

Evidence of Performance

Airborne sound insulation of building components

Test Report
No. 13-002294-PR01
(PB Z6-A01-04-en-01)



Client
Selectron Elektrokimya San.
ve Tic. Ltd. Sti.
Atatürk Bulvari Köstemir
yolu No:74
34570 Silivri - Istanbul
Turkey

Basis

EN ISO 10140-1 : 2010
+A1:2012
EN ISO 10140-2 : 2010
EN ISO 717-1 : 2013

Representation



Instructions for use

This test report serves to demonstrate the airborne sound insulation of a building component.

Applicable for Germany

- $R_{w,R}$ as per DIN 4109:
(R_w corresponds to $R_{w,P}$,
 $R_{w,R} = R_{w,P} - 2$ dB)

Validity

The data and results given relate solely to the tested and described specimen.

Testing the sound insulation does not allow any statement to be made on any further characteristics of the present construction regarding performance and quality.

Notes on publication

The ift Guidance Sheet "Conditions and Guidance for the Use of ift Test Documents" applies.

The cover sheet can be used as abstract.

Contents

The test report contains a total of 11 pages:

- 1 Object
 - 2 Procedure
 - 3 Detailed results
 - 4 Instructions for use
- Data sheet (1 page)

Product	Single window, one leaf
Designation	FLAT 68f
Overall Dimensions (w × h)	1,230 mm × 1,480 mm
Material	Wood / Aluminium profile
Type of opening	Tilt and turn
Rebate seals	1 external seal, 2 central seals, 1 internal seal
Infill panel	Insulating glass unit , 13 LSG SC / 16 / 8 LSG SC
Special features	-/-

Weighted sound reduction index R_w
Spectrum adaptation terms C and C_{tr}



$$R_w (C; C_{tr}) = 41 (-1;-3) \text{ dB}$$

ift Rosenheim
27.01.2014

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Building Acoustics

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1 Object

1.1 Description of test specimen

Product	Single window, one leaf
Product designation	FLAT 68f
Type of opening	Tilt and turn
Opening direction	To the inside
Mass of window	97.8 kg
Area related mass	53.7 kg/m ²
Frame member	
Frame member size (w x h)	1,230 mm x 1,480 mm
Type	Wood / Aluminium profile
Material	Softwood and Aluminium
Profile number	Wood profile: Flat68f, Aluminium profile: Uniform LA 746
Profile section (w x d)	Wood profile: 70 mm x 68 mm total: 91 mm x 84 mm
Casement member	
Casement size (w x h)	1,142 mm x 1,397 mm
Type	Wood / Aluminium profile
Material	Softwood and Aluminium
Profile number	Wood profile: Flat68f, Aluminium profile: Uniform LA 860
Profile section (w x d)	Wood profile: 80 mm x 68 mm total: 80 mm x 101 mm
Rebate design	
Rebate drainage	5 slots, 30 mm x 4 mm to the bottom
Rebate seal	1 external seal, 2 central seals, 1 internal seal
external (type/material/manufacturer)	Stop seal / EPDM / Company Uniform, DE 115
Position	in the aluminium profile of frame member
central (type/material/manufacturer)	Lip seal / EPDM / Company Uniform, DE 126
Position	in frame member
central (type/material/manufacturer)	Hollow chamber seal / PP + PU / Company Schlegel, Q-LON 3053
Position	in casement member
internal (type/material/manufacturer)	Hollow chamber seal / PP + PU / Company Schlegel, Q-LON 3054
Position	in overlap of casement member
Pressure compensation/ventilation	-/-
Infill panel	
Type, manufacturer	Insulating glass unit Sağlam Cam SAN. VE TIC. LTD. ŞTi.
Visible size (w x h)	985 mm x 1,234 mm
Total thickness on the edge	37.9 mm
Total thickness in the middle of pane	38.9 mm

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Construction	13 LSG SC / 16 / 8 LSG SC
Gas filling in cavity	As specified by client
Type of gas	Argon
Volume in %	> 90%
Construction of laminated glass	4 mm Float-0.76 acoustic film -4 mm Float 6 mm Float-1,14 acoustic film -6 mm Float
Type, manufacturer of interlayer	SC / Kuraray
Mounting of infill panel	
Sealing system	Sealing profiles exterior and interior
Interior: Type/material/manufacturer	EPDM / Company Uniform, DE 133
Exterior: Type/material/manufacturer	EPDM / Company Uniform, DE 115
Vapour pressure equalization	via the aluminium profile of casement member, Gap size: 3 mm continuous around perimeter
Glazing beads	Aluminium profile of casement member
Position interior / exterior	Exterior
Type, manufacturer	LA 860, Company Uniform
Hardware	
Type, manufacturer	MACO
Hinges / Pivots	1 hinge / 1 pivot
Locking devices	at top 2, at bottom 2, on hinge side 3, on lock side 3
Closing force	< 10 Nm

The description is based on inspection of the test specimen at **ift** Laboratory for Building Acoustics. Item designations / numbers as well as material specifications were provided by the client.

1.2 Mounting to test rig

Test rig	Window test rig „Z“ with suppressed flanking transmission acc. to EN ISO 10140-5: 2010; the test rig includes a mounting frame with a continuous acoustic break which is sealed in the test opening with closed-cell permanently resilient sealant.
Mounting of test specimen	Test specimen mounted by ift Laboratory for Building Acoustics.
Mounting conditions	Mounting in test opening, connecting joints stuffed with foam and sealed on both sides with plastic sealant.
Mounting position	At the rate of 1/3 to 2/3 in the test opening.
Opening direction	Towards receiving room.
Preparation	The window was opened and closed repeatedly.

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1.3 Representation of test specimen

The structural details were examined solely on the basis of the characteristics to be classified. The illustrations are based on unchanged documentation provided by the client.



Fig. 1 Photos of the mounted element, taken by ift Laboratory for Building Acoustics

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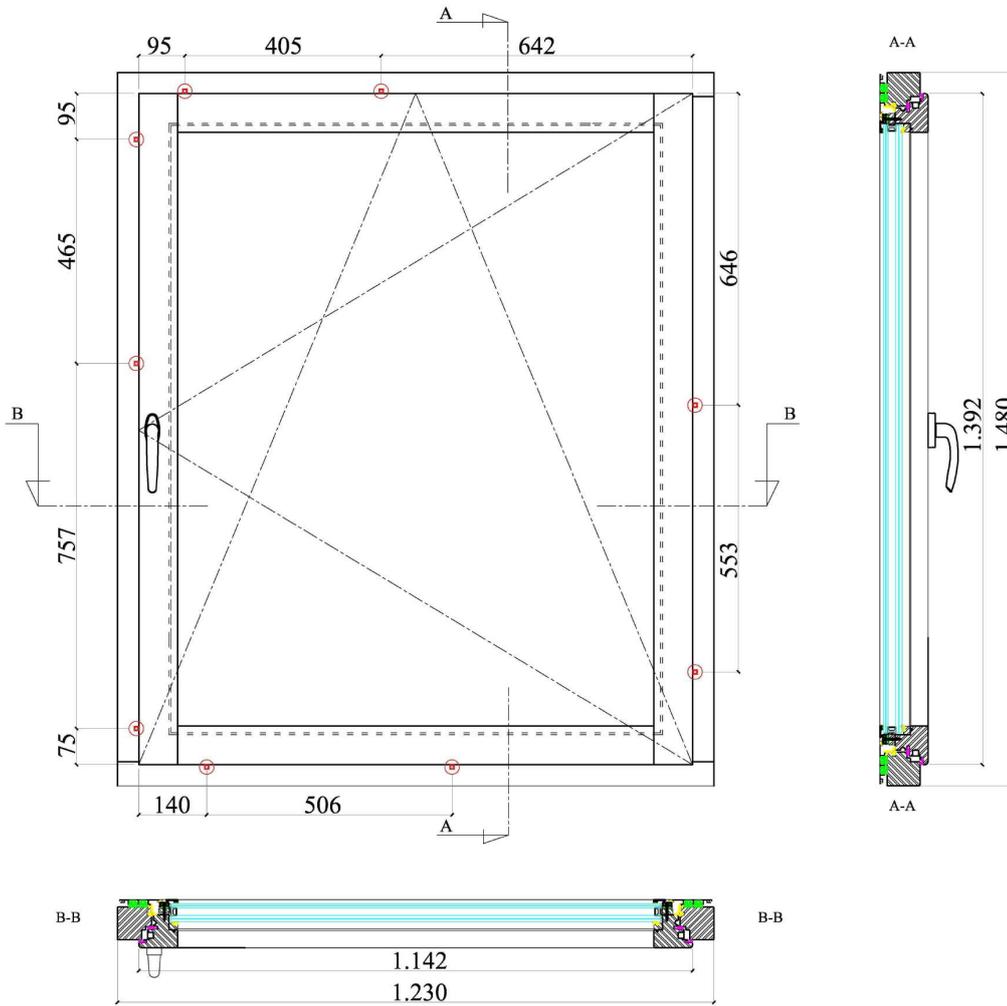


Fig. 2 view and cross section

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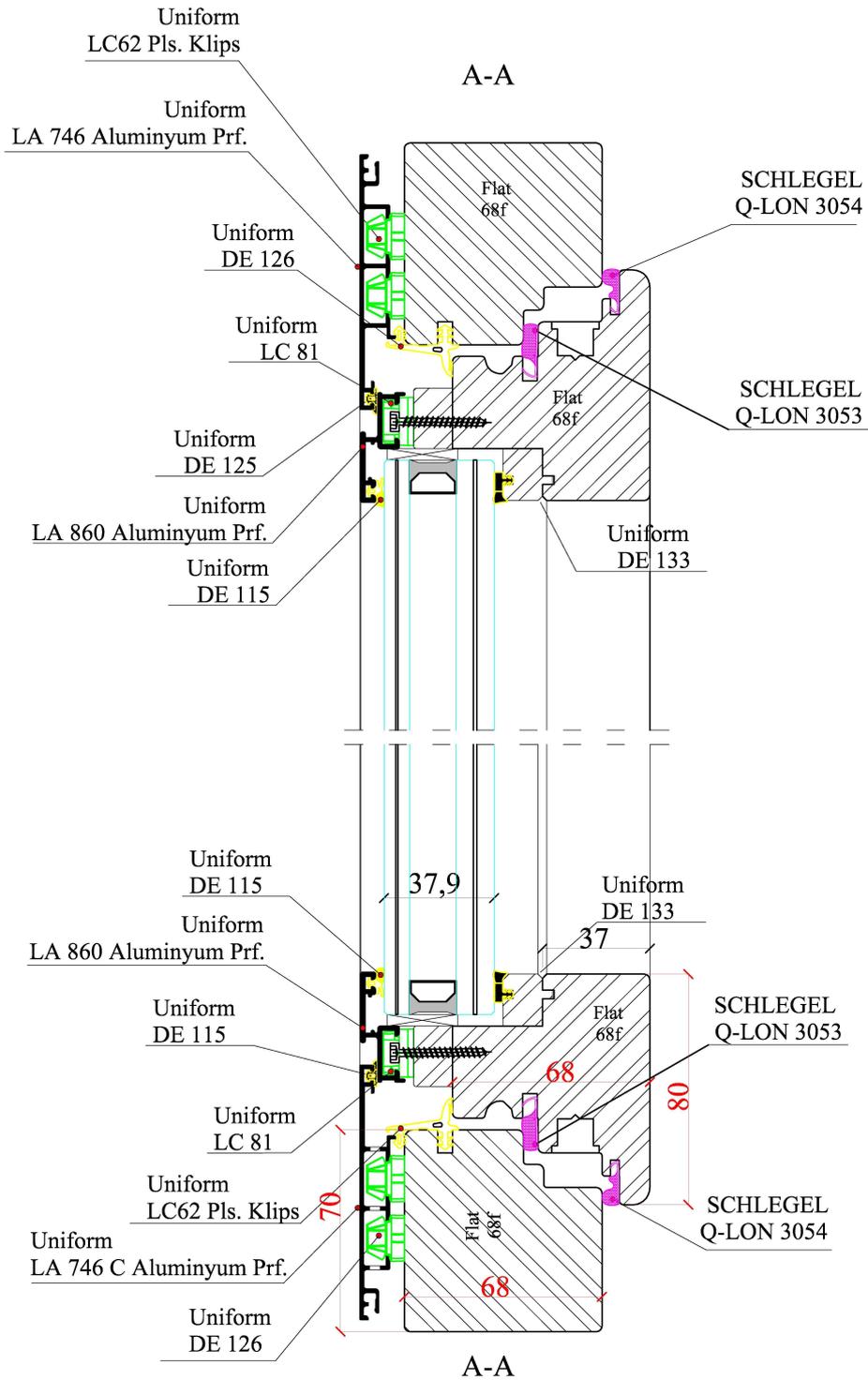


Fig. 3 vertical cross section (section A-A)

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2 Procedure

2.1 Sampling

Sampling	The samples were selected by the client
Quantity	1
Manufacturer	Selectron Elektrokimya San.Ve Tic. Ltd Sti (Arbor Wood Windows)
Manufacturing plant , Site of manufacturing	Istanbul
Date of manufacture /	17.09.2013
Date of sampling	
Production line	not specified
Responsible for sampling	Mr. Abdullah Seyfi
Delivery at ift	8th of October 2013 by the client via forwarding agency
ift registration number	35671/ 02

2.2 Method/s

Basis

- EN ISO 10140-1:2010 + A1 : 2012 Acoustics; Laboratory measurement of sound insulation of building elements - Part 1: Application rules for specific products (ISO 10140-1:2010+Amd.1:2012)
- EN ISO 10140-2:2010 Acoustics; Laboratory measurement of sound insulation of building elements - Part 2: Measurement of airborne sound insulation (ISO 10140-2:2010)
- EN ISO 717-1: 2013 Acoustics; Rating of sound insulation in buildings and of building elements - Part 1: Airborne sound insulation

Corresponds to the national German standard/s:

DIN EN ISO 10140-1:2012-05, DIN EN ISO 10140-2:2010-12 und DIN EN ISO 717-1 : 2013-06

Procedure and scope of measurement are in conformity with the principles of the Working Group of sound insulation testing bodies approved by the national building supervisory authorities in cooperation with the standardization committee NA 005-55-75-AA (subcommittee UA 1 - DIN 4109).

Boundary conditions	As specified by the standard
Deviation	There are no deviations from the test method/s and/or test conditions.
Test noise	Pink noise
Measuring filter	One-third-octave band filter

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Measurement limits

Low frequencies	The dimensions of the receiving room were smaller than recommended for testing in the frequency range from 50 Hz to 80 Hz as per EN ISO 10140-4:2010 Annex A (informative). A moving loudspeaker was used.
Background noise level	The background noise level in the receiving room was determined during measurement and the receiving room level L_2 corrected by calculation as per EN ISO 10140-4: 2010 Clause 4.3.
Maximum sound insulation	The maximum sound insulation of the test set-up was at least 15 dB higher than the measured sound reduction index of the test specimen. Not corrected by calculation.

Measurement of reverberation time

Arithmetical mean: two measurements each of 2 loudspeaker and 3 microphone positions (a total of 12 independent measurements).

Measurement equation A $A = 0,16 \cdot \frac{V}{T} \text{ m}^2$

Measurement of sound level difference

Minimum of 2 loudspeaker positions and rotating microphones.

Measurement equation $R = L_1 - L_2 + 10 \cdot \lg \frac{S}{A} \text{ dB}$

KEY

A	Equivalent absorption area in m^2
L_1	Sound pressure level source room in dB
L_2	Sound pressure level receiving room in dB
R	Sound reduction index in dB
T	Reverberation time in s
V	Volume of receiving room in m^3
S	Testing area of the specimen in m^2

2.3 Test apparatus

Device	Type	Manufacturer
Integrating sound meter	Type Nortronic 840	Norsonic-Tippkemper
Microphone preamplifiers	Type 1201	Norsonic-Tippkemper
Microphone unit	Type 1220	Norsonic-Tippkemper
Calibrator	Type 1251	Norsonic-Tippkemper
Dodecahedron loudspeakers	Own production	-
Amplifier	Type E120	FG Elektronik
Rotating microphone boom	Own production / Type 231-N-360	Norsonic-Tippkemper

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The **ift** Laboratory for Building Acoustics participates in comparative measurements at the Physikalisch-Technische Bundesanstalt (PTB) in Braunschweig every three years, the last one was in April 2013. The sound level meter used, Series No. 24842, was DKD calibrated by the company Norsonic Tippkemper (DKD - Deutscher Kalibrierdienst "German Calibration Service") on 3rd of April 2013.

2.4 Testing

Date 10. October 2013

Operating testing officer Till Stübben

3 Detailed results

The values of the measured sound reduction index of the tested window are plotted as a function of frequency in the annexed data sheet and tabled.

As per EN ISO 717-1 the weighted sound reduction index R_w and the spectrum adaptation terms C and C_{tr} for the frequency range 100 Hz to 3150 Hz obtained by calculation are as follows:

$$R_w (C;C_{tr}) = 41 (-1;-3) \text{ dB}$$

According to EN ISO 717-1 the following additional spectrum adaptation terms are obtained

$C_{50-3150}$	=	-1 dB	$C_{100-5000}$	=	0 dB	$C_{50-5000}$	=	0 dB
$C_{tr,50-3150}$	=	-4 dB	$C_{tr,100-5000}$	=	-3 dB	$C_{tr,50-5000}$	=	-4 dB

4 Instructions for use

4.1 Safety margin according to DIN 4109

Basis

DIN 4109:1989-11

Sound insulation in buildings, requirements and verifications

For verification of sound insulation according to DIN 4109: 1989-11 (Suitability Test I) the weighted sound reduction index R_w corresponds to the test value $R_{w,P}$. Including safety margin of 2 dB, the following value $R_{w,R}$ is obtained by calculation..

$$R_{w,R} = 39 \text{ dB}$$

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4.2 Laminated glass

The sound reduction of laminated glass depends on the temperature of the environment. If the temperature is lower than the test temperature the sound reduction index may be reduced.

4.3 Test standards

The standard series EN ISO 10140:2010 supersedes those, until the respective date, applicable parts of the standards series EN ISO 140 which describe laboratory tests. According to the two standard series, the test methods are identical.

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Laboratory for Building Acoustics
27.01.2014

Sound reduction index according to ISO 10140 - 2

Laboratory measurements of airborne sound insulation of building components



Client: Selectron Elektrokimya San.
ve Tic. Ltd. Sti., 34570 Silivri - Istanbul (Turkey)

Product designation FLAT 68f

Design of test specimen

Single window, one leaf

Overall dimensions 1,230 mm x 1,480 mm

Material Wood / Aluminium profile

Type of opening Tilt and turn

Rebate seals 1 external seal, 2 central seals, 1 internal seal

Locking devices at top 2, at bottom 2, on hinge side 3, on lock side 3

Infill panel Insulating glass unit

Pane construction 13 LSG SC / 16 / 8 LSG SC

Gas filling in cavity Argon

Test date 10. October 2013

Test surface S 1.25 m x 1.50 m = 1.88 m²

Test rig as per EN ISO 10140-5

Partition wall Double-leaf concrete wall, insert frame

Test noise pink noise

Volumes of test rooms V_S = 104 m³
V_R = 67.5 m³

Maximum sound reduction index
R_{w,max} = 62 dB (related to test surface)

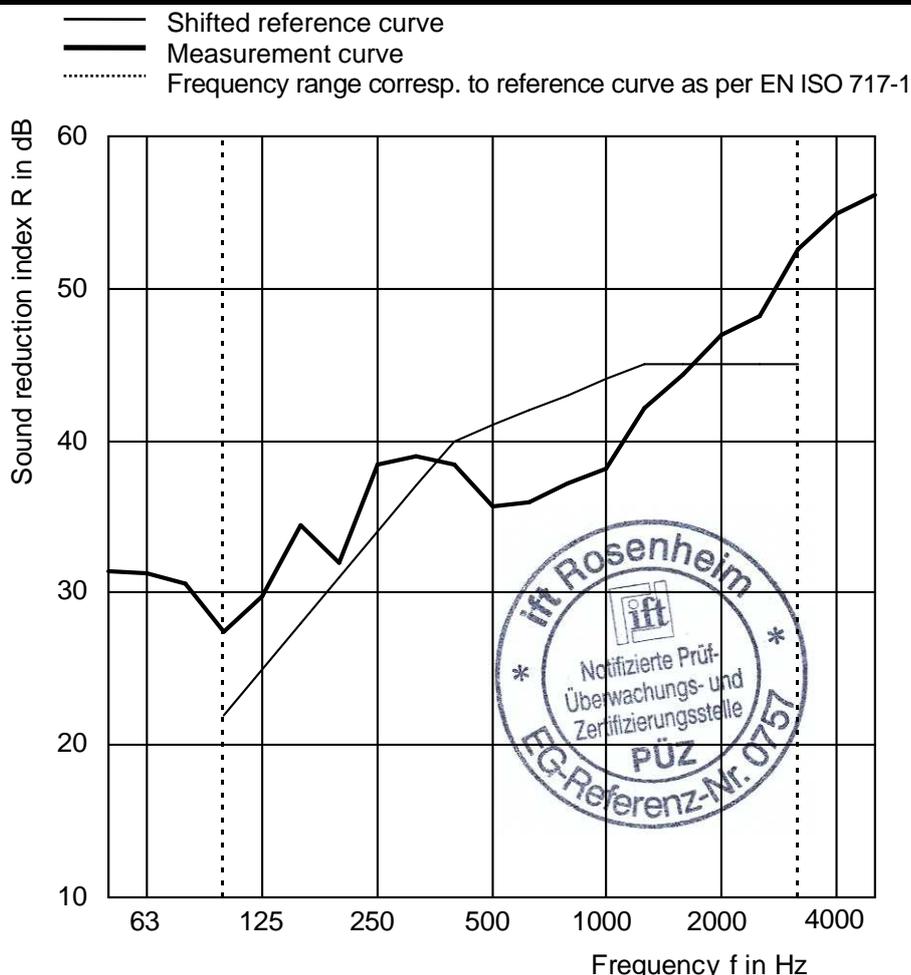
Mounting conditions

Window butt-mounted in test opening and fixed by wedges. Connecting joints stuffed with foam and sealed on both sides with plastic sealant.

Climate in test rooms 21 °C / 51 % RF

Static air pressure 951 hPa

f in Hz	R in dB
50	31,4
63	31,3
80	30,6
100	27,5
125	29,8
160	34,4
200	32,0
250	38,5
315	39,0
400	38,5
500	35,7
630	35,9
800	37,2
1000	38,2
1250	42,2
1600	44,3
2000	47,0
2500	48,2
3150	52,6
4000	54,9
5000	56,1



Rating according to EN ISO 717-1 (in third octave bands):

R_w (C;C_{tr}) = 41 (-1;-3) dB C₅₀₋₃₁₅₀ = -1 dB; C₁₀₀₋₅₀₀₀ = 0 dB; C₅₀₋₅₀₀₀ = 0 dB
C_{tr,50-3150} = -4 dB; C_{tr,100-5000} = -3 dB; C_{tr,50-5000} = -4 dB

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27. January 2014

Dipl. Ing. (FH) Till Stübgen
Operating testing officer