



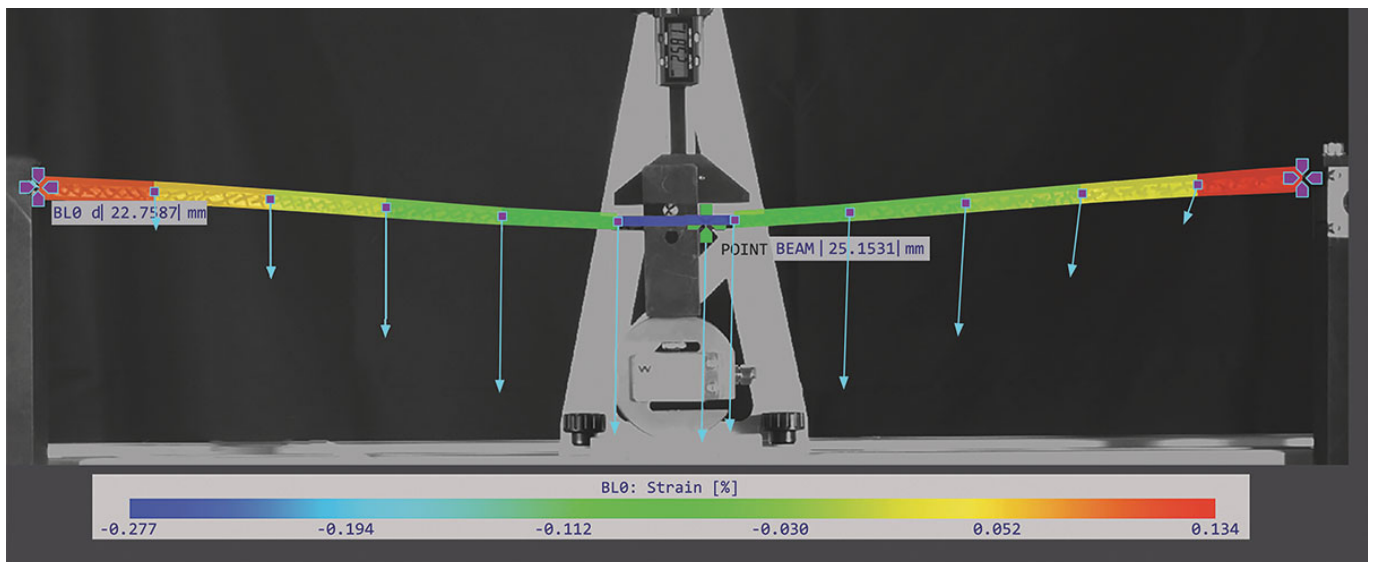
## DEFLEX®

### DEFLEX®-2D

An entry-level, two-dimensional digital image correlation (DIC) system to teach students how to measure and visualise surface deformations, strains and displacements in materials and shapes.



## DEFLEX®-2D



SCREENSHOT OF THE DEFLEX® SOFTWARE

### KEY FEATURES

- Complete system including camera, stands and lighting
- Includes Deflex® software
- Includes calibration set
- Frame rate – 60 FPS
- System can be used on wide variety of TecQuipment products
- Meets requirements for ASTM E83, ISO 9513, and JIS B7741

### KEY BENEFITS

- Non-contact method – no contact between the camera and the object/surface
- Visualises strain measurement and shape deformation
- Enhances student learning experience
- Fast and easy to set up
- Teaches students principles of digital image correlation

### KEY SPECIFICATIONS

- Single low-noise camera unit with in-built LED light
- Resolution: 6.3 MPx
- FOV/resolution @ distance 239 mm: 190/0.5  $\mu$ m
- For a wide range of measuring areas, 200–2000 mm
- Deflex® software
- One year of technical enhancements and customer support



### DESCRIPTION

The DefleX®-2D edition offers a student-friendly solution for visualising optical deformation measurements on various object sizes. It is a compact and fully integrated system that offers students a digital blended learning experience as part of materials science, structural or general mechanical engineering courses. It is equipped with camera measurement and image processing software for analysing motions, displacements and strains.

Versatile in application, the TecQuipment DIC unit is suitable for uniaxial testing (ISO 6892), biaxial testing (ISO 16842) and shear testing, as well as three-point and four-point bending (ISO 178) and torsion testing, making it a comprehensive tool for material and structural analysis.

### WHAT'S INCLUDED

The DefleX®-2D edition includes:

- All-in-one DIC unit with integrated LED light and camera (supplied with 12 mm lens)
- Power/USB connection cable
- 2 x calibration grids
- USB licence key
- USB flash drive with software installation files and comprehensive user guide
- DefleX® software
- Camera tripod
- Light mounting arm
- 2 x additional LED lights
- Light tripod
- Backdrop screen
- Sturdy storage box
- 1 x each: black permanent fine tip marker pen, black non-permanent fine tip marker pen, white fine tip paint pen
- Cable tie hook and loop
- One year of technical enhancements

### STANDARD FEATURES

- Comprehensive user guide
- Five-year warranty
- Manufactured in accordance with the latest European Union Directives
- ISO 9001 certified manufacturer

### RECOMMENDED ANCILLARIES

- DefleX® Speckling Kit (SPK1)
- DefleX® Starter Kit (DSK1)
- DIC Educational Network Licence (DefleX®-2DNet)
- Additional lenses (see table on page 5 for details)
- Either an annual or multi-year technical enhancement package up to five years (DefleX®-2D-TE1-TE5)



CAMERA TRIPOD



USB  
LICENCE  
KEY



USB  
FLASH  
DRIVE



DIC UNIT



POWER/USB CONNECTION CABLE



12 MM LENS



CALIBRATION GRIDS



BACKDROP SCREEN  
[EXAMPLE IMAGE]



LIGHT MOUNTING ARM  
[EXAMPLE IMAGE]



LED LIGHTS  
[EXAMPLE IMAGE]



STORAGE  
BOX

### RECOMMENDED EXPERIMENTS/PRODUCTS

#### NEXT GENERATION STRUCTURES:

- Deflection of Beams and Cantilevers (STS4)\*
- Two-Pinned Arch (STS10)\*
- Fixed Arch (STS11)\*
- Curved Bars and Davits (STS14)\*
- Plastic Bending of Beams (STS15)\*
- Plastic Bending of Portal Frames (STS16)\*
- Frame Deflections and Reactions (STS18)
- Simple Suspension Bridge (STS19)

#### MATERIALS TESTING AND PROPERTIES:

- Universal Testing Machine (SM1000)
- Benchtop Tensile Testing Machine (SM1002)\*
- Creep Machine (SM1006)\*
- Materials Laboratory with Data Capture (MF40 MKII)\*
- Beam Apparatus (SM1004)
- Hooke's Law and Spring Rate (SM110)
- Stiffness, Bending and Torsion (TE16)

#### THEORY OF MACHINES:

- Free Vibrations (TM164-167)
- Free and Forced Vibrations (TM1016V)

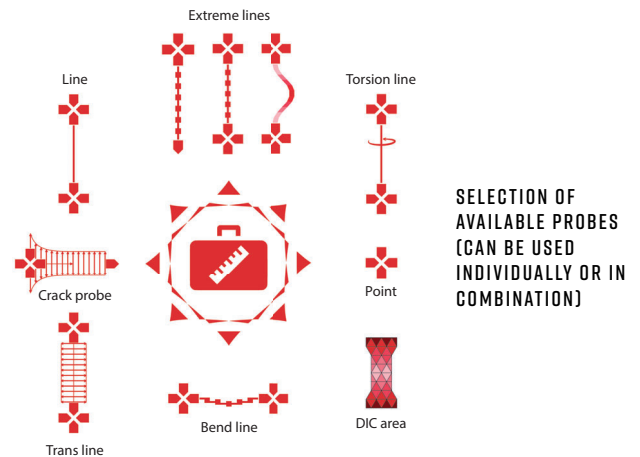
\*Sample results available for these experiments/products

DefleX®-2D can be used as a complementary learning aid to TecQuipment products (the above list is not definitive) and other suitable third-party lab products.

### SOFTWARE

DefleX®-2D runs on the integrated DefleX® software to deliver high-quality measurement results while providing an engaging user experience.

- Quick set-up and simple measurement
- Wide range of measurement tools
- Advanced DIC features and I/O
- Postprocess functionalities
- Several measurement probes allow measurements to be tailored to the experiment being conducted



Measurements taken with DefleX® are performed in real-time and/or utilise a post-processing feature to get the most out of the optical deformation measuring device and acquire the most complex deformation analysis.



### LICENSING

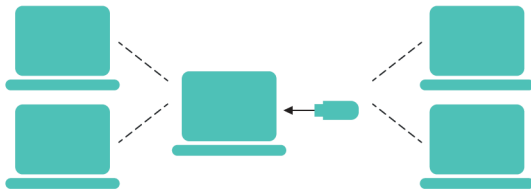
Deflex®-2D includes a single-user perpetual software licence accessed via the USB licence key. The user installs the software (via the USB flash drive) on the desired number of PCs, but can only use the one with the USB licence key plugged in to access and use the Deflex® software.



PERPETUAL LICENCE

The perpetual licence can be extended (optionally if required) by purchasing an annual network licence (Deflex®-2DNet). This allows access of the Deflex® software for up to 20 users on multiple devices whilst connected to the same network.

The network licence enables the lecturer to record footage and send it to students for them to analyse in the Deflex® software installed on their own computers. (NOTE: Both the network licence and the single-use licence are restricted to educational purposes.)



NETWORK LICENCE

Both licensing options include one year of technical enhancements, valid from the date of delivery.

Deflex®-2D is aimed at education for use in universities, colleges and other specialist training centres, and shall only be installed on equipment owned or used by such institutions. Please contact TecQuipment if you wish to use Deflex® for published research or commercial purposes.



DEFLEX®-2DNET: OPTIONAL ANNUAL NETWORK LICENCE PACK (20 USERS)

### ESSENTIAL SERVICES

#### ELECTRICAL SUPPLY:

- 100-240 VAC, 50/60 Hz, 0.5 A

#### MINIMUM COMPUTER HARDWARE:

- 1 x USB 3.0
- 2 x USB 2.0
- Memory 8 GB
- Hard disk 8 GB HDD
- CPU: Intel/AMD 2 GHz 2-core

#### SUPPORTED OPERATING SYSTEM:

- Windows 11 64 bit / Windows 10 64 bit
- Windows Server 2019 / Windows Server 2022

Latest release on date of purchase

#### MINIMUM PC OPERATING SYSTEM TO RUN DEFLEX® SOFTWARE:

- Windows 11 64 bit / Windows 10 64 bit
- Windows Server 2019 / Windows Server 2022

### OPERATING CONDITIONS

#### OPERATING ENVIRONMENT:

Laboratory environment

#### STORAGE TEMPERATURE RANGE:

-25°C to +55°C (when packed for transport)

#### OPERATING TEMPERATURE RANGE:

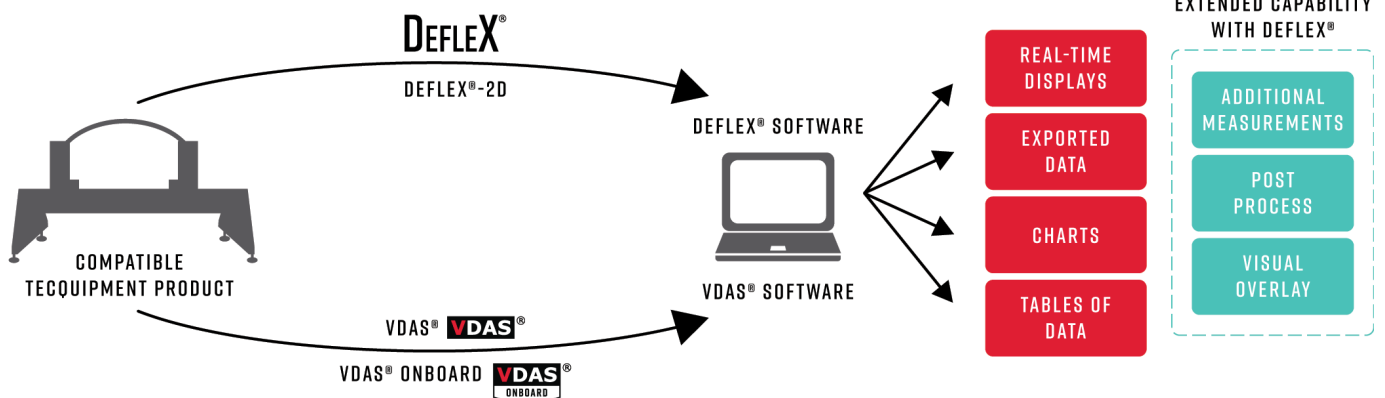
+5°C to +40°C

#### OPERATING RELATIVE HUMIDITY RANGE:

30% to 70%

#### DIMENSIONS AND WEIGHT:

- Whole kit boxed: 590 mm (width), 282 mm (height), 397 mm (depth), 8 kg (weight)
- Camera unit dimensions: 421 mm (width), 187 mm (front to back), 80 mm (height), 2.2 kg (weight)
- Total mass including all accessories: 18.5 kg



### LENSES

Selecting the right lens can optimise accuracy by maximising the number of available pixels for the measured area.



DEFLEX® LENS08



(SUPPLIED) LENS12



DEFLEX® LENS16



DEFLEX® LENS25



DEFLEX® LENS35



DEFLEX® LENS50



DEFLEX® LENS75

PRODUCT REFERENCE	FOCAL LENGTH [MM]	SENSOR FORMAT	MINIMAL FOCUSING DISTANCE [MM]	F-STOP	DIMENSIONS [MM]	WEIGHT [G]	FILTER SIZE	MOUNT
Deflex® LENS08	8	2/3"	100	2.8	Ø32 x 35.5	60	M30.5x0.5	C
-	12*		100		Ø29 x 43.5	60	M27x0.5	
Deflex® LENS16	16		250		Ø29 x 29	40	M27x0.5	
Deflex® LENS25	25		200		Ø29 x 31.5	40	M27x0.5	
Deflex® LENS35	35		250		Ø29 x 38.5	50	M27x0.5	
Deflex® LENS50	50		300		Ø29 x 56	65	M27x0.5	
Deflex® LENS75	75		400		Ø36 x 75	100	M34x0.5	

\* Supplied as standard

ISO 9513 class	Field of View [mm]		Working Distance [mm]						
	TECQUIPMENT DIG 2D		LENS FOCAL LENGTH [MM]						
	HEIGHT	WIDTH	08	12	16	25	35	50	75
0.5	190	125	220	344	460	743	1080	1583	2275
1	380	250	473	718	961	1512	2159	3133	4572
2	760	505	980	1476	1964	3049	4318	6234	9166

ASTM E83 class	Field of View [m]		Working Distance [m]						
	TECQUIPMENT DIG 2D		LENS FOCAL LENGTH [M]						
	HEIGHT	WIDTH	08	12	16	25	35	50	75
A	3.860	2.580	5.112	7.575	10.148	15.559	21.932	31.531	46.638
B1	19.300	12.900	25.692	37.998	50.910	78.081	109.661	157.526	233.277
B2	38.600	25.800	51.417	76.027	101.862	156.188	219.321	315.020	465.573
C	193.000	129.000	257.217	380.257	509.478	781.045	1096.607	1574.970	2332.963

## LENS COMPARISON

The chart below details which lenses are suitable for which TecQuipment products along with the approximate optimum working distances for each lens.

LENS COMPARISON TABLE										
PRODUCT CODE	RECOMMENDED LENSES	FIELD OF VIEW		OPTIMUM WORKING DISTANCE FOR EACH LENS (CM)						
		HEIGHT (MM)	WIDTH (MM)	8 MM LENS	12 MM LENS	16 MM LENS	25 MM LENS	35 MM LENS	50 MM LENS	75 MM LENS
STS4	8, 12, 16	400	600	65	100	130	205	285	405	610
STS10	8, 12, 16, 25	333	500	55	85	110	170	240	340	510
STS11	8, 12, 16, 25	333	500	55	85	110	170	240	340	510
STS14	8, 12, 16	480	720	80	120	160	245	340	490	730
STS15	8, 12, 16	500	750	85	125	165	255	355	505	760
STS16	12, 16, 25, 35	200	300	35	50	70	105	145	205	310
STS18	8, 12, 16, 25, 35	250	375	45	65	85	130	180	260	385
STS19	8, 12, 16, 25	333	500	55	85	110	170	240	340	510
SM1000	12, 16, 25, 35,	200	300	35	50	70	105	145	205	310
SM1002	25, 35, 50, 75	100	150	20	25	35	55	75	105	160
SM1004	8	900	1350	145	220	290	455	635	910	1360
SM1006	12, 16, 25, 35, 50	150	225	25	40	50	80	110	155	235
TM161 and 164-167	8, 12, 16	600	1000	100	150	195	305	425	605	910
TM1021V	8, 12, 16, 25	300	450	50	75	100	155	215	305	460
TE16	12, 16, 25, 35	333	500	55	85	110	170	240	340	510
TM1016	8, 12, 16	533	800	90	130	175	270	380	540	805
MF40 MkII	8, 12, 16, 25, 35	250	375	45	65	85	130	180	255	385

NOTE: It is possible to get good data with any combination of the product and lenses. The boxes shaded green are however recommended.

### INTRODUCTORY VIDEO

