OPERATING MANUAL

VDH 30

Van Der Hoofden Test Head

IEC 62493

REVISION LEVEL 2.2

VDH 30 VAN DER HOOFDEN TEST HEAD
OPERATING MANUAL

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SECTION A: GENERAL INFORMATION

GENERAL

The information contained herein, are provided in connection with the usage of AFJ VDH 30 Van Der Hoofden Test Head and his accessories only.

Such information is property of AFJ Instruments, and cannot be duplicated, copied or reproduced in whole or part, without prior written consent of the owner:

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All efforts have been made to ensure the accuracy of the contents of this document. However, the supplier can assume no liability whatsoever for any errors in this manual or their consequences, direct and/or indirect. Information contained herein, are subject to change without prior notice.

STATEMENT OF COMPLIANCE

The AFJ VDH 30 Van Der Hoofden Test Head is designed and built in accordance with IEC 62493 Ed. 2.0:2015-03: “Assessment of lighting equipment related to human exposure to electromagnetic fields”.

WARRANTY

Systems, options and accessories thereof, manufactured and shipped under the AFJ Instruments brand name, are warranted to be free from manufacturing defects for a period of twelve (12) months from the date of shipment.
AFJ Instruments certifies that all products are tested and inspected to comply with the published specifications originating from the company. Calibration procedure includes Calculation of uncertainty using ISO model and traceability.

- Warranty is provided “Ex-Works”: therefore, AFJ Instruments will be responsible of the amendment of failures arising from ascertained manufacturing defects only.
- Warranty will not be applicable in case of mishandling, unauthorized opening of the cabinets, improper use, and unauthorized repairs. In such cases, the warranty will be terminated.
- A repair under warranty will not extend the original term of validity of the warranty itself.
- All products or parts thereof, to be subject to a warranty operation, shall be shipped to the appropriate AFJ Instruments Warranty Centre, at Customer’s charge. In such case, refer to the following Return Procedure.

RETURN PROCEDURE

To return the VDH 30 Van Der Hoofden Test Head to AFJ Instruments, use the following procedure:

- Briefly describe the problem in writing (Service Requested form). Include the serial number of the item being returned;
- Give details regarding the observed symptom(s), and whether the problem is constant or intermittent in nature. If you have talked previously to AFJ representative about the problem, provide such information also;
- Package the unit carefully. Damages due to transport are not covered from any guarantee;
- Before return the system back to AFJ, wait for RMA number (Returned Material Authorization).

DISCLAIMER OF LIABILITY

In no event shall AFJ Instruments be held liable for incidental or consequential damages of any kind whatsoever caused, or alleged to be caused directly or indirectly by the usage and operation of products herein, to customers or any third party, including, but not limited to, loss of use, loss of profit or any commercial loss.

Products described herein, do not imply any stated or alleged fitness for use, or any feasibility for business purpose, or expectation of profit. AFJ Instruments sole and only commitment is the compliance with the published product specifications.
All information in this manual is given in good faith. However, AFJ Instruments shall not be liable for any loss or damage whatsoever arising from the use of this manual, or any errors or omissions herein.

WORKING CONDITIONS

The allowed temperature range during use of the device is +15°C to +25°C. In cases of storage or transport this range may exceed by -20°C to +70°C.
Working relative humidity shall be 30% to 75%, atmospheric pressure shall be 86kPa to 106kPa (860 to 1060mba). System is not influenced by direct solar radiation.
The VDH 30 Van Der Hoofden Test Head has to be used in dry and clean rooms. Avoid conditions like dust, air-humidity, danger of explosion and aggressive chemical environment. During use a sufficient air circulation has to be realized. It is possible that condense water originates inside the device due to storage or transport conditions. In this case realize a period of 2 hours for acclimatize without use.

ELECTRICAL SHOCK FIRST AID PROCEDURE

Before touching a person being electrocuted break, first switch off power supply or send away, using a non-conductive object, the wire or the part under HV in contact with the person being electrocuted. Then immediately the first aid electrical shock procedure must start.

If the victim doesn't breath, or its heart doesn't beats, immediately the electrical shock first aid procedure must be applied.

A. If the victim doesn't breath, proceed as follows:

1. Lay down on the back on a solid surface like ground or pavement (not bed or sofa), the person being electrocuted
2. Fold the head of the victim backwards keeping it straight. Lift the neck as much as possible towards height (to avoid tongue obstruct the breath way).
3. Open the mouth and lean resolutely on the mouth of the person being electrocuted and simultaneously close the nostrils with two fingers.
4. Blow into the mouth (or in to the noose, closing the mouth), in steady way until is thorax lift up again.
5. Remove the mouth to consent the victim to breathe passively and observe if its thorax go down.
6. Repeat the cycle, with a rhythm of a breath every 5 second.

NOTE

If do not succeed in entering air into the victim respiratory system, check quickly the head position and the perfect air tight around the mouth.
If subsequent endeavor still doesn't succeed, put the fingers into the mouth and in the throat, to remove intruding parts.
If the helper doesn't succeed to remove intruding parts, turn the victim on a side and beat some dryly stroke between the shoulders blade, to release the respiratory channel.
After four quick breaths, stop and check if the heart beat regularly, feeling if carotid rhythm.
If the heart beat, start again the mouth breathing until victim start to breath.

B. If the carotid beating is absent or uncertain, supply the artificial circulation, through an external cardiac compression.

1. Lean the palm of the hand in the lower half of the breastbone and the other hand upon it.
2. Push down with the shoulders movement, with sufficient strength to compress the breastbone of about 4 to 5cm.
3. Lift immediately the hands after each compression to consent the natural thorax expansion
4. Repeat the compression at a rhythm of about one per second. Compression should be regular constant and uninterrupted. If the helper is alone with the victim he may alternate the mouth breath with the external cardiac compression at the rate of 2 breaths followed from 15 cardiac compressions. If the helper may be supported, the rates are of 5 cardiac compression for each breath; however after 5 cardiac compression, ASK FOR HELP. Go on with one or both method until the victim has been taken into the hospital.

After the person being electrocuted start again to breathe, check carefully about an eventual physical shock happened. The physical sock is a collapse state or prostration that interferes against the normal function of the nervous system; the symptoms are: feeble beats, cold feeling, sickness and pallor. To oppose the shock:

1. Stretch out the victim, if possible with the head lower than the foots;
2. Loosen the garments;
3. Make sure that victim has plentiful breathable air around.
4. Wind the victim with a quilt or garments as soon as possible, keeping the patient warm and calm waiting for aid arrival.

SECTION B: TECHNICAL DESCRIPTION

GENERAL

AFJ VDH 30 Van Der Hoofden Test Head is defined in IEC 62493 Ed. 2.0:2015-03 about its circuit and principal characteristic.

A “Van Der Hoofden” Test Head consists of a conducting sphere with an outside diameter of *D*head = 210mm ± 5mm mounted on an insulated (e.g. wood, plastic) support and connected via an ordinary wire to a protection network (Fig.2).

Example of the “Van Der Hoofden” Test Head construction is shown in Fig.1.

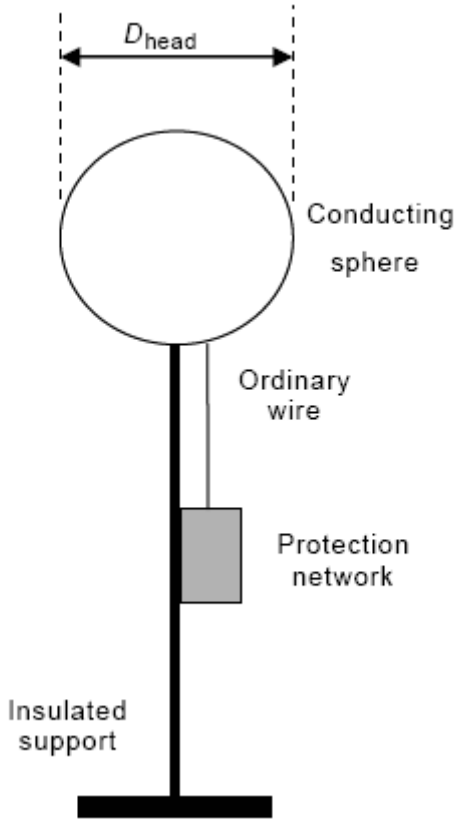
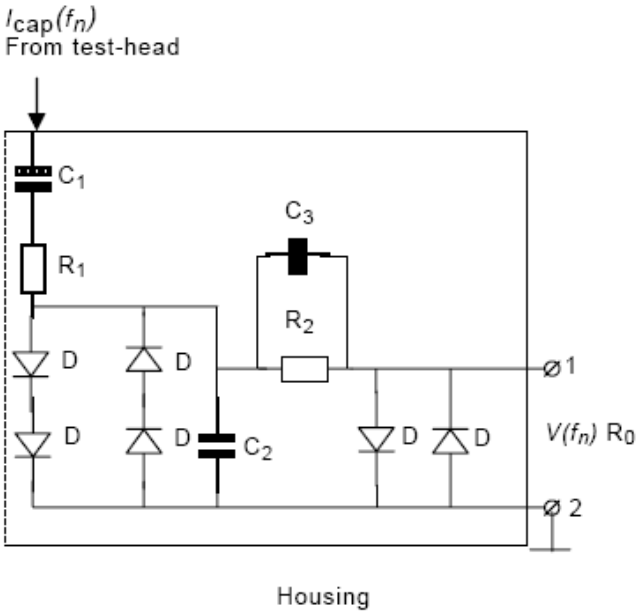


Fig.1: The “Van Der Hoofden” Test Head



Example

C_1 = 470 pF
C_2 = 10 nF
C_3 = optional capacitor (~56 pF) to fulfill the transfer function requirements of annex F.
R_1 = 470 Ω
R_2 = 150 Ω
D = Schottky diode
R_0 = 50Ω input of EMI receiver

Terminal 1 and 2 have to be connected to EMI receiver of spectrum analyzer via coaxial cable.

Fig.2: Example of a protection circuit

SECTION C: IEC 62493 MEASUREMENT SETUP

GENERAL

Included in the scope of the standard are:

- all lighting equipment with a primary function of generating and/or distributing light intended for illumination purposes, and intended either for connection to the low voltage electricity supply or for battery operation; used indoor and/or outdoor;
- lighting part of multi-function equipment where one of the primary functions of this is illumination;
- independent auxiliaries exclusively for the use with lighting equipment;
- lighting equipment including intentional radiators for wireless communication or control.

Excluded from the scope of this standard are:

- lighting equipment for aircraft and airfields;
- lighting equipment for road vehicles; (except lighting used for the illumination of passenger compartments in public transport)
- lighting equipment for agriculture;
- lighting equipment for boats/vessels;
- photocopiers, slide projectors;
- apparatus for which the requirements of electromagnetic fields are explicitly formulated in other IEC standards.

This standard does not apply to built-in components for luminaires such as electronic control gear.

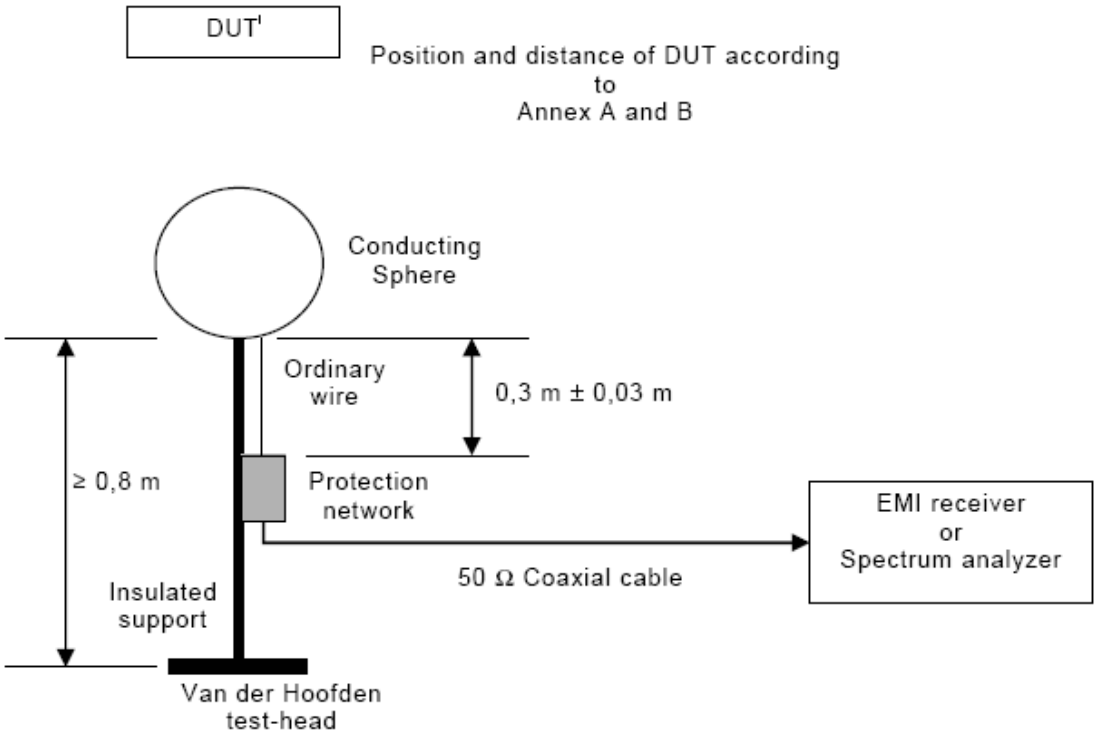
MEASUREMENT SETUP

The measurement frequency range considered is from 20kHz to 10MHz.
An electromagnetic interference EMI test receiver according to CISPR 16-1-1 is required, with the settings given in Table 1.

Frequency range	B_6 according to CISPR 16-1-1	Measurement time	f_{step}	Detector
20 kHz – 150 kHz	200 Hz	100 ms	220 Hz	Peak
150 kHz – 10 MHz	9 kHz	20 ms	10 kHz	Peak

Table 1: Receiver settings

The measurement set up is given in Fig.3.



DUT = device under test.

NOTE The EMI receiver or spectrum analyzer must be powered by mains including protective earth.

Fig.3: Measuring set up

During the tests no conductive plane or object or human being should be closer to the lighting equipment than 0,8m.
The height of the insulated support is minimum 0,8m. The conducting sphere is connected to the protection network via an ordinary wire of length 30 cm ± 3cm. The protection network is then connected to the EMI receiver, or spectrum analyser, by a 50Ω coax cable having a maximum cable loss of 0,2dB and a d.c. resistance of < 10Ω.

Peak detector measurement sweep data measured from 20kHz to 10MHz (usually EMI receiver generates output data in a matrix where the frequency [MHz] is stored in column 0 and the measured voltage [dBµV] in column 1) have to be used to calculate the induced internal electric field due to the electric field of the DUT in the frequency range from 20kHz to 10MHz.
This output data have to be processed by the calculation program and the measured induced internal electric field does not exceed the factor (*F*) 1 as defined into the standard.

For more information about measurement setup settings and mathematical calculation please refer to IEC 62493 Ed. 2.0:2015-03 standard.

SECTION D: SOFTWARE

GENERAL

AFJ VDH 30 Van Der Hoofden Test Head is passive equipment that can be connected and used with any brand EMI Receiver. After peak detector measurement sweep from 20kHz to 10MHz, EMI Receiver software has to be able to calculate from this output data the F factor necessary for evaluation testing.
Stand alone software can be used for calculating F factor from output data coming from measurements with any brand EMI Receiver. If AFJ EMI Receiver is used, its own software calculates the F factor automatically.

STAND ALONE SOFTWARE

The stand alone software allows to calculate F factor from output data coming from measurements with any brand EMI Receiver able to give measurement result in the following *.txt file format:

frequency (Hz); test level (dBµV)

with American indication (comma to separate thousands; dot to separate decimals). See please the example shown in Fig.4.

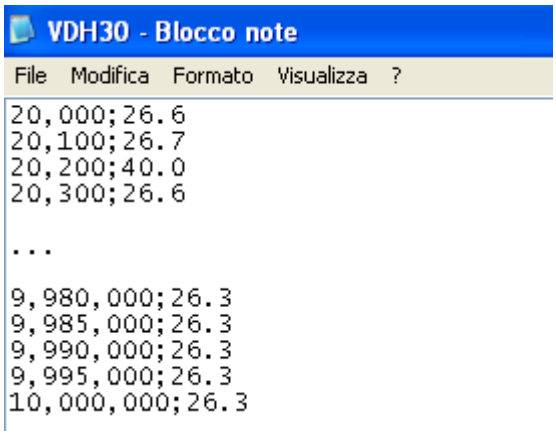


Fig.4: Example of *.txt file managed by stand alone software

The main window shown in Fig.5 allows with *Input File* to select and load the *.txt file including measurement result obtained with VDH 30.

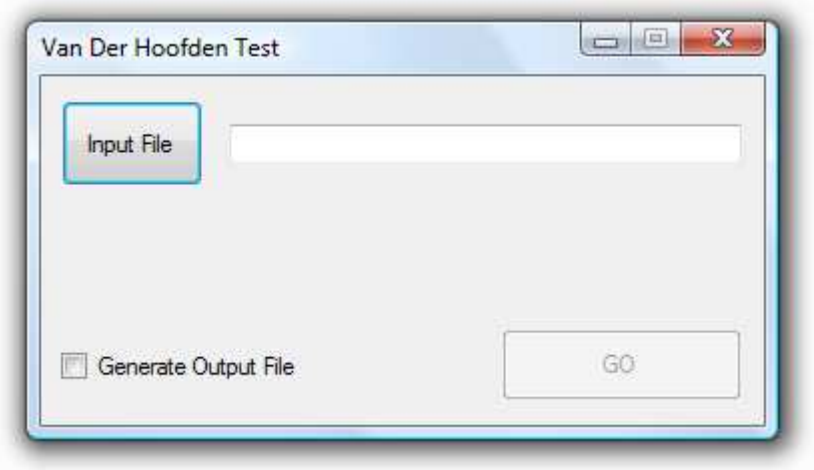


Fig.5: Stand alone software main window

Pushing *GO* you get the F factor with either “PASS” (F≤1) or “FAIL” (F>1) indication (Fig.6), with the possibility to generate at the same time an output *.txt file *(Generate Output File)* with the following information:

frequency (Hz); test level (dBµV); current density Jcap(f) (A/m^2); electric field Ecap(f) (V/m)

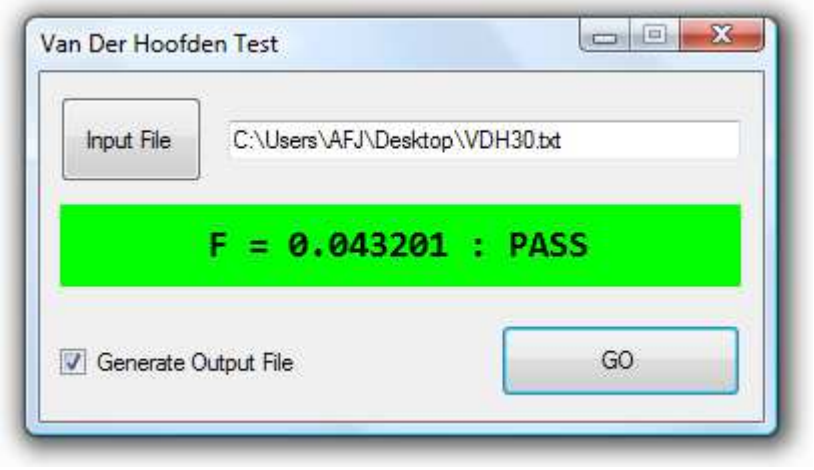


Fig.6: Stand alone software test result

AFJ EMI RECEIVER SOFTWARE

With Van Der Hoofden Test software tool included on tools menu options of the AFJ EMI Receiver software and shown in Fig.7 is possible to calculate F factor from output data coming from measurements with AFJ EMI Receiver.

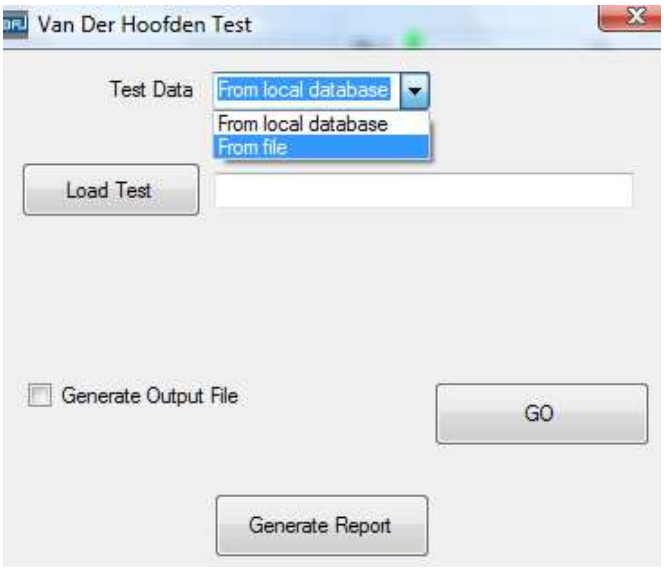


Fig.7: Van Der Hoofden Test Software Tool

With *Test Data* you select where to find (either from local database or from file) the measurement result obtained with VDH 30.

With *Load Test* the measurement result is selected and loaded.

Pushing *GO* you get the F factor with either "PASS" (F≤1) or "FAIL" (F>1) indication (Fig.8), with the possibility to generate at the same time an output *.txt file *(Generate Output File)* with the following information:

frequency (Hz); test level (dBµV); current density Jcap(f) (A/m^2); electric field Ecap(f) (V/m)

With *Generate Report* you create automatically the report with all the information about measurement with VDH 30.

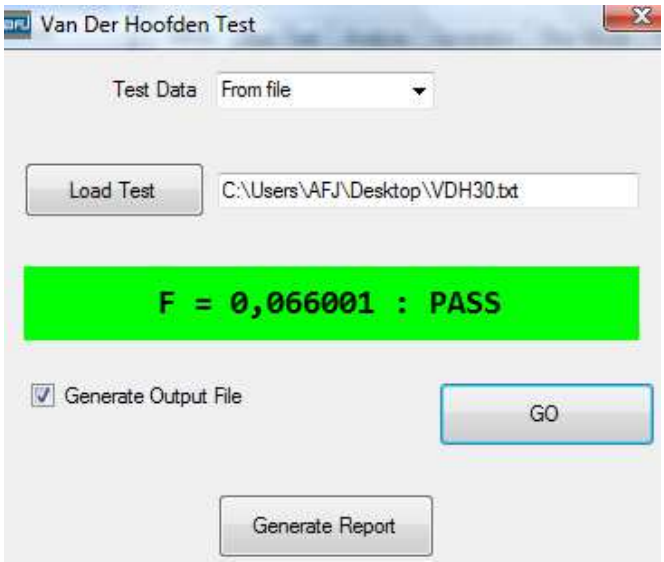


Fig.8: Van Der Hoofden Test Result