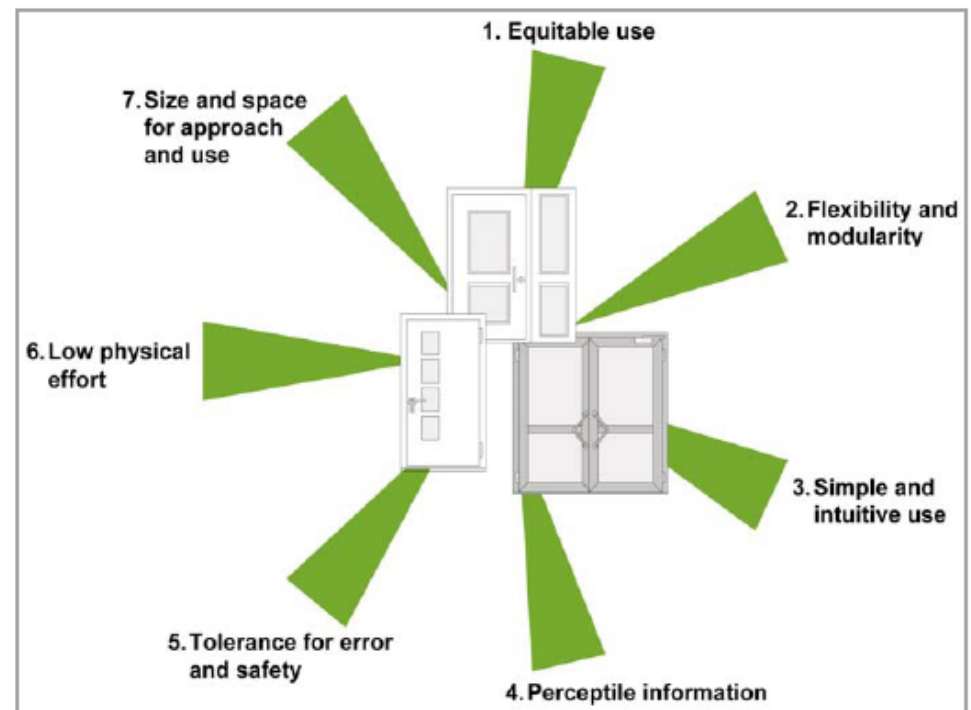
Which persons are affected?

1. **“Normal people”** like you and I
2. **Mobility impaired people**
(walking impaired/arm or hand impaired/growth repressed people/wheelchair users)
3. **Sensory impaired people**
visually impaired/blind/hearing impaired/deaf/temporarily impaired people)
4. **Old people & Children**
5. **People of small & large stature**
6. **Parents with young children and baby buggies**



The 7. principles of Universal Design

1. **Equitable** Use
2. **Flexibility** in Use
3. Simple and **Intuitive** Use
4. **Perceptible** Information
5. **Tolerance** for Error
6. **Low Physical** Effort
7. **Size and Space** for Approach and Use



Universal Design product groups

Intensive use in industries such as

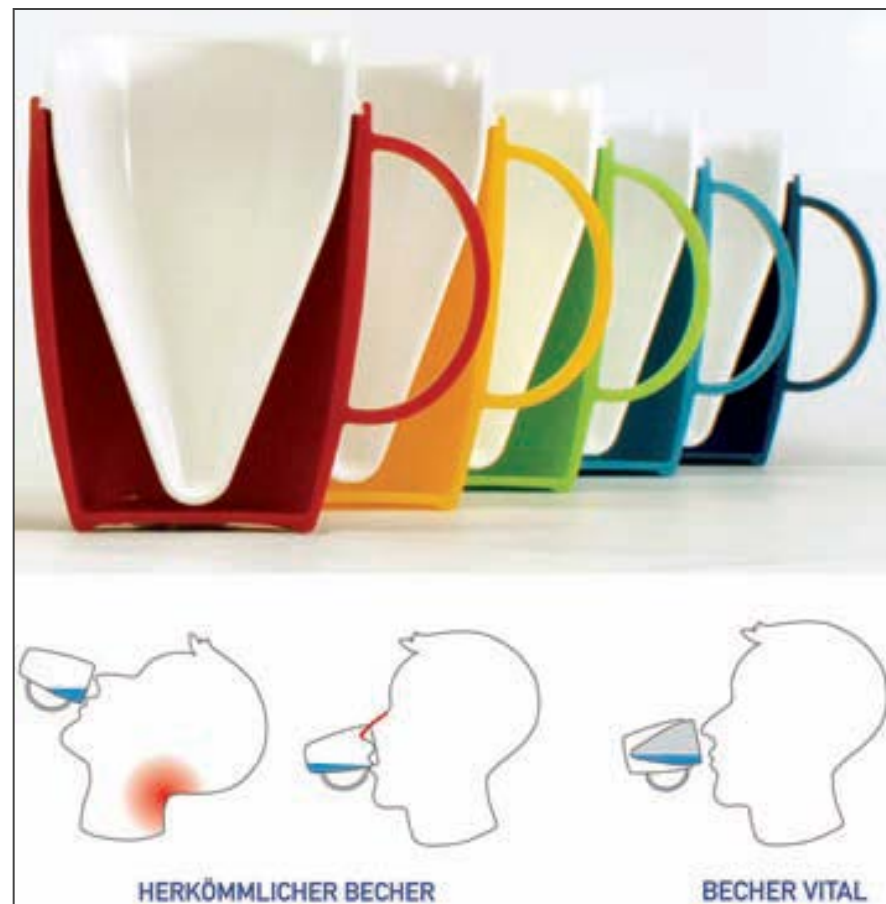
- **Electrical** devices
- **Utility** items
- **Consumer** electronics
- **Automotive**
- **Living area** (bath room, kitchen)



Example consumer - Drink cup

UD principals 1/2/3/5

- Usable for bed-ridden patients or persons with limited mobility in their upper body or neck
Principals
 1. Equitable Use
 2. Flexibility in Use
- The cup can be emptied easily and completely without the cup having to be tipped up. This allows to drink independently and handle the cup intuitively
Principals
 3. Simple and Intuitive Use
 5. Tolerance for Error



Universal design award 2011
Design: ORNAMIN Design Team,
Manufacturer: ORNAMIN-KUNSTSTOFFWERKE

Example industry: Pneumatic slide valve

UD principals 3/4/5/6

- Valve is manually operated and is ergonomically designed
Principal
6. Low Physical Effort
- The blue ring identifies the operating area and ensures fatigue-proof movement with positive locking
Principals
3. Simple and Intuitive Use
4. Perceptible Information
5. Tolerance for Error



Universal design award 2012
Design: Simone Mangold
Manufacturer: Festo AG & Co. KG

Example automotive: Minivan

Opel Meriva UD principals 1/2/3/4/5/6/7

- **Ergonomic seat** can be set to 18 different positions
Principals
 1. Equitable Use and
 2. Flexibility in Use
- The **rear-hinged back doors** make getting in and out of the car comfortable and ergonomic even in narrow parking spaces
Principal 7. Size and Space for Approach and Use.
- The **cycle rack** system in the rear bumper is convenient to adjust and loading height for bicycles is low
Principal 6. Low Physical Effort
- **Park Pilot** with acoustic and visual warnings and **hill start assistance** prevents from rolling down the hill
Principals
 4. Perceptible Information
 5. Tolerance for Error



Minivan Opel Meriva; Manufacturer: Adam Opel AG

Example building industry: Shower and bath-rooms

Good access to the product / service and sufficient room to move for different types of users.

Also think of persons with

- strollers/pushchairs
- Wheelchair and walking frames users
- Cleaning personnel, etc.

UD-Principals

3. Simple and **Intuitive** Use
5. **Tolerance** for Error
6. **Low Physical** Effort
7. **Size and Space** for Approach and Use



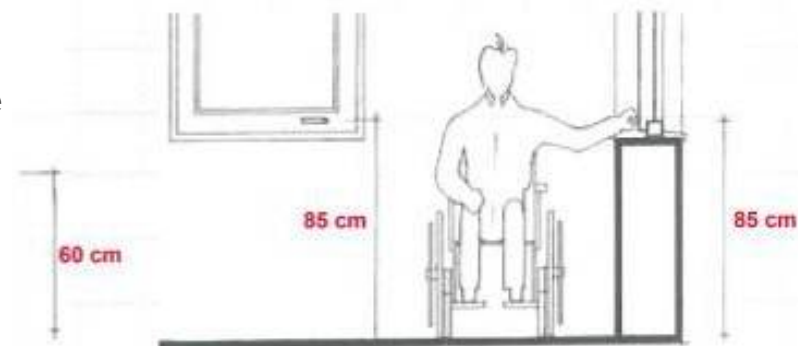
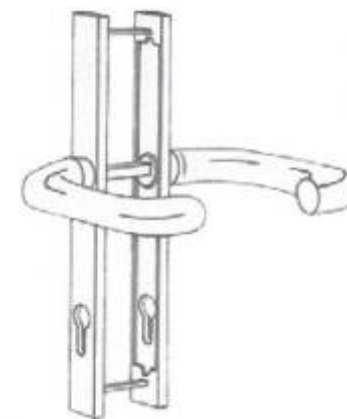
Freedom from barriers means

- 1. Vertical**
steps/sills, ramp -> elevator, lift
- 2. Horizontal**
door width/height, access paths/corridors,
movement areas in front/behind doors ->
Spatial movement areas
- 3. Sensory** orientation/obstacles, missing
colors contrasts
- 4. Ergonomic**
operating elements, missing support,
accessibility of elements, equipment,
furnishing
- 5. Anthropometric**
grab range, orientation



Simple tips for barrier-free window & doors

1. Turn windows shouldn't be sized too large – **weight problem** and limitation of movement area
2. **Sill height** of massive walls max. 60 cm for **better visual contact** from inside to outside in sitting position; maybe preference of glass and metal constructions
3. Window+door **fittings at height of 85 cm**
4. **Electric closing** drive in case of limited hand function
5. Window and door fittings 90° **bent at the ends** for easier use



Transfer to windows and doors

You have to be able to perceive, understand, reach and use building elements.

Therefore they have to be:

1. Clearly **perceptible**,
2. **Simple** to open and close,
3. **Safe** to operate,
4. **Adaptable**
(e.g. retrofitting of automation)
5. Sustainable,
6. Aesthetical,



Picture: Special show BAU 2011/Geze

Universal Design for internal doors

Construction and design requirements

1. Shape & **design**
(no edges, risk of injury)
2. No **sills** and ledges
3. Used **materials**
(sustainable, recycling, durability)
4. **Surface**
(closed, no ledges, clean ability)



Construction requirements – dimension

Requirements on height of door handles

Requirement of manual operated doors			
	The axial dimension of the height for catching and operating is basically 85 cm above floor ground. In reasonable cases (i.e. if there is no apartment for wheel chair use in the entire building there are dimensions between 85 cm to 105 cm acceptable).		
6	Lever handle	Height of turn axis above finished floor (Mid of latch boss)	85 cm (≤ 105)
7	Handle horizontal	Height axis above finished floor	
8	Handle vertical	Operating height above finished floor	



Construction requirements – operation

Requirements on **operating force** for manual operated internal doors

Durability against	Class 0	Class 1	Class 2	Class 3	Class 4
Closing force .	- 1)	75	50	25	10
Manual operated hardware (door handle)	-	10	5	2,5	1
- max. Moment (Nm)	-	100	50	25	10
- max. Force (N)					
Finger operated hardware (cylinder lock)	-	5	2,5	1,5	1
- max. Moment (Nm)	-	20	10	6	4
- max. Force (N)					
1) No requirements					
Classification of operating forces according DIN EN 12217					



Orientation help on internal glass doors

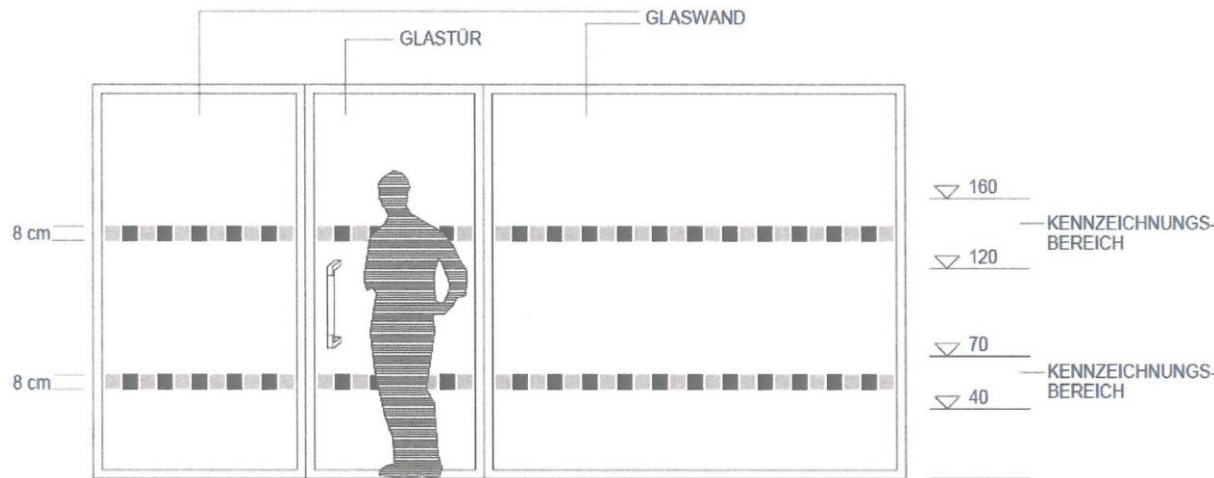
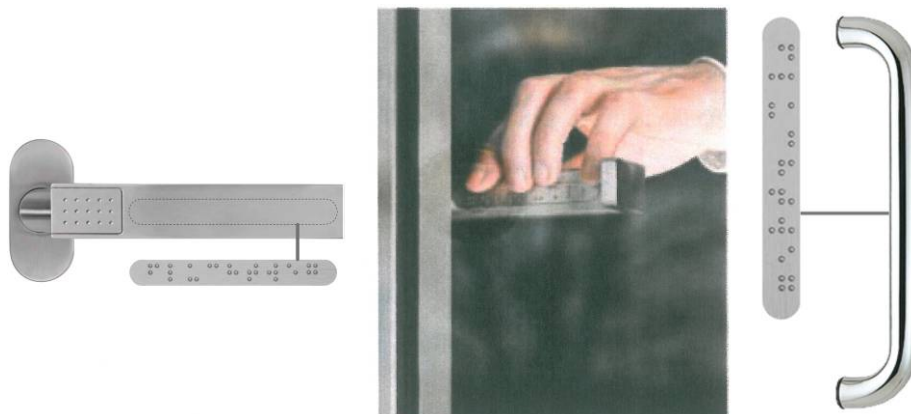


Illustration of a glass wall with integrated glass door and markings on two levels.

Source of picture: BOS)

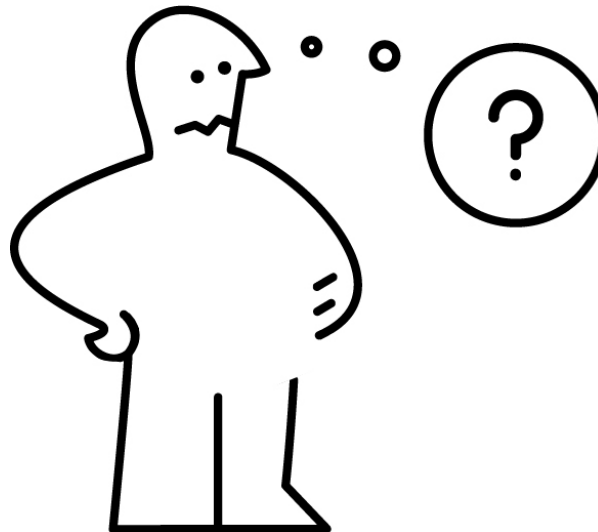


Door handles with **Braille script** allow the marking of rooms or access zones.

Source of picture : Dorma)

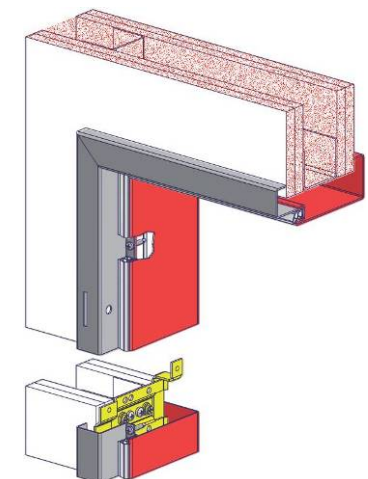
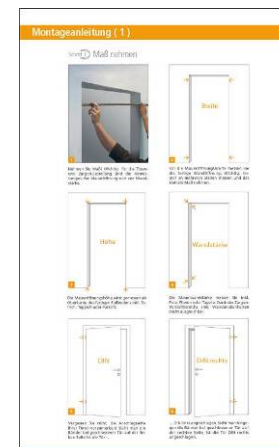
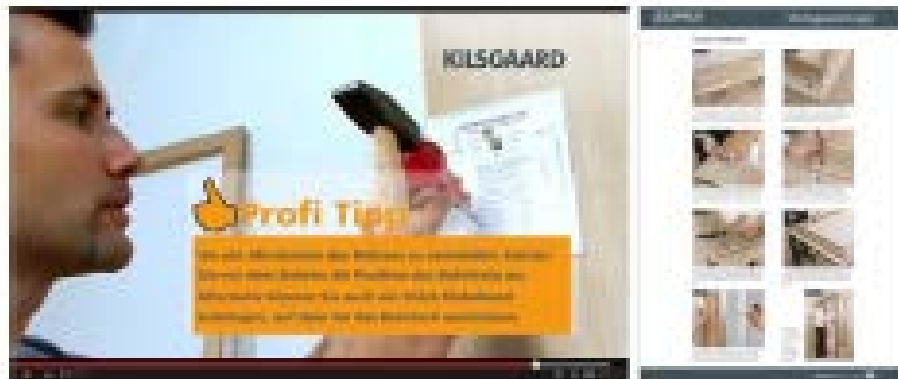
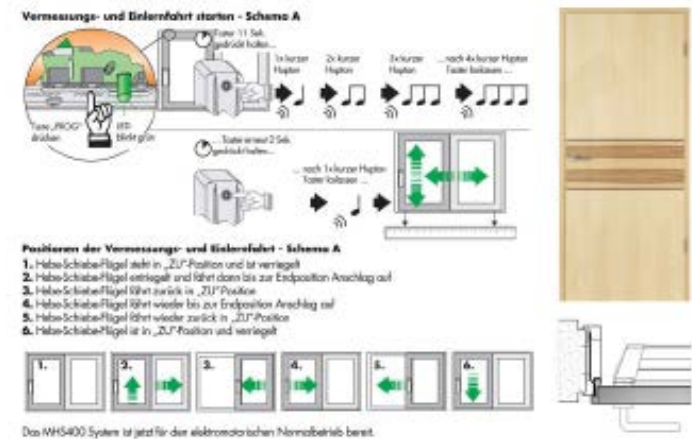
Requirements – packaging

1. Material (sustainable, recycling)
2. Transport (weight, lifting pins)
3. Handling while unpacking (IKEA style)
4. Recycling



Assembly, mounting and maintenance instructions

1. **Comprehensive** & easy to understand
2. **Illustration** and coloring
3. **Instruction** in
 - different **languages**
 - different **media** (letters, pictures, acoustic, video)



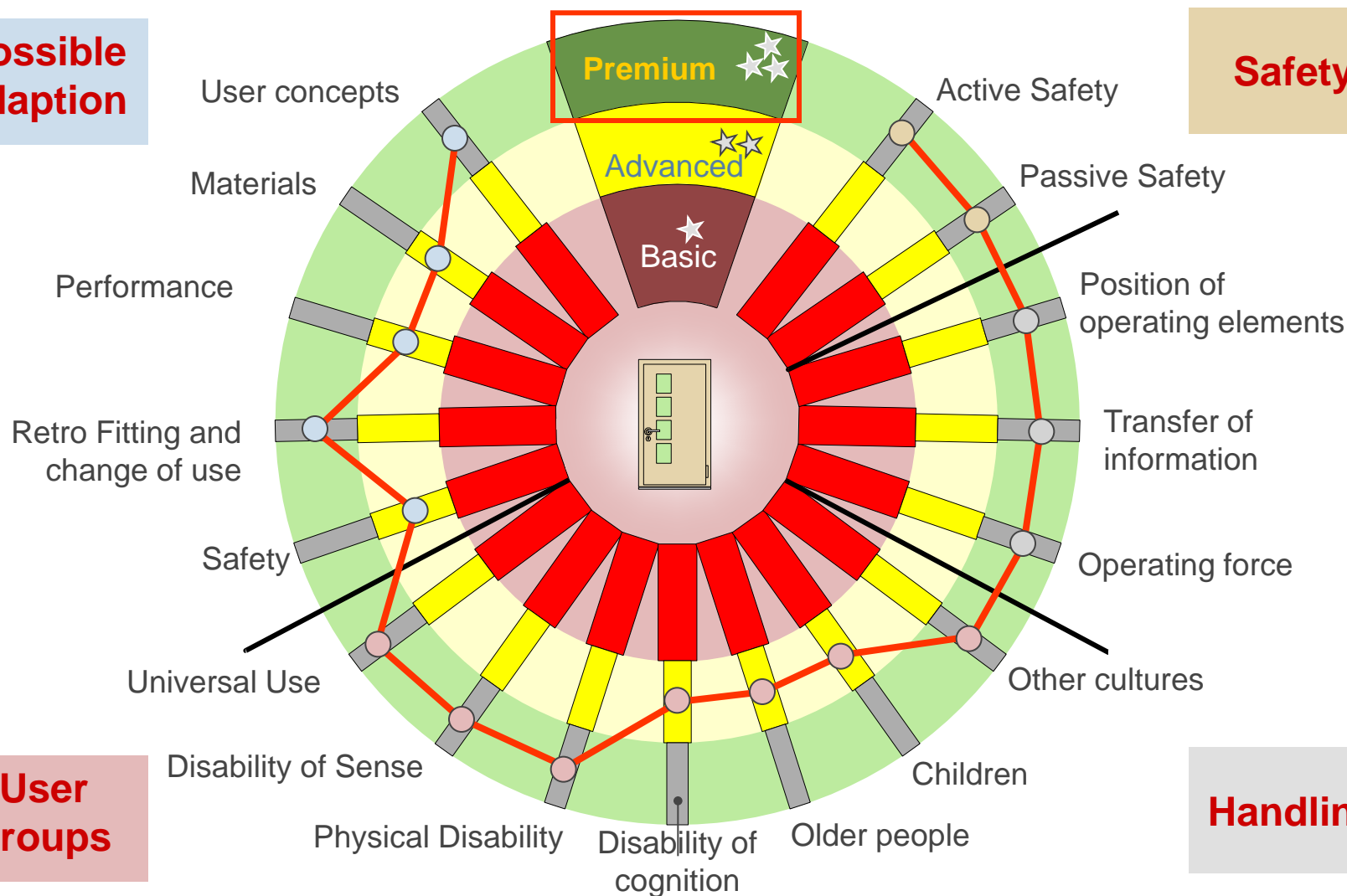
Universal Design: Benchmarking of products „UD profil“ Doors

Possible adaption

Safety

User groups

Handling



Assessment and certification

Assessment by means of the
ift catalogue of criteria
„Universal Design“
and the quality criteria's
of the ift-certification
“QM 328”



ift-KONFORMITÄTSZERTIFIKAT
ift-CERTIFICATE OF CONFORMITY



Universal Design

<p>Produkt <i>product</i></p> <p>Produktname <i>product name</i></p> <p>Hersteller <i>manufacturer</i></p> <p>Produktionsstandort <i>production site</i></p>	<p>Innentür <i>Interior door</i></p> <p>Innentürblatt</p> <p>Innentürhersteller Innentürstraße 1, 12345 Innentürstadt</p> <p>Innentürhersteller Innentürstraße 1, 12345 Innentürstadt</p>
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LOGO
Firma





universal design

Mit diesem Zertifikat wird bescheinigt, dass die benannten Produkte und das Unternehmen den Anforderungen des ift-Zertifizierungsprogramms für Universal Design (QM328: 2012) sowie dem Kriterienkatalog der Universal Design GmbH entsprechen. Grundlegend hierfür sind:

- die Bewertung des Unternehmens und der Produkte gemäß dem Kriterienkatalog für Universal Design,
- ein Probentestlauf über die gesamten Produkte,
- eine Prüfung durch das Prüflabor gemäß den Anforderungen des Zertifizierungsprogramms für Innentüren QM 328: 2009 mit Mindestklassifizierungen,
- zusätzliche technische Anforderungen gemäß Anlage 1 des ift-Zertifizierungsprogramms für Universal Design,
- Aufbau eines Systems der weitestgehenden Produktionskontrolle unter Berücksichtigung Universal Design,
- eine kontinuierliche Fremdüberwachung des Unternehmens durch die Überwachungsstelle am benannten Standort.

Das Zertifikat darf nur unverändert vervielfältigt werden. Alle Änderungen der Voraussetzungen für die Zertifizierung sind dem ift-Q-Zert mit den erforderlichen Nachweisen unverzüglich schriftlich anzugeben. Die Gültigkeitsdauer des Zertifikates beträgt 3 Jahre.

Das Unternehmen ist berechtigt, die Beschlüsse gemäß der ift-Zeichensatzung mit dem „ift-zertifiziert“-Zeichen zu kennzeichnen.

The present certificate attests that the product and the company mentioned fulfils the requirements of the ift-certification scheme for Universal Design (QM328: 2012) as well as the criteria of Universal Design GmbH. Basis therefore are:

- the evaluation of the company and the products based on the criteria catalogue for Universal Design,
- tests performed by products of the mentioned products,
- tests performed by the test laboratory according to the requirements of the certification scheme for interior doors QM 328: 2009 with a minimum classification,
- additional technical requirements according to annex 1 of the certification scheme Universal Design,
- setting up a system of a factory production control in consideration of Universal Design,
- a continuous third party control of the company by the surveillance body at the production site mentioned.

The reproduction of the certificate without any change whatsoever from the original, is permitted. Any changes to the prerequisites applicable to certification shall be immediately communicated in writing to ift-Q-Zert accompanied by the necessary evidence. The certificate is valid for a period of 3 years.

The company is authorised to affix the "ift-certified"-mark to the hardware according to the "ift Rules for use of the "ift-certified"-mark.

<p>Rosenheim 12.34.5678</p> <p><i>Christian Kehrer</i> Christian Kehrer Leiter ift Zertifizierungs- und Überwachungsstelle Head of ift Certification and Surveillance Body</p>	<p><i>Ulrich Sieber</i> Ulrich Sieber Institutsleiter Director of Institute</p>
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More information


Special information UM-02/1

Universal Design

Simple – safe – sustainable

Chances and consequences for
building elements

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May 2013

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Windows and Facades,
Doors and Gates, Glass
and Building Materials

Universal Design
simple – safe – sustainable
Opportunities and implications
for building components

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