

FEX Series Irrigation Water Management

The Armfield FEX Series – Gauging and Control Structures introduces students to the technology commonly used in the operation of canal and surface irrigation systems.

The range provides practical skill development in subjects such as management and operation of canals and rivers, including use of weirs, flume gates and flow measurement devices.



Parshall Flumes – FEX26-1/2/3

Named after the inventor Dr. Robert L. Parshall, this widely used flume causes little head loss and passes sediment readily.

Constructed in Glass Reinforced Plastic (GRP), flumes are supplied with measuring scales, spirit levels and calibration curves.

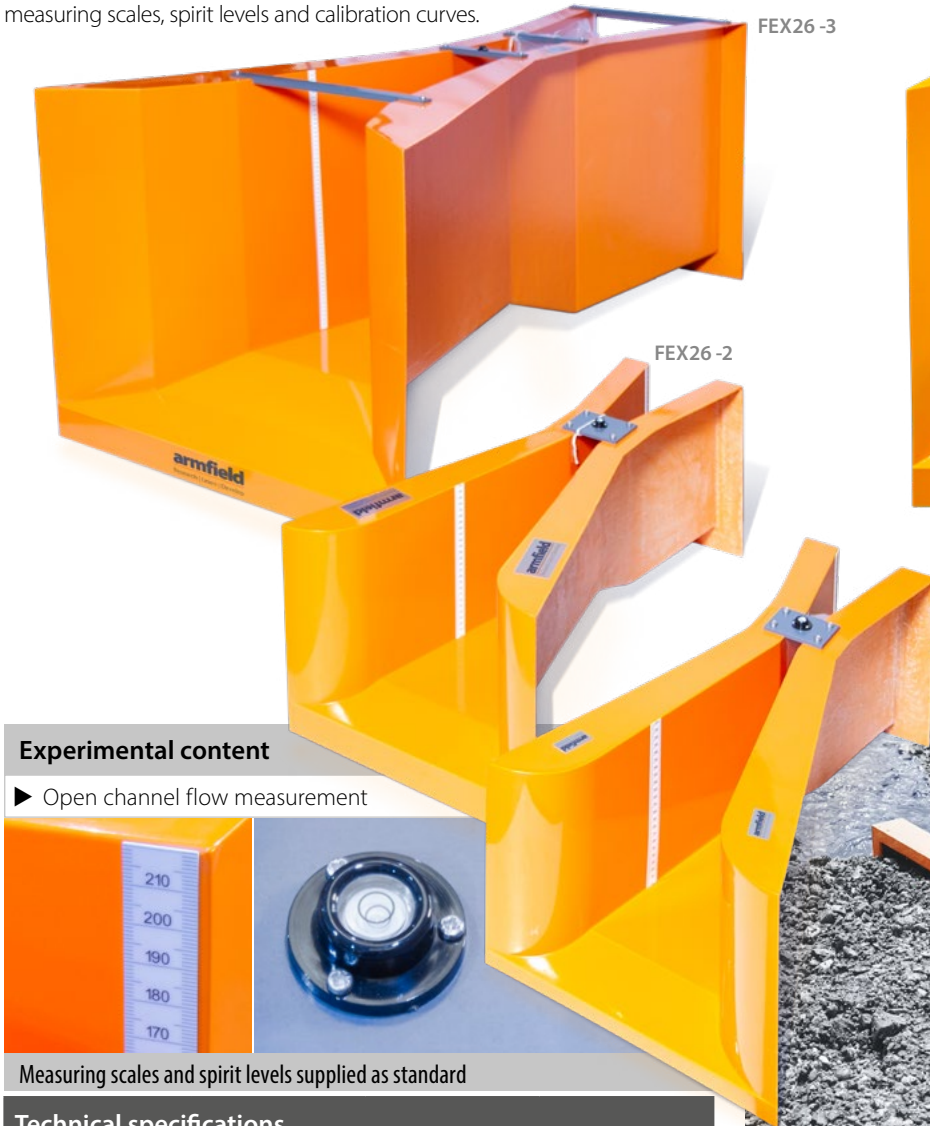
**COST EFFECTIVE
HIGHLY PORTABLE
EXTREMELY DURABLE**

FEX26 -3



FEX26 -2

FEX26 -1



Experimental content

- Open channel flow measurement



Measuring scales and spirit levels supplied as standard

Technical specifications

Model	FEX26-1	FEX26-2	FEX26-3
Throat width	25mm	51mm	152mm
Flow range	0.3 to 5 l/sec	0.5 to 14 l/sec	1.5 to 110 l/sec

Overall dimensions

Model	FEX26-1	FEX26-2	FEX26-3
Length	0.710m	0.860m	1.830m
Width	0.360m	0.420m	0.902m
Height	0.270m	0.305m	0.756m

Packed and crated shipping specifications

Volume	0.24m ³	0.33m ³	2.14m ³
Gross weight	40Kg	50Kg	60Kg



Ordering specification

- Parshall Flumes constructed in GRP
- Supplied with measuring scales, spirit levels and calibration curves

Ordering codes

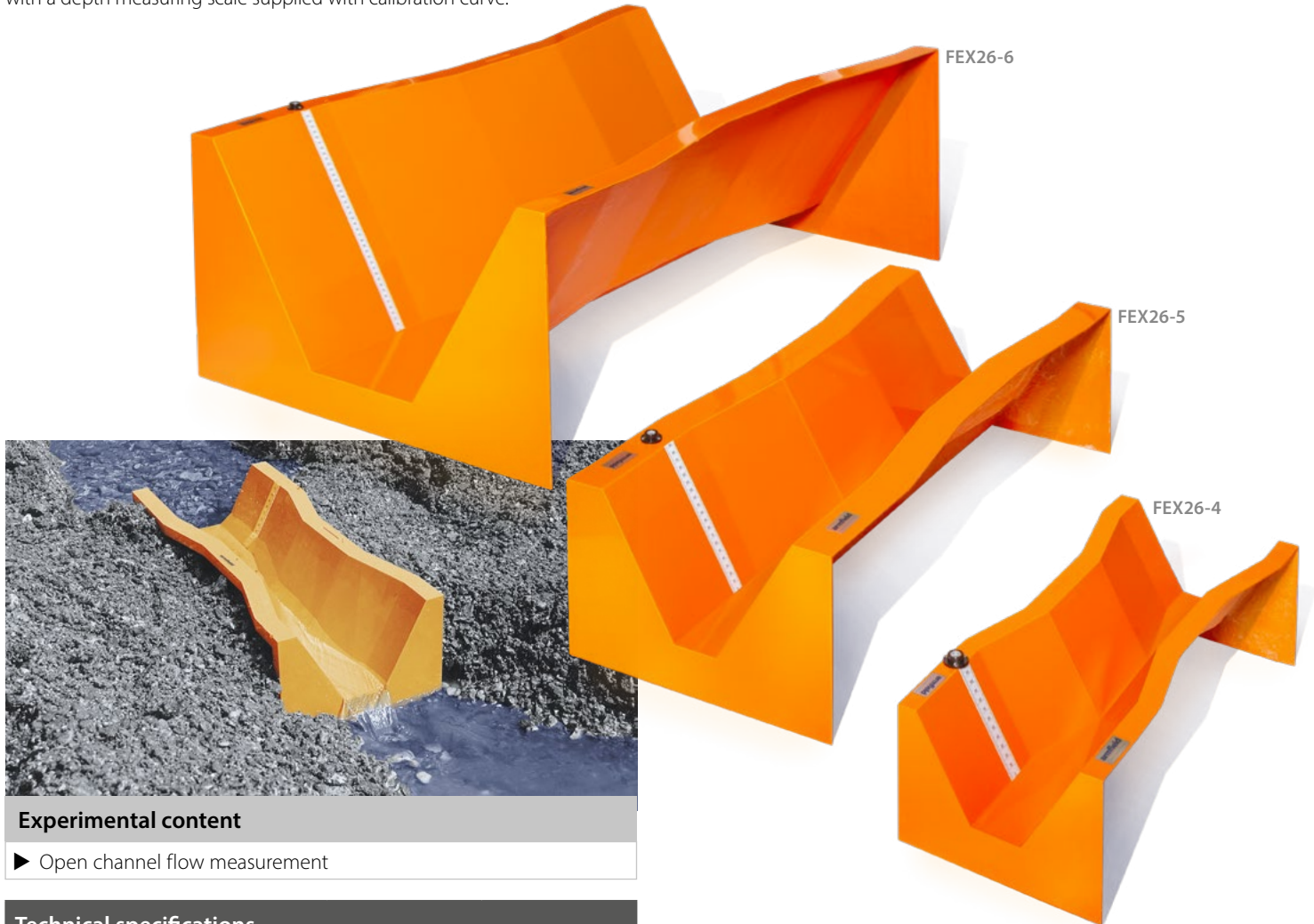
- FEX26-1
- FEX26-2
- FEX26-3

Washington State College (WSC) Flumes – FEX26-4/5/6

This trapezoidal design of flume, developed by Washington State College (WSC) for field irrigation, has many advantages over a rectangular flume. It gives a greater depth range, conforms closely to the channel section and enables sediment to pass more freely.

Constructed in Glass Reinforced Plastic (GRP), these flumes are fitted with a depth measuring scale supplied with calibration curve.

COST EFFECTIVE
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Experimental content

- Open channel flow measurement

Technical specifications

Model	FEX26-4	FEX26-5	FEX26-6
Flow range	0.1 to 2.0 l/sec	1.0 to 7.5 l/sec	6.0 to 76 l/sec

Overall dimensions

Model	FEX26-4	FEX26-5	FEX26-6
Length	0.710m	0.860m	1.830m
Width	0.360m	0.420m	0.902m
Height	0.270m	0.305m	0.756m

Packed and crated shipping specifications

Volume	0.24m ³	0.33m ³	2.14m ³
Gross weight	40Kg	50Kg	60Kg

Ordering specification

- WSC Flumes constructed in GRP
- Fitted with depth measuring scale
- Supplied with calibration curve

Ordering codes

- FEX26-4
- FEX26-5
- FEX26-6

Thin Plate Weirs & Accessories – FEX26-7

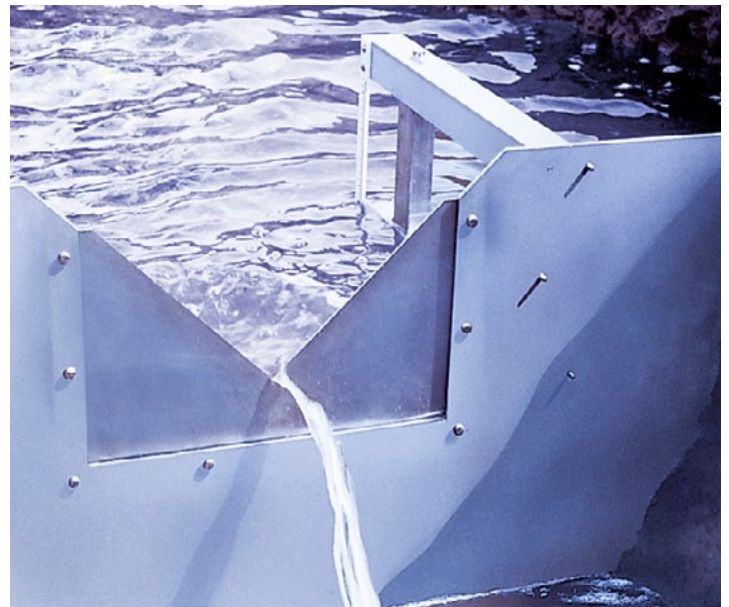
Armfield Thin Plate Weirs are constructed of stainless steel and mounted on a painted weir plate carrier, which can be set either into the banks and bed of a small stream or fixed to the end of a concrete channel. A simple head scale is attached to each weir plate but a stilling well can be fitted for greater accuracy.

The following weir plates are supplied:

- ▶ Rectangular Weir
- ▶ Cipoletti Weir
- ▶ 90° V-notch Weir
- ▶ ½ 90° V-notch Weir



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Technical specifications

Rectangular Weir	Max flow rate of 28 l/sec
Cipoletti Weir	A trapezoidal shaped weir with a max flow rate of 28 l/sec
90° V-notch Weir	Max flow rate of 15 l/sec
½ 90° V-notch Weir	Max flow rate of 7.5 l/sec

Experimental content

- ▶ Open channel flow measurement

Packed and crated shipping specifications

Volume	0.20m ³
Gross weight	100Kg

Ordering specification

- ▶ Thin Plate Weirs constructed of stainless steel and mounted on a painted weir plate carrier with a simple head scale attached

Ordering codes

- ▶ FEX26-7

Depth gauge comprises 300mm hook and point gauge, resolution 0.1mm.

Experimental content

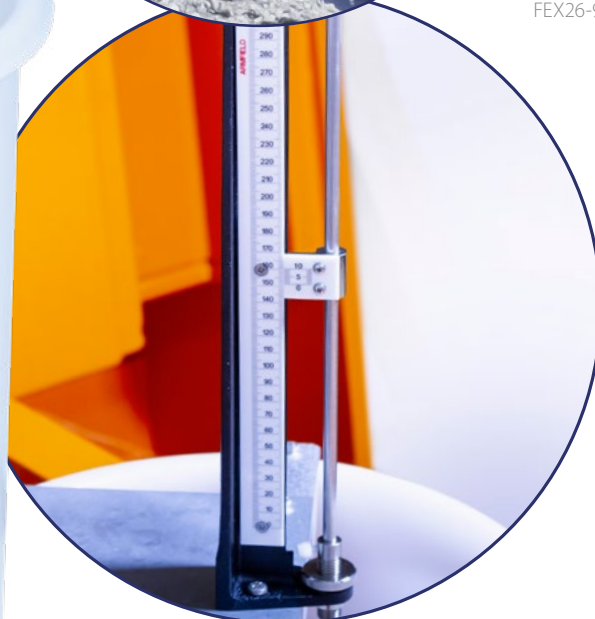
- Level measurement in an open channel

Stilling Well and Depth Gauge – FEX26-8

PART OF AN EXTENSIVE RANGE



FEX26-8: In use with FEX26-9 flume



FEX26-8: Hook and point gauge

Resolution: $\pm 0.10\text{mm}$

Typical accuracy: $\pm 0.20\text{mm}$

Repeatability: $\pm 0.10\text{mm}$

Overall dimensions

Dimensions Stowed

Length	0.420m
Width	0.350m
Height	0.570m

Packed and crated shipping specifications

Volume	0.4m ³
Gross weight	55Kg

Ordering specification

- Stilling well with depth gauge comprising hook and point gauge

Ordering codes

- FEX26-8

Channel Section – FEX26-9

A lightweight channel section made from corrosion-resistant material with the provision for easy mounting of the FEX26-10 or 11.

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FEX26-11 Crump Weir being-fitted, see page 3



Experimental content

- Level measurement in an open channel

Overall dimensions

Length	2.000m
Width	0.600m
Height	0.525m

Packed and crated shipping specifications

Volume	1.30m ³
Gross weight	70Kg

Ordering specification

- Lightweight portable channel section constructed of corrosion resistant material

Ordering codes

- FEX26-9

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Issue: 2
URL: <http://www.armfield.co.uk/fex26>

Applications
ChE IP

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**FE
SERIES**

Used for controlling upstream water levels and measuring discharge rate. The weir is set perpendicular to the flow across the channel bed.

It is particularly useful in sediment laden waters that can be detrimental to sharp edged weirs. Made from Glass Reinforced Plastic (GRP).

Broad Crested Weir – FEX26-10

**COST EFFECTIVE
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Experimental content

- Measurement of water discharge

Technical specifications

Flow range	0 to 30 l/sec
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Overall dimensions

Length	0.450m
Width	0.400m
Height	0.120m

Packed and crated shipping specifications

Volume	0.10m ³
Gross weight	30Kg



Ordering specification

- Broad Crested Weir constructed of GRP

Ordering codes

- FEX26-10

Crump Weir – FEX26-11

Named after its designer, C. S. Crump, this broad crested weir is triangular in section making it less likely to trap silt and debris.

The weir is used for accurate measurement of discharge rates and is made from durable Glass Reinforced Plastic (GRP).

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Experimental content

- Measurement of water discharge

Technical specifications

Flow range	0 to 30 l/sec
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Overall dimensions

Length	0.450m
Width	0.450m
Height	0.070m

Packed and crated shipping specifications

Volume	0.10m ³
Gross weight	30Kg



Ordering specification

- Triangular shaped Crump Weir constructed of GRP

Ordering codes

- FEX26-11

These two types of adjustable sluice gate, undershot and overshoot are widely used for the control of water in canal systems.

In the absence of more accurate devices they may be used for the approximation of flow rates.

Armfield sluice gates are made from stainless steel and plastic and are designed to fit in a rectangular channel section 0.450m wide.

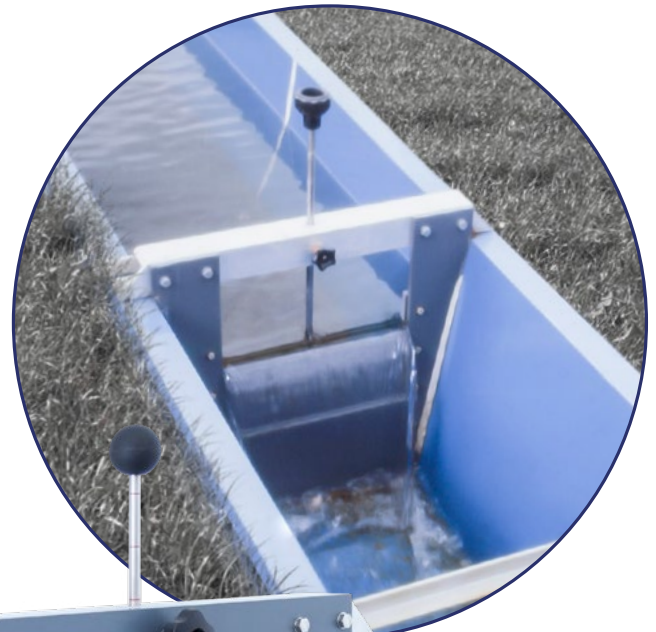
Two types are available - Undershot (FEX40-3) and Overshot (FEX40-4).

History

In a surface irrigation distribution network it is necessary to establish a command from which water may be discharged to the area where it will be applied to growing crops. Regulation of discharge, its distribution and disposal is carried out using a range of control structures selected to suit particular situations.

In order to familiarise technicians with the mode of operation of a variety of control structures, Armfield has designed and produced a range of demonstration units.

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FEX40-4: Overshot weir in trials



FEX40-4: Overshot weir



FEX40-3: Undershot weir

Gate control bar has measurements to accurately record position data



Experimental content

- Flow control and flow measurement in an open channel or furrow

Overall dimensions

Model	FEX40-3/4
Length	0.580m
Width	0.450m
Height	0.080m
Packed and crated shipping specifications	
Volume	0.1m ³
Gross weight	20Kg

Ordering codes

- FEX40-3
- FEX40-4

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Issue: 2

URL: <http://www.armfield.co.uk/fex40>

Applications

ChE IP

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Automatic Water Control Gates – FEX40-5/6/7

Automatic control gates are used extensively in canal systems for regulating water levels and discharge.

They are usually float operated and are designed to maintain constant levels in the canal so that discharges from off-takes can be kept at a constant known rate.

Armfield are able to supply models of three types of commonly used gate:

Float Operated Radial Gate – FEX40-5

Float Operated Tilting Gate – FEX40-6

Float Operated Weir Gate – FEX40-7

Experimental content

- Demonstration of the most widely used automatic control gates in distribution systems for maintaining constant water levels under varying discharges or vice versa

FEX40-5

This is a counterbalanced radial-type gate, which is controlled by means of a displacer located in a chamber. The displacer chamber is fed with upstream water via a V-notch Weir and water is discharged from the chamber downstream through a circular orifice.

The flow through this orifice may be adjusted by means of a throttle valve, altering the characteristics of the gate as required. The gate, of the undershot type, provides upstream level control and is designed to fit in a rectangular channel section 0.450m wide.

FEX40-6

This consists of a gate flap, which is hinged at the base. The position of the gate is controlled by means of a displacer housed in a chamber.

Water is fed to the chamber from the upstream side over a V-notch Weir and discharged downstream through an orifice.

A throttle valve enables the orifice flow to be controlled and the gate characteristics to be modified as required. The gate, of the overshot type, provides a further method of control of upstream level and is designed to fit in a rectangular channel section 0.450m wide.

FEX40-7

This is a radial-type gate incorporating buoyancy tanks. The gate floats at a constant depth so the head of water over the gate crest remains constant despite variations in upstream level.

The gate is suitable for applications where constant flow is required, for example in irrigation canal off-takes, and is designed to fit in a rectangular channel section 0.450m wide.

Overall dimensions

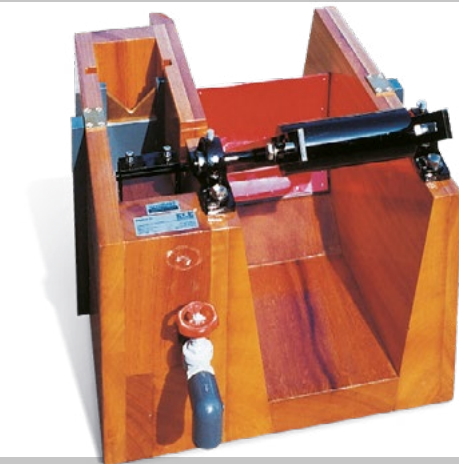
Model	FEX40-5	FEX40-6	FEX40-7
Length	0.715m	0.480m	0.480m
Width	0.480m	0.470m	0.470m
Height	0.475m	0.445m	0.445m

Packed and crated shipping specifications

Volume	0.3m ³	0.3m ³	0.3m ³
Gross weight	70Kg	70Kg	70Kg



FLOAT OPERATED RADIAL GATE – FEX40-5



FLOAT OPERATED TILTING GATE – FEX40-6



FLOAT OPERATED WEIR GATE – FEX40-7

Ordering codes

- FEX40-5
- FEX40-6
- FEX40-7