STS Italia

Sensori, trasduttori e sonde per il monitoraggio ambientale

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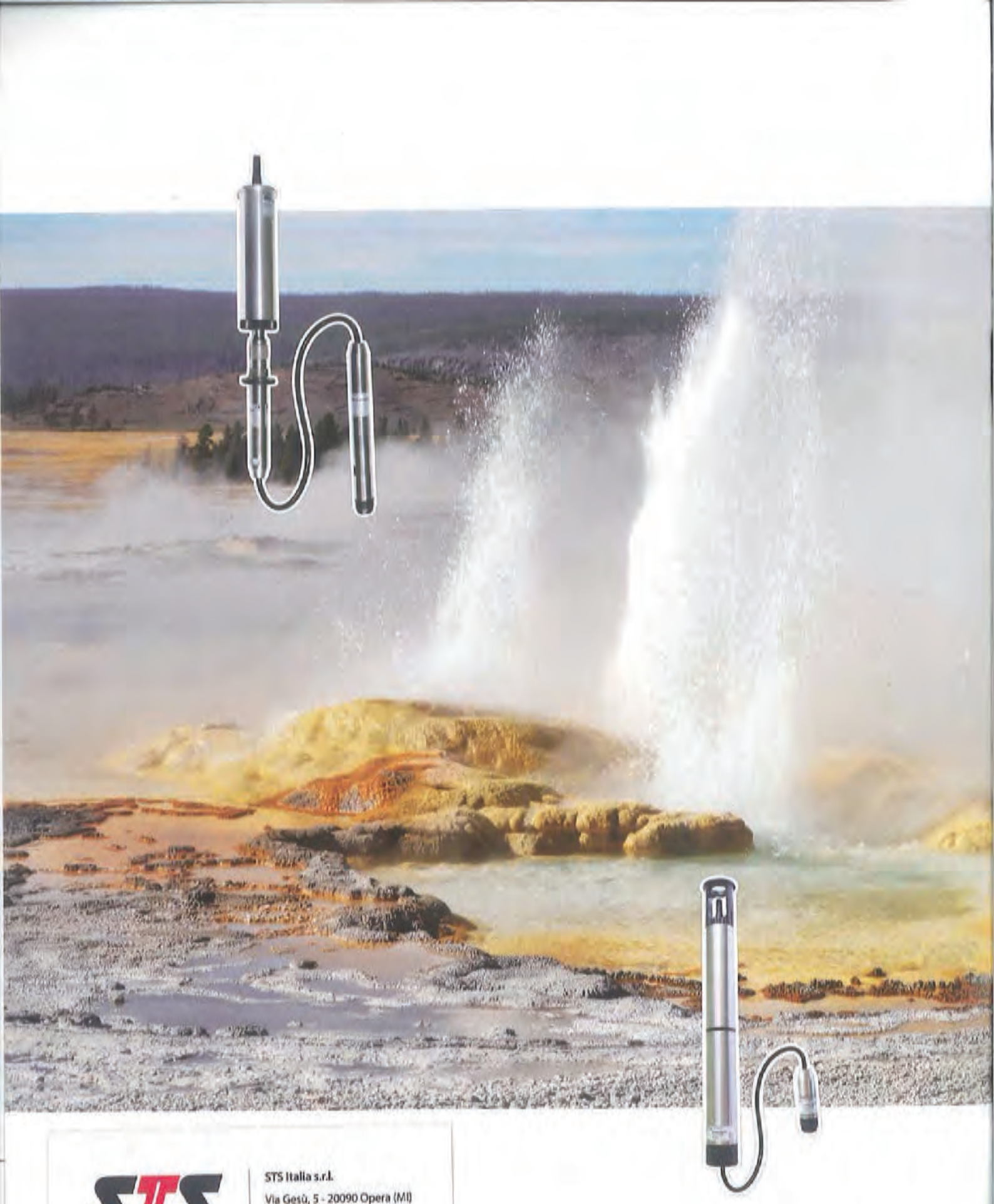

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附件 3- 2

LEADER DEL SETTORE PER SENSORISTICA DI PRESSIONE TRASDUTTORI E SONDE PER IL MONITORAGGIO AMBIENTALE

STS Italia s.r.l. è stata fondata nel 1992 con l'obiettivo di distribuire in Italia la sensoristica ed i trasduttori di pressione prodotti da STS Sensor Technik Sirnach nel suo stabilimento a Sirnach (CH). La rispondenza tecnica e l'alta affidabilità dei prodotti unita ad un elevato standard qualitativo, certificato ISO 9001, ha permesso di proporre alla clientela le soluzioni più idonee alle proprie esigenze applicative.

Il gruppo STS che opera a livello mondiale, è in grado di assicurare ovunque un adeguato servizio post-vendita, con interventi rapidi per assistenza, manutenzione o rispondenza in garanzia.

Crediamo, che fra le maggiori motivazioni del nostro successo vi sia la soddisfazione della clientela e riteniamo prioritario proseguire nello sviluppo mantenendo un rapporto di piena collaborazione con la clientela acquisita operando per sviluppare nuovi mercati e soddisfare al meglio tutte le richieste che pervengono dalla clientela.

DL/N.OCS

sonda multiparametrica per misure di livello e temperatura (con opzione conducibilità elettrica)

Caratteristiche Tecniche

Range di livello	[mH₂O]	2... 5	> 5 ... 20	> 20...250
Sovrapressione		≥ 3 bar	3 x FS (≥ 3 bar)	3 x FS
Precisione	[± % FS]	≤ 0,15	≤ 0,05	≤ 0,03
Campo di temperatura	(°C)	-5...+50	-5...+80	
Stabilità a lungo termine (1 anno) (tipico/max)		≤ 0,5%FS/< 4mbar	≤ 0,2%FS/< 4mbar	≤ 0,1%FS/< 0,2%FS

	Campo di misura	Risoluzione	Precisione
Misura di livello	0...250mH₂O	21 bit	
Misura della temperatura -5...+50		21 bit	≤ ± 0,5°C
Misura della temperatura -8...+80		21 bit	≤ ± 1,5°C

Misura di conducibilità (Range 0...200 mS/cm)	Campo di misura	Precisione
	0...200 µS/cm	≤ ± 2,5%
	0...2 mS/cm	≤ ± 1,5%
	0...20 mS/cm	≤ ± 1,5%
	0...200 mS/cm	≤ ± 1,5%

Datalogger

Grandezze misurabili	Livello (pressione), temperatura e conducibilità
Orologio	Orologio con precisione al quarzo; data e ora di avvio dell'acquisizione configurabile
Memoria	500.000 misure, non volatile, i dati rimangono memorizzati anche senza batteria, ogni valore misurato è provvisto di ora e data
Identificazione	Ogni data logger possiede un numero di serie inequivocabile e una designazione liberamente selezionabile dall'utente
Alimentazione	Batteria al litio da 3.6 V / forma costruttiva AA (batteria sostituibile dall'utente)

Configurazione e scarico dei dati

Software	Software Browser based per la configurazione e lo scarico dei dati
Trasferimento dati	Lettura dati delle diverse serie di misurazioni, lettura di tutti i dati memorizzati, lettura dei dati in funzione del tempo
Configurazione	Intervallo di misura e memorizzazione. Registrazione di dati in una finestra temporale definita. Denominazione di punti di misurazione. Registrazione della distanza dal piano campagna. Taratura dello zero. Valori di soglia. Impostazione densità del fluido. Avvio acquisizione in funzione di valori soglia o del tempo
Formato dati	I dati possono essere salvati in formato TXT, CSV o XML

Materiali

Sonda	Parte esterna	Acciaio Inox
	Parte immersa	Acciaio Inox o Titanio
	Sensore di livello	Acciaio Inox o Titanio
	Elettrodi conducibilità	Acciaio Inox o Platino
Cavo elettrico	PUR, PE, FEP con tubetto di sfiato per compensazione barometrica	

DL/N 70 - DL/N 70 MULTI

sonde per misure di livello
(con opzioni per temperatura e conducibilità elettrica)

Caratteristiche Tecniche

Campo di pressione	[mH_2O]	1 ... 5	> 5 ... 20	> 20...250
Sovrapressione		3bar	3 x FS (minimo 3 bar)	3 x FS
Precisione	[± % FS]	≤ 0,25	≤ 0,1	≤ 0,1
Errore di temperatura	[± % FS/°C]			
zero	-5...50°C	≤ 0,06	≤ 0,03	≤ 0,015
Span	-5...50°C	≤ 0,015	≤ 0,015	≤ 0,015
Campo di temperatura			-5...50°C	
Stabilità a lungo termine (1 anno) (tipico/max)		< 0,5%FS/< 4mbar	< 0,2%FS/< 4mbar	< 0,1%FS/< 0,2%FS

	Campo di misura	risoluzione	precisione
Misura della temperatura con conducibilità	-5...50°C	0,1°C	≤ ±0,25°C
Misura della temperatura senza conducibilità	-5...50°C	0,1°C	≤ ±1°C
Conducibilità	20 µS/cm...20mS/cm	1 µS/cm	± 2% del valore misurato

Datalogger

Grandezze misurabili	Livello o pressione (misurazione della temperatura come opzione), e conducibilità con misura della temperatura
Risoluzione	Pressione 0.01% FS
Orologio	Orologio con precisione al quarzo; data e ora di avvio dell'acquisizione configurabile
Memoria	500.000 misure, non volatile, i dati rimangono memorizzati anche senza batteria, ogni valore misurato è provvisto di ora e data
Interfaccia	RS485
Identificazione	Ogni data logger possiede un numero di serie inequivocabile e una designazione liberamente selezionabile dall'utente
Alimentazione	Batteria al litio da 3.6 V / forma costruttiva AA (batteria sostituibile dall'utente) 1 batteria per lunghezza cavo ≤ 100m, 2 batterie per lunghezza cavo > 100m (max. 300m)

Software per la configurazione e lo scarico dei dati

Requisiti del sistema	PC o notebook IBM compatibile, potenza del processore min. 200 MHz, memoria del disco fi sso min. 50 MByte, memoria di lavoro min. 64 MByte. Interfaccia seriale libera (a 9 o 25 poli con adattatore) o porta USB con adattatore sistema operativo Windows 98 / 98 SE / ME o superiore (32 bit). NT a partire dalla versione 4 (min. Service Pack 6 e Internet Explorer a partire dalla versione 6.0) / 2000 / XP
Trasferimento dati	Lettura dati ad ogni serie di misurazioni, lettura di tutti i dati memorizzati, lettura dei dati in funzione del tempo
Configurazione	Intervallo di misura e memorizzazione. Registrazione di dati in una fi nestra temporale definita. Denominazione di punti di misurazione. Registrazione della distanza dal piano campagna. Taratura dello zero. Valori di soglia; avvio acquisizione in base a valori soglia. Impostazione densità del fluida . Avvio acquisizione in funzione di valori soglia o del tempo.
Formato dati	I dati vengono salvati nel formato ASCII o XML e sono leggibili con tutti i programmi comunemente in uso (Excel, Lotus ecc.)

DL MTM/N 10
sonda di livello miniaturizzata (10 mm)

Caratteristiche Tecniche

Campo di misura	[bar]	1,0... 2,0	> 2,0... 4,0	> 4...10
Sovrapressione		3 x FS	3 x FS (max 12 bar)	3 x FS
Precisione	[± % FS]	≤0,1	≤0,1	≤0,1
Errore di temperatura	[± % FS/°C]			
zero	-5...50°C	≤ 0,06	≤ 0,03	≤ 0,015
Span	-5...50°C	≤ 0,015	≤ 0,015	≤ 0,015
Stabilità a lungo termine	(1 anno) (tipico/max)	< 0,5%FS/< 4mbar	< 0,2%FS/< 4mbar	< 0,1%FS/< 0,2%FS

Datalogger

Grandezze misurabili	Livello o pressione
Risoluzione	Pressione < 0.01% FS
Orologio	Orologio con precisione al quarzo; data e ora di avvio dell'acquisizione configurabile
Memoria	500.000 misure, non volatile, i dati rimangono memorizzati anche senza batteria, ogni valore misurato è provvisto di ora e data
Interfaccia	RS485
Identificazione	Ogni data logger possiede un numero di serie inequivocabile e una designazione liberamente selezionabile dall'utente
Alimentazione	Batteria al litio da 3.6 V / forma costruttiva AA (batteria sostituibile dall'utente) 1 batteria per lunghezza cavo ≤ 100m, 2 batterie per lunghezza cavo > 100m (max. 300m)

Software per la configurazione e lo scarico dei dati

Requisiti del sistema	PC o notebook IBM compatibile, potenza del processore min. 200 MHz, memoria del disco fi sso min. 50 MByte, memoria di lavoro min. 64 MByte. Interfaccia seriale libera (a 9 o 25 poli con adattatore) o porta USB con adattatore sistema operativo Windows 98 / 98 SE / ME o superiore (32 bit). NT a partire dalla versione 4 (min. Service Pack 6 e Internet Explorer a partire dalla versione 6.0) / 2000 / XP
Trasferimento dati	Lettura dati ad ogni serie di misurazioni, lettura di tutti i dati memorizzati, lettura dei dati in funzione del tempo
Configurazione	Intervallo di misura e memorizzazione. Registrazione di dati in una fi nestra temporale definita. Denominazione di punti di misurazione. Registrazione della distanza dal piano campagna. Taratura dello zero. Valori di soglia; avvio acquisizione in base a valori soglia. Impostazione densità del fluida . Avvio acquisizione in funzione di valori soglia o del tempo.
Formato dati	I dati vengono salvati nel formato ASCII o XML e sono leggibili con tutti i programmi comunemente in uso (Excel, Lotus ecc.)

Modulo GSM

modulo di comunicazione GSM per Datalogger

Trasmissione dati a mezzo GSM

Bande di frequenza	GSM GSM 900 MHz, GSM 1800 MHz, GSM 1900 MHz (fase 2/2+)
Potenza di trasmissione	classe 4 (2W) in EGSM900, classe 1 (1W) in GSM 1800 e GSM 1900
Carta SIM	supporta carte SIM da 3V
Antenna	Antenna standard da 1/4λ: 900/1800 MHz o 1900 MHz (Gain 0/0 dB), antenna piatta: 900/1800 MHz (Gain 0/0 dB)
Velocità di trasmissione	9600 Baud

MODEM ANALOGICO PER PC	
Tipo compatibile	V.92
Velocità di trasmissione	9600 Baud

UTILIZZABILE CON

DL/MTM/N 10

DL/N 70

Modulo

Custodia	alluminio AlMgSi1 cromato
Prese per cavi rete	acciaio inox 1.4435
Copertura antenna	Ertalyte Tx (PET), grigio chiaro
Collegamento di comunicazione	FME (spina, male)
Interfaccia datalogger	RS485 per DL/N serie 70, RS232 per DL/N serie 64
Orologio	orologio al quarzo termocompensato, variazione max. 30 s all'anno

Ingressi/uscite	2 ingressi o uscite digital (ad es. per il monitoraggio)
Batteria	litio 3.6V, tipo D (sostituibile dall'utente), durata ca. 1.5 anni a 4 accessi on line al mese
Campo di temperatura	-20...55°C
Umidità	0...100% umid. rel., tipo protezione IP67 a coperchio chiuso e datalogger collegato

Comunicazione e configurazione

Requisiti del PC	PC o notebook, potenza del processore min. 200 MHz, memoria di massa a disco rigido 50 MB, memoria di lavoro min. 64 MB, modem analogico dallo standard V.42 / modem ISDN o modulo GSM dual/tri-band
Sistema operativo	Windows 98 / 98SE / Me / NT dalla versione 4 (min. Service Pack 6) / 2000 / XP o superiori (32 bit) e Internet Explorer dalla versione 6.0
Configurazione	2 attivazioni (avvio, durata e giorni definibili), attivazione giornaliera di sicurezza a mezzanotte. Connessione attraverso chiamata diretta o richiamata. Commutazione automatica all'ora legale attivabile

Interrogazione datalogger	Interrogazione e gestione di gruppi di datalogger completamente automatiche
Sicurezza di accesso	2 livelli con protezione della password
SMS al modulo	Invio SMS di configurazione, riconoscimento di eventi, richiesta dati
SMS dal modulo	Allarmi superamento valori soglia, stato carica batteria del modulo, periodico controllo funzionale
Tempi lettura datalogger	Modulo GSM con modem PC GSM: ca. 36 s / 1000 valori Modulo GSM con modem PC analogico: ca. 21 s / 1000 valori

Trasferimento dati a distanza

* si consiglia una sim card per trasmissione solo dati, tipo machine to machine.

Trasduttori di Pressione
per misure di livello

ATM/N.ECO - (ATM/N.ECO Ex)

Campo di lavoro	[bar]	(su richiesta) 0,05 ... 0,1	> 0,1 ... 2	> 2 ... 25
Sovrapressione			3 x FS (minimo 3 bar)	
Pressione di scoppio	[bar]	≥ 200	≥ 200	≥ 200
Errore totale TEB [± % FS]	Entro -5...50°C	1,0/1,5	0,7/1,0	0,7/1,0
	Entro -5...80°C	2,0/2,5	1,0/1,5	1,0/1,5
Precisione [± % FS]	≤ 0,25 (S.R. ≤0,1)	comprensiva della linearità, isteresi e repetibilità a temperatura 25°C e con punto fisso iniziale secondo norma DIN 16086		
Temperatura del fluido	[°C]	-5 ... 80°C		
Tempo di risposta	[ms]	< 1ms/10...90 %FS		
Deriva a lungo termine	[tip./max.]	<0,5 %FS/ < 4 mbar	<0,2 %FS/ <4mbar	<0,1 %FS/ <0,2%FS

MATERIALI

Attacco, membrana, involucro: Acciaio inossidabile St. 1.4435 (AISI 316 L) o Titanio (su richiesta)

Guarnizioni: Viton

ATM/N.1ST - (ATM/N.1ST Ex)

Campo di lavoro	[bar]	(a richiesta) 0,05 ... 1	> 0,1 ... 2	> 2 ... 25
Sovrapressione			3 x FS (minimo 3 bar)	
Pressione di scoppio	[bar]	≥ 200	≥ 200	≥ 200
Errore totale TEB [± % FS]	Entro 0...70°C	0,8/1,0	0,3/0,5	0,3/0,5
	Entro -25...100°C	1,3/1,5	0,75/1,0	0,75/1,0
Compensazione attiva	Entro 0...70°C	0,5/0,7	0,2/0,4	0,2/0,4
	Entro -40...125°C	1,5/1,7	0,5/0,8	0,5/0,8
Precisione [± % FS]	≤ 0,25 (S.R. ≤0,1/≤0,05)	comprensiva della linearità, isteresi e repetibilità a temperatura 25°C e con punto fisso iniziale secondo norma DIN 16086		
Temperatura del fluido	[°C]	-5...+80°C		
Tempo di risposta	[ms]	< 1ms/10...90 %FS		
Stabilità a lungo termine	[tip./max.]	<0,5 %FS/ < 4 mbar	<0,2 %FS/ <4mbar	<0,1 %FS/ <0,2 %FS

MATERIALI

Attacco, membrana, involucro: Acciaio inossidabile St. 1.4435 (AISI 316 L) o Titanio (su richiesta)

Guarnizioni: Viton

Trasduttori di Pressione
per misure di livello

ATM/NC - (ATM/NC Ex)

Campo di lavoro	[bar]	0,1 ... 0,5	> 0,5 ... 2	> 2...25
Sovrapressione		3bar	3 x FS (minimo 3 bar)	3 x FS
Pressione di scoppio	[bar]	>200	> 200	> 200
Precisione	[± % FS]	≤2	≤1	≤0,5
Deriva termica	[± % FS/°C]			
zero	0...70°C	0,06	0,03	0,015
	-25...85°C	0,08	0,04	0,02
Span	0...70°C	0,015	0,015	0,015
	-25...85°C	0,02	0,02	0,02
Stabilità a lungo termine (1 anno)		< 4 mbar	< 4 mbar	<0,2% FS
Segnale in uscita		4 ... 20mA	0 ... 20mA	0 ... 5V/0...10V
Tipo		Circuito a 2 fili, uscita in corrente	Circuito a 3 fili, uscita in corrente	Circuito a 3 fili, uscita in tensione
Alimentazione		9...33 V DC	9...33 V DC	15...30 V DC
Influenza dell'alimentazione sul segnale		<0,1 %FS	<0,1 %FS	<0,1 %FS

MATERIALI

Attacco, membrana, tubo: corpo in PVDF alta densità e membrana in PTFE

Guarnizioni: Viton (Kalrez o altri materiali su richiesta).

MTM/N 10 - ATM/N 19

Campo di lavoro [bar]	**MTM/N 10**	0,1... 0,5	> 0,5 ... 2	> 2...10
	ATM/N 19	0,1... 0,5	> 0,5 ... 2	> 2...10 (25 Bar)
Sovrapressione	**MTM/N 10**	3 x FS	3 x FS (max.12 bar)	12 bar
	ATM/N 19	3 x FS	3 x FS (max.12 bar)	75 bar
Precisione	[± % FS]	≤0,5 (≤0,25% su richiesta)	≤0,5 (≤0,25% su richiesta)	≤0,5 (≤0,25% su richiesta)
Regolazione zero e span	Zero	± 1mV	± 1mV	± 1mV
	Span	± 2%	± 2%	± 2%
Errore di temperatura	[± % FS/°C]			
zero	-5...50°C	≤0,06	≤0,03	≤0,015
Span	-5...50°C	≤0,015	≤0,015	≤0,015
Stabilità a lungo termine (1 anno)		≤0,2% FS/<4mbar	≤0,1% FS/<0,2% FS	≤0,1% FS/<0,2% FS
Segnale in uscita	**MTM/N 10**	(alimentazione 10V CC)	Uscita 50 m/V	
	ATM/N 19	(alimentazione 9...33 V CC- 15...30 VCC)	Uscita mA/V	

MATERIALI

Attacco, membrana, custodia: Acciaio inox 1.4435 (AISI 316 L)

Guarnizioni: Viton

CT2X

sonde per misure di Livello/temperatura/ conducibilità elettrica con protocollo modbus RTU (RS485) ed interfaccia SDI_12 (disponibile anche con Datalogger integrato)

Highlights

Disponibile anche per singolo parametro	Misure anche di Salinità e TDS
Range 0...300.000 microSiemens/cm	Diametro ridotto (19 mm)
Memoria non volatile 349.000 misure	

Caratteristiche Tecniche

lunghezza versione batterie:	con sensore pressione: 41,60 cm	Senza sensore pressione: 32,00 cm
lunghezza versione senza batterie:	con sensore pressione: 37,80 cm	Senza sensore pressione: 28,20 cm
Diametro: 19 mm	Peso: 0,5 kg	Materiale: Acetale AISI 316 o titanio
Materiale guarnizioni: Fluoropolimero e PTFE	Cavo immergibile: PU, PE o FEP	Peso cavo: 1,80 kg/30m
Classe di protezione: IP68, NEMA 6P	Connettore terminale: disponibile	Comunicazione: RS485 Modbus RTU, SDI-12 (ver. 1.3)
Range temperatura operativa raccomandato: [2]	-5°C +40°C	
Range temperatura di conservazione: [1]	-40°C +80°C	

Acquisizione Dati

Memoria	1 mb 319.000 dati
Modalità di registrazione	Variabile, definibile dall'utente, logaritmica
Baud Rate programmabile	9.600, 19.200, 38.400
Frequenza di acquisizione	Massimo 4 misure al secondo
Software	Free
Formato file	.xls/.csv/.a4d

Temperatura

Tipo Elemento	termistore 30K ohm
Precisione	± 0,25°C
Risoluzione	0,1 °C
Range	-5°C +40°C
Unità di misura	Gradi Celsius, Fahreneit, Kelvin

Conducibilità [5]

Materiale sonda:	epossidica / grafite
Elettrodo:	4 poli
Precisione statica:	±0,5% del valore misurato (0-100.000 µS/cm)
Risoluzione:	32 bit
RANGE:	
Conducibilità	0-300.000 µS/cm
TDS	4,9 – 147.000 mg/l
Salinità	2 – 42 PSU
Unità di misura:	µS/cm - mS/cm - 0,1 mg/l (TDS) - 0,001 PSU
Tempo riscaldamento:	200 msec
Compensazione termica:	nessuna, lineare, o nl.Fn

Alimentazione

Batteria interna	2 x 1,5V AA
Alimentazione ausiliaria	12VDC – Nominale 6-15VDC – Range
Durata stimata batteria	12 mesi con acquisizione ogni 15min [6]

Livello

Trasduttore tipo:	Silicio su film sottile
Materiale trasduttore:	Acciaio inox 316 o titanio
Unità di misura:	cmH2O, mmH2O, mH2O, PSI, bar, mbar, kPa, FtH2O, inH2O
Precisione statica:	± 0,05 % FSO (tipica) ± 0,1 % FSO (massima)
Risoluzione:	0,0034% FS (tipica)
Massimo operativo:	1,1 x FS
Protezione over range:	3 x FS (per >300 PSI contattare STS) [3]
Pressione di scoppio:	1.000 psi (circa 600 metri)
Range compensato:	0°C +40°C
Range di Pressione: [4]	Relativo mH2O 0,7[7] 3,50 10,50 21,00 35,00 70,00 210,00 Assoluto [8] mH2O 10,00 24,00 59,00, 200,00

1. conservazione senza batterie
2. necessario kit protezione antigelo se utilizzate opzione pressione in acque gelate
3. Circa 200 metri
4. Ulteriori range di pressione disponibili su richiesta
5. Precisione ridotta ai livelli <10 µS/cm e >100.000 µS/cm
6. Può variare in funzione di fattori ambientali
7. ±0,25% precisione FSO (massima) con questo range
8. dai range assoluti vengono detratti 14,7 psi per fornire profondità reale

PH/ORP

sonde per misure di pH, ORP, temperatura con protocollo modbus®RTU (RS485) ed interfaccia SDI_12 con Datalogger integrato

Highlights

Bassi consumi, batterie AA sostituibili in campo	Modbus®RTU (RS485) ed interfaccia SDI-12 (grande flessibilità)
Misura il pH fino a 100 mH2O	Elettrodo brevettato – Stabilità sensore 6 mesi*
Diametro ridotto (19 mm)	Memoria non volatile 200.000 valori (nessuna perdita di dati in caso di batterie scariche)
Software user-friendly	

*può variare in funzione di fattori ambientali

Caratteristiche Tecniche

lunghezza versione batterie:	con sensore pressione: 45,60 cm		
lunghezza versione senza batterie:	con sensore pressione: 36,00 cm (più corto di 0,6 cm nella versione senza cavo)		
Diametro: 19 mm	**Peso:** 0,4 kg		**Materiale:** Acetale AISI 316 o titanio
Materiale guarnizioni: Fluoropolimero e PTFE	**Cavo immergibile:** PU, PE o FEP		**Peso cavo:** 1,80 kg/30m
Classe di protezione: IP68, NEMA 6P	**Connettore terminale:** disponibile		**Comunicazione:** RS485 Modbus RTU, SDI-12 (ver. 1.3)
Direct modbus Read Output:	32-bit IEEE floating point		

Canali mV:	N° canali disponibili	2mV, 1 temp.	**Riferimenti:**	Elettrodo	Ag/AgCl allo stato solido
	Range	± 1.200 mV		Giunzione	liquida capillare brevettata
	Precisione	0,1% del valore		Elettrolito	Soluzione di riferimento TempHion™
	Risoluzione	0,1 mV			

Range di temperatura operativa: 0° C a 55°C **Range di temperatura di conservazione[1]:** -20°C +80°C **Profondità massima:** 210 metri

Acquisizione Dati

Memoria	4 mb 400.000 valori
Modalità di registrazione	Variabile, definibile dall'utente, logaritmica
Baud Rate programmabile	9.600, 19.200, 38.400
Frequenza di acquisizione	Massimo 2 misure al secondo
Software	Free
Formato file	.xls/.csv/.a4d

Alimentazione

Batteria interna	2 x 1,5V AA alcaline [2]
Alimentazione ausiliaria	12VDC – Nominale 6-15VDC – Range
Durata stimata batteria	18 mesi con acquisizione ogni 15min[3]

Temperatura

Tipo Elemento	termistore 30K ohm
Precisione	± 0,2°C
Risoluzione	0,1 °C
Range	-5°C + 60°C
Unità di misura	Gradi Celsius, Fahreneit, Kelvin

pH/ORP

Tipo di Sensore/materiale	pH	Elettrodo combinazione vetro
	ORP	Anello in platino
Range:	pH	unità di misura 0-14 / -538mV a 260mV
	ORP	± 1.200mV
Unità di misura:	pH, mV, Eh	
Precisione tipica:	pH	± 0,2
	ORP	0,1 mVH
Risoluzione:	pH	0,01
	ORP	0,01 mVH
Range compensato:	0°C a 40 °C	
Calibrazione:	pH	a 1 o 2 punti con buffer pH (7 & 4 o 10)
	ORP	EH calibrazione a 1 punto
Soluzione di riferimento:	nitrato di potassio (KNO_3)	

1 conservazione senza batterie
2 disponibile al Rilio su richiesta
3 Può variare in funzione di fattori ambientali

D02

sonde per misure di Ossigeno disciolto con protocollo modbus®RTU (RS485) con Datalogger integrato

Highlights

- Misura e registra l'ossigeno disciolto e la temperatura
- Tempo di warm-up programmabile
- Diametro 42,2 mm (entra agevolmente in pozzetti da 2")
- Nessuna membrana, soluzione di riempimento, o cartuccia
- Non richiede movimenti di acqua, flusso, o pulizia frequente
- Memoria non volatile 260.000 valori (nessuna perdita di dati in caso di batterie scariche)
- Modbus®RTU (RS485)
- Software user-friendly
- Tecnologia a fluorescenza
- Non richiede nessuna capsula di ricambio
- Non richiede calibrazione frequente

Caratteristiche Tecniche

- Diametro sonda: 42,2 mm
- Materiale sonda: Epossidico, PUR, e PVC
- Cavo immergibile: disponibile PU, PE o FEP
- Direct modbus Read Output: 32-bit IEEE floating point
- Range temperatura operativa raccomandato: 0° C a 55°C
- Materiale tubo: Acetale AISI 316 o titanio
- Materiale guarnizioni: Fluoropolimero e PTFE
- Connettore terminale: disponibile
- Comunicazione: RS485 Modbus, RTU
- Range temperatura di conservazione[1]: -20°C +80°C

[1] conservazione senza batterie

Acquisizione Dati

Memoria	260.000 valori
Modalità di registrazione	Variabile, definibile dall'utente, logaritmica
Baud Rate programmabile	9.600, 19.200, 38.400
Frequenza di acquisizione	Massimo 8 misure al secondo
Software	Free
Formato file	.xls/.csv/.a4d

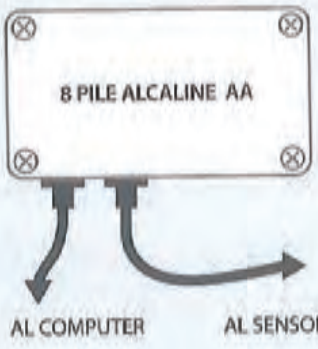
Sensore

Range di misura	0 – 25 ppm
Precisione	1% della lettura o 0,02 ppm (qualunque sia il maggiore)
Sensibilità/Risoluzione	0,01 ppm entro 4,00, 0,1 ppm oltre 4,0
Stabilità	0,01 ppm
Ripetibilità	0,01 ppm
Deriva sensore	minore di 1% all'anno
Range di temperatura	0° C a 55°C
Tempo di risposta	95% in meno di 60 sec
Pressione massima	70 mH2O

Alimentazione

Pacco batterie esterno 9-15 VDC

Disponibili altre opzioni di alimentazione



POWER PACK	
Materiale involucro	Policarbonato (1P67)
Dimensioni involucro	14 x 7.9 x 6.6 cm connettori esclusi
Alimentazione	12VDC (8 pile alcaline AA)
Connettori	1 porta di comunicazione 1-3 porte sensore

TORBIDITÀ

sonde per misure di Torbidità con protocollo modbus®RTU (RS485) con Datalogger integrato

Highlights

- Misura e registra la torbidità e la temperatura
- Modbus®RTU (RS485) ed interfaccia SDI-12 (grande flessibilità)
- Memoria non volatile 260.000 valori (nessuna perdita di dati in caso di batterie scariche)
- Tempo di warm-up programmabile
- Software user-friendly
- Spazzole tergicristallo sostituibili

Caratteristiche Tecniche

lunghezza: 40,34 cm con bardatura cavo 41,97 cm con adattatore NPT	**Comunicazione:** RS485 Modbus RTU, SDI-12 (ver. 1.3)
Diametro sonda: 33 mm	**Materiale sonda:** Composito
Materiale tubo: Acetale AISI 316 o titanio	**Materiale guarnizioni:** Fluoropolimero e PTFE
Cavo immergibile: disponibile PU, PE o FEP	**Connettore terminale:** disponibile
Range temperatura operativa raccomandato: 0° C a 40°C	**Range temperatura di conservazione[1]:** -20°C +50°C
Direct modbus Read Output: 32-bit IEEE floating point	[1] conservazione senza batterie

Acquisizione Dati

Memoria	260.000 valori
Modalità di registrazione	Variabile, definibile dall'utente, logaritmica
Baud Rate programmabile	9.600, 19.200, 38.400
Frequenza di acquisizione	Massimo 2 misure al secondo
Software	Free
Formato file	.xls/.csv/.a4d

Alimentazione

Pacco batterie esterno	9-15 VDC

LA GAMMA È DISPONIBILE ANCHE CON INTERFACCIA ANALOGICA, RS232. SDI-12, CON CARATTERISTICHE:

Range	fino a 5.000 NTU
Profondità massima	100 metri
Ottiche	utilizza ottiche 90° e luce infrarossa per ISO7027
Modulazione	unica modulazione che assicura rigetto quasi totale di luce fluttuante ambientale

Risoluzione

Range	RS232/SDI-12	Analogico
40 NTU	± 0,01 NTU	± 0,06 NTU
100 NTU	± 0,02 NTU	± 0,15 NTU
400 NTU	± 0,1 NTU	± 0,6 NTU
1.000 NTU	± 0,2 NTU	± 1,5 NTU

Sensore

Range di misura	0 – 1.000 NTU
Precisione	±2% o ±2 NTU @ 25°C (qualunque sia il maggiore)
Ripetibilità	±2% @ 25°C
Range di temperatura	0° C a 40°C
Tempo di risposta	95% in meno di 60 sec
Pressione massima	50 mH2O

SONDA MULTIPARAMETRICA

sonde per misure di pH, ORP, temperatura, Conducibilità, Salinità, TDS, livello, ossigeno disciolto, Torbidità (a seconda della configurazione) con protocollo modbus®RTU (RS485) con Datalogger integrato

Highlights

Interfaccia Modbus® ed SDI-12 - grande flessibilità	Memoria non volatile
Network RS485	Design modulare –in base ai parametri e le esigenze dei dati
Flessibile. Programma Windows-based	Visualizzazione in real time
Facile esportazione in fogli di calcolo o database	Opzione per lettura direta – utilizzi con pannelli o RTU/PLC
Opzioni cavo in PE, PU, e FEP	Alloggia in piezometri 2"

Caratteristiche Tecniche

Adattatore	Materiale: Acetale Scarico della trazione incluso	Comunicazione	RS485 Modbus RTU SDI-12 (ver. 1.3)
Involucri sensore	Materiale tubo: Acciaio inox 316 o Titanio Materiale guarnizioni: Fluoropolimero e PTFE	Direct modbus Read Output	32-bit IEEE floating point
		Output SDI-12	ASCII
Cavo	Diametro: 7mm max Punto di rottura. 62,7 kg Lunghezza massima: 610 metri Peso: 1,8 kg / 30 metri	Alimentazione	Esterna 12 VDC

Range, Risoluzione, Precisione

	RANGE	RISOLUZIONE	PRECISIONE
Livello/pressione Assoluta PSI Assoluta mH_2O Assoluta FtH_2O	 100 PSI 70 mH_2O 231 FtH_2O	16 bit	± 0,05 F.S. Tipica ± 0,1% F.S. Massima (B.F.S.L. 20°C)
Conducibilità	0-100 mS/cm	0,001 mS/cm	± 0,5% del valore misurato
Salinità	0-70 PSU	0,01 PSU	± 1% della lettura o 0,1 PSU (qualunque si il maggiore)
TDS	4,9 – 49.000 mg/l	0,1 mg/l	± 0,5% del valore misurato
pH	1-14 unità pH	0,01 unità pH	± 0,2 unità pH
ORP	±1.200 mV	0,01 mVH	0,1 mVH
Ossigeno disciolto	0-25 ppm	0,01 ppm se <4,00 ppm 0,1 ppm se >4,00 ppm	1% della lettura o 0,02 ppm (qualunque si il maggiore)
Torbidità	0-1.000 NTU	±3 NTU	2% @ 25°C
Temperatura	-5°C a 60°C	0,1°C	± 0,5°C

Configurazioni disponibile in 5 configurazioni standard (per ulteriori configurazioni contattare STS)

	Opzione 1	Opzione 2	Opzione 3	Opzione 4	Opzione 5
Livello/Pressione	X	X	X	X	X
Conducibilità/Salinità/TDS	X	X	X	X	X
pH/ORP			X	X	X
Ossigeno disciolto	X			X	
Torbidità		X	X		
Temperatura	X	X	X	X	X

VART910

sistema di acquisizione e trasmissione dati

Descrizione

Il sistema di acquisizione e comunicazione ANYlogg è stato progettato da SIAP+MICROS come sistema ci acquisizione/comunicazione compatto ed economico per essere associato a sensoristica o sistemi, con uscita seriale.

A seconda del tipo di applicazione può essere alloggiato in contenitori diversi, con o senza un sistema integrato di alimentazione a batterie. In tutti i casi sul dispositivo possono essere programmate sia la frequenza di acquisizione dei dati, sia la frequenza di invio degli stessi con diversi protocolli, FTP, http, SMTP (email), oppure tramite SMS. ANYlogg può altresì essere dotato di ricevitore GPS integrato allo scopo di georeferenziare il dato oppure per la sincronizzazione dell'orologio interno.

Il sistema è stato progettato per avere bassissimi consumi e per poter essere impiegato anche in sistemi sprovvisti di alimentazione esterna.

Peculiarità del Prodotto

Il sistema di acquisizione e comunicazione ANYlogg, è stato progettato per l'interfacciamento con sistemi e sensori con uscite seriali di tipo RS232, RS485, RS422 e SDI-12. Le sue funzionalità base sono l'acquisizione di dati ed il trasferimento tramite la rete pubblica telefonica (xG). Il dispositivo può essere programmato sia per la registrazione dei dati scambiati sulle porte seriali, così come possono essere implementati comandi per l'interfacciamento con sistemi e sensori di tipo intelligente, previa disponibilità della relativa documentazione o l'utilizzo di protocolli standard (Es. MODBUS). Il dispositivo è in grado di alimentare (ON/OFF) apparecchiature esterne ad una tensione di 5 o12 Vdc. ANYlogg è dotato di due ingressi digitali a cui può essere collegato un sensore con uscita ad impulsi (Es.: pluviometro), oppure a cui può essere associato un comando per lo svolgimento di una funzione.

Il dispositivo è altresì dotato di due uscite digitali per l'interfacciamento con altri dispositivi esterni.

Caratteristiche Tecniche

Alimentazione:	4÷32 Vdc – max 4 A
Assorbimento di corrente in shut-down:	< 500 µA
Alimentazione stabilizzata per dispositivi esterni:	configurabile 5 o 12VDC 500mA
Unico connettore di interfaccia	
RTC interno con batteria al litio	
SIM Card:	Sim Card slot o, in alternativa, SIM-on chip integrata
LED:	LED di segnalazione corretta alimentazione, copertura di rete e stato chiamata
Ingressi:	2 ingressi digitali con pull-up interno (20kΩ) a 3V per contatti o circuiti open-drain con protezione ESD integrata
Uscite:	2 uscite OPEN DRAIN 500mA 24V
Bus di comunicazione condiviso utilizzabile come:	RS232 (RX, TX, DTR) RS485 RS422
Bus di comunicazione dedicato:	SDI-12 per l'interfacciamento con sensori esterni
Watchdog hardware interno	

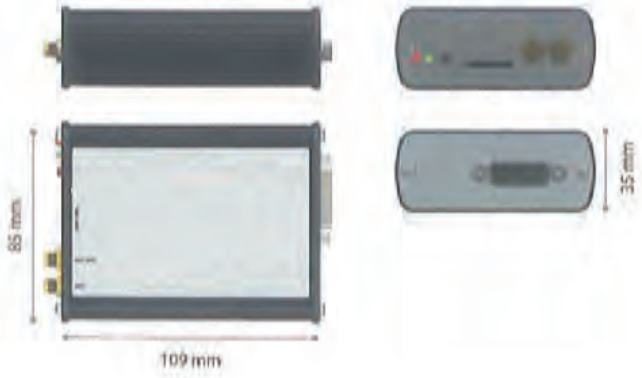
Versioni

Connettività 2G:	GSM / GPRS
Connettività 3G:	HSDPA (UMTS)

Possibili Opzioni

- **Pacco batteria al litio per alimentazione interna**
- **Box IP68**
- **Box con pannello solare 5W e batteria tampone**
- **Antenna esterna ad alto guadagno**
- **Ricevitore GPS: A-GPS/Frequency=L1/monitor up to 28 channels**

Dimensioni



DL/OCS CONDOTTA

sonde per misura e registrazione di pressione in condotta

Caratteristiche Tecniche

Campo di pressione	[mH_2O]	2 ... 5	> 5 ... 20	> 20...250
Sovrapressione		≥ 3bar	3 x FS (≥ 3bar)	3 x FS
Precisione	[± % FS]	≤ 0,15	≤ 0,05	≤ 0,03
Stabilità a lungo termine (1 anno) (tipico/max)		≤ 0,5%FS/< 4mbar	≤ 0,2%FS/< 4mbar	≤ 0,1%FS/< 0,2%FS

	Campo di misura	risoluzione
Misura di pressione	0...250 mH_2O	21 bit

Datalogger

Grandezze misurabili	Livello o pressione
Risoluzione	21 bit
Orologio	Orologio con precisione al quarzo; data e ora di avvio dell'acquisizione configurabile
Memoria	500.000 misure, non volatile, i dati rimangono memorizzati anche senza batteria, ogni valore misurato è provvisto di ora e data
Interfaccia	RS485
Identificazione	Ogni data logger possiede un numero di serie inequivocabile e una designazione liberamente selezionabile dall'utente
Alimentazione	Batteria al litio da 3.6 V / forma costruttiva AA (batteria sostituibile dall'utente)

Software per la configuarzione e lo scarico dei dati

Requisiti del sistema	PC o notebook IBM compatibile, potenza del processore min. 200 MHz, memoria del disco fi sso min. 50 MByte, memoria di lavoro min. 64 MByte. Interfaccia seriale libera (a 9 o 25 poli con adattatore) o porta USB con adattatore sistema operativo Windows 98 / 98 SE / ME o superiore (32 bit). NT a partire dalla versione 4 (min. Service Pack 6 e Internet Explorer a partire dalla versione 6.0) / 2000 / XP
Trasferimento dati	Lettura dati ad ogni serie di misurazioni, lettura di tutti i dati memorizzati, lettura dei dati in funzione del tempo
Configurazione	Intervallo di misura e memorizzazione. Registrazione di dati in una fi nestra temporale definita. Denominazione di punti di misurazione. Taratura dello zero. Valori di soglia: Impostazione densità del fluida . Avvio acquisizione in funzione di valori soglia o del tempo.
Formato dati	I dati vengono salvati nel formato TXT, CSV o XML.

ESS III acqua

sonde per misura e registrazione di pressione, con display

Campi di applicazione

Misura e registrazione dati per:

- Analisi nelle reti di distribuzione
- Prove di tenuta
- Monitoraggi di esercizio di reti idriche

Dimensioni e attacchi al processo

Diametro:	108 mm
Profondità:	143 mm
Peso:	1,2 kg

Attacchi al processo:	1/2" (maschio) 1/8" (femmina) altri su richiesta

Classe di protezione

Classe involucro:	IP68

Campi di misura

Range di misura standard:	0...10 bar Assoluto 0...25 bar Assoluto 0...100 bar Assoluto
Altri range di misura a richiesta:	100 mbar ... 600 bar

Precisione:	± 0,09% del F.S.
Errore di temperatura:	Inferiore a +/- 0,05 % per intervallo di 10°C da -20°C a +40°C o stabilità <= a 5 mbar per 15°C in base a G469

Esercizio

Durata batteria:	8 anni con intervallo misura 1 min 1 anno con intervallo 1 sec da 1 a 3 mesi con intervallo di 125 msec

Intervallo di manutenzione:	Calibrazione consigliata ogni 1-3 anni Annuale in rispondenza alla normativa DKD Su richiesta calibrazione in fabbrica

Funzioni

Visualizzazione a display di:	Valori effettivi Valori minimi/massimi Differenza valori % memoria utilizzata Stato batteria
Impostazione di:	Data e ora Intervallo di misura 125 msec ... 6 ore Soglia di allarme superiore ed inferiore
Risoluzioni:	Nome località di misura (30 caratteri) Modalità risparmio batteria

Settaggi mediante:	Tastiera. Cavo interfaccia e software TfsWin III
Memorizzazione:	250.000 valori singoli
Software:	TfsWin III per scarico e visualizzazione dati EsapPro III per visualizzazione ed analisi dei dati disponibile per postazione singola o come soluzione server

ESS III gas

sonde per misura e registrazione (e temperatura), con display

Campi di applicazione

Misura e registrazione dati per:

- Analisi guasti nelle reti di distribuzione
- Prove di tenuta
- Monitoraggi funzionali in sistempi di regolazione di pressione gas

Dimensioni e attacchi al processo

Diametro:	108 mm
Profondità:	80 mm
Altezza:	162 mm
Peso:	1,2 kg
Attacchi al processo:	1/2" (maschio) 1/8" (femmina) altri su richiesta

Classe di protezione

Protezione antideflagrante:	Ex II 2G EEx ib IIC T4
Classe involucro:	IP67

Campi di misura

Range di misura standard:	0...100 mbar Relativo 0...250 mbar Relativo 0... 1 bar Relativo 0...2,5 bar Relativo 0...10 bar Relativo 0...25 bar Assoluto 0...100 bar Assoluto
Altri range di misura a richiesta:	2,5 mbar ... 600 bar
Range di misura standard, differenziale:	0... 100 mbar 0... 1 bar 0... 10 bar
Precisione:	± 0,09% del F.S.
Errore di temperatura:	inferiore a +/- 0,05 % per intervallo di 10°C da -20°C a +40°C o stabilità <= a 5 mbar per 15°C in base a G469

Esercizio

Durata batteria:	8 anni con intervallo misura 1 min 1 anno con intervallo 1 sec da 1 a 3 mesi con intervallo di 125 msec
Intervallo di manutenzione:	Calibrazione consigliata ogni 1-3 anni Annuale in rispondenza alla normativa DKD Su richiesta calibrazione in fabbrica

Funzioni

Visualizzazione a display di:	Valori effettivi Valori minimi/massimi Differenza valori % memoria utilizzata Stato batteria
Impostazione di:	Data e ora Intervallo di misura 125 msec ... 6 ore Soglia di allarme superiore ed inferiore
Risoluzioni:	Nome località di misura (30 caratteri) Modalità di memorizzazione (anello chiuso/stopmode) Modalità risparmio batteria
Settaggi mediante:	Tastiera Cavo interfaccia e software TfsWin III
Memorizzazione:	250.000 valori singoli
Software:	TfsWin III per scarico e visualizzazione dati EsapPro III per visualizzazione ed analisi dei dati disponibile per postazione singola o come soluzione server

DPK III

Kit per prove di tenuta/collaudi

Produzione di rapporti dei test di pressione in loco mediante stampante o batterie o mediante Pc con TfsWin III o EsapPro III

Campi di applicazione

- Verifiche della pressione secondo i nuovi G469 e W400-2
- Prove di tenuta in condotte gas, acqua, canali di scarico e serbatoi

Componenti del kit

ESS III Gas: con sensore di temperatura, senza sensore di temperatura

- Valigetta con stampante incorporata
- Alimentatore
- Manuale d'uso
- Guida rapida
- Software
- Cavo di interfaccia RS 232
- Rotolo di carta sostitutivo
- Tubo flessibile di collegamento (raccorderia mini presa)
- Adattatore G 1/2 raccorderia mini presa

Classe di protezione

Strumenti di misura	
Classe di protezione:	EX II 2G EEx ib IIC T4
Classe involucro:	IP68

Valigia

Protezione antideflagrante:	priva di protezione EX
Classe involucro:	IP54

Dimensioni

Larghezza:	412 mm
Profondità:	390 mm
Altezza:	135 mm
Peso:	4,2 kg

Collegamenti Valigetta:	Caricabatteire 1/2" maschio e 1/8" femmina*2 Attacco per sensore di temperatura*1
Collegamenti Strumenti di misura:	1/2" maschio*2 e 1/8" femmina*2 Attacco per sensore di temperatura*1

*1 Esclusivamente per kit dotato di sensore di temperatura *2 Medesimo attacco

Funzioni

Visualizzazione a display di:	Valori effettivi Valori minimi/massimi Differenza valori % memoria utilizzata Stato batteria
Settaggi mediante:	Tastiera Cavo interfaccia e software TfsWin III
Memorizzazione:	250.000 valori singoli (fino 100 test di pressione)
Software:	TfsWin III per scarico e visualizzazione dati EsapPro III per visualizzazione ed analisi dei dati disponibile per postazione singola o come soluzione server

Impostazione di:	Data e ora Intervallo di misura 125 msec. ... 6 ore Soglia di allarme superiore ed inferiore Medie di 2 ... 600 valori Risoluzione Nome località di misura (30 caratteri) Modalità di memorizzazione (anello chiuso/stopmode) Modalità risparmio batteria Pressione di verifica minimo Durata del test di pressione da 10 sec a 365 giorni Calo di pressione massimo Compensazione temperatura*

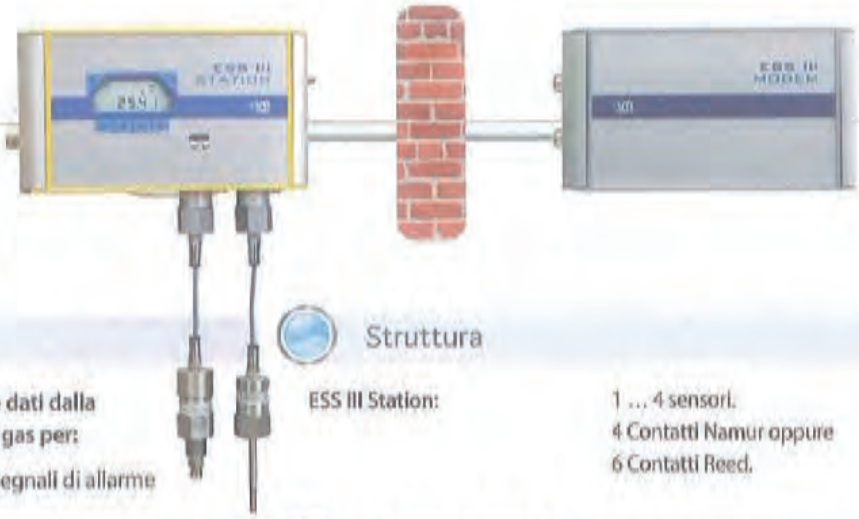
* solo per apparecchi con sensore di temperatura.

Campi di misura e Esercizio

Vedi ESS III Gas

ESS III station

sistema di registrazione dati di pressione, temperatura e quantità



Campi di applicazione

Misura, memorizzazione e trasmissione dati dalla stazione di regolazione della pressione gas per:

- controllo funzionale e trasmissione di segnali di allarme

Struttura

ESS III Station:	1 ... 4 sensori. 4 Contatti Namur oppure 6 Contatti Reed.

Classe di protezione

Protezione EX:	Ex II 2G EEx ib II B T4
Protezione involucro:	IP54

Involucro (sensori esclusi)

Larghezza:	286 mm
Profondità:	99 mm
Altezza:	169 mm
Peso:	3,5 kg
Collegamenti:	Alimentazione esterna Modem ESS III contatti Namur oppure Reed
Collegamento sensore:	4 ingressi M30x1
Campo di temperatura:	-20°C ... +60°C

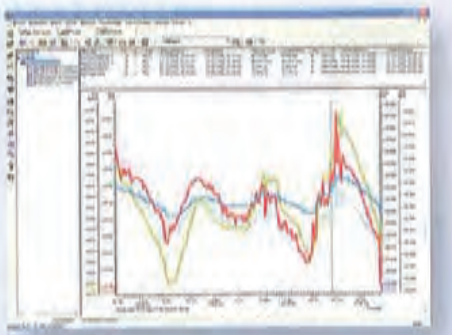
Esercizio

Durata batteria:	10 anni con intervallo misura 1 min. 2 anni con intervallo misura 1 sec.

Campi di misura

Range di pressione standard:	0...100 mbar Relativo. 0...250 mbar Relativo. 0...1 bar Relativo. 0...2,5 bar Relativo. 0...10 bar Relativo. 0...25 bar Assoluto. 0...100 bar Assoluto.
Sensore di pressione differenziale:	0...100 mbar 0...1 bar 0...10 bar
Precisione:	± 0,09% del F.S.
Errore di temperatura:	inferiore a +/- 0,05 % per ogni 10°C tra i -20°C e i +40°C del fluido
Sensore di temperatura:	-10°C...+40°C -20°C ...+150°C
Risoluzione:	0,01°C
Precisione:	± 0,3°C
Impulso:	0,05 Hz...2000 Hz
Contatto Namur	
Sensori speciali su richiesta	

Sistema



Software di visualizzazione ed elaborazione EsapPro III.

Visualizzazione, elaborazione e archiviazione dei dati di misura.

FREATIMETRO MLS/MLS-T

misuratore di livello in pozzi e piezometri a cavo piatto (MLS) o cavo tondo (MLS-T)

Cavo

A cavo piatto mod. MLS: cavo piatto in PVC a due conduttori in acciaio: facilità di lettura grazie alla graduazione in centimetri, decimetri, metri (in rosso). Disponibile in qualsiasi metratura perché di produzione interna.

A cavo tondo mod. MLS-T: cavo tondo (diam. 4,7 mm) a quattro conduttori, con anima in kevlar e guaina esterna di protezione graduazione ogni centimetro (stampata sul cavo e protetta dalla guaina esterna in poliuretano antigraffio trasparente)

Puntale Rilevatore

Diametro 12 mm (10mm su richiesta) in acciaio inox AISI316 in unico pezzo, studiato per pozzi idropotabili ed anche per siti contaminati. Isolanti in PVC, internamente immerso in resina, guaina superiore termo restringente.

Tamburo Avvolgicavo

Supporto in acciaio tubolare, bobina in PVC rigido. Freno anti-svolgimento involontario. Portasonda.

Strumentazione

Scheda elettronica con segnalatore acustico e luminoso. Tasto per effettuare test di prova.

Dimensioni

MODELLO	DIMENSIONI IN MM Prof.	Altezza	Largh.	Kg
MLS 20	150	350	260	1,5
MLS - MLS-T 30	150	350	260	2.0
MLS - MLS-T 50	150	350	260	2.5
MLS - MLS-T 100	200	350	260	4.0
MLS - MLS-T 150	200	400	300	6.0
MLS - MLS-T 200	200	400	300	7.0
MLS - MLS-T 250	200	400	300	8.0
MLS - MLS-T 300	350	450	850	10.0
MLS 350	350	450	850	11.0
MLS 400	350	450	850	12.0
MLS 500	350	450	850	15.0

Alimentazione

Batteria 9V alloggiata in un vano portabatteria solidale con il disco portascheda estraibile dall'esterno per sostituzione.

Trimmer

Regolazione della sensibilità accessibile dall'esterno:
- tutto aperto: suoneria sempre in funzione
- tutto chiuso: suoneria non in funzione
- posizione media ottimale

FREATIMETRO MLT

misuratori di livello e temperatura

Descrizione

Strumento per la misura del livello freatico e della temperatura in pozzo o piezometro. Disponibile anche la versione con puntale che segnala il fondo foro. Può anche essere utilizzato in fori di sondaggio, anche in assenza di falda, per la misura del gradiente geotermico

Cavo

Cavo tondo diametro 4,7mm a quattro conduttori in rame con anima in Kevlar, gradazione ogni centimetro stampata sul cavo e protetta con guaina esterna in poliuretano antigraffio trasparente.

Puntale Rilevatore

In acciaio inox, diametro 12 mm. Pesi in ottone.

Dimensioni

MODELLO	KG
MLT-30	1,5
MLT-50	2,0
MLT-100	4,0
MLT-150	6,0
MLT-200	7,0
MLT-250	8,0
MLT-300	10,0

Precisione

Precisione +/- 0,1°C, tolleranza a fondo scala di 0,5 °C. Il sensore rilevatore di temperatura è tarato per un campo di lettura temperature compreso tra 0°C e +100°C.

CORRUGATO

PALMARE
Pocket PC

SOFTWARE

CAVO DI INTERFACCIA
DL/N 70 - PC

ACCESSORI GSM
USB modem

VERSIONE CONNETTORE IMMERGIBILE

ACCESSORI GSM
Antenne di espansione

BATTERIE
DL e GSM

DIVERSE ESECUZIONI ED ATTACCHI
MECCANICI DISPONIBILI

ADATTATORE PER BATTERIE
DL

GANCIO DI SOSTEGNO
per sensori di livello

TESTE DI CHIUSURA POZZO
2" e 4"

Compatibilità Elettromagnetica

tutti i trasduttori sono rispondenti alle seguenti normative

Sollecitazioni meccaniche:	EN 60068-2-6 EN 60068-2-27	Vibrazioni Shock	10g (4…2000 Hz, deviazione ± 10 mmpp) 100g (durata dell'impulso)	
Emissioni:	EN 50022, classe B	<30dbµV/m (0.03…1 GHz)		
Immunità:	EN 61000-4-2	Norma generica sull'immunità	8 kV contatto, 15 kV aria	
	EN 61000-4-3	Scariche elettrostatiche	10V/m, 0.08…2,7 GHz, 80%AM 1kHz, 3s	Radiotrasmettitori e telefoni cordless
	EN 61000-4-4	Transienti rapidi (burst)	4 kV	Valvole e motori
	EN 61000-4-5	Tensione impulsive (surge)	Line-Line: 0,5 kV/42 Ω Line-Earth: 1 kV/42 Ω	Fulmine
	EN 61000-4-6	Interferenze elettromagnetiche	10 V, 0,15…80 MHz 80%AM 1kHz, 3s	Radiotrasmettitori e telefoni cordless

CE Il trasduttori di pressione sono conformi per le emissioni e l'immunità a quanto indicato nella direttiva comunitaria EMC EN 61000

CASA MADRE

STS Sensor Technik Sirnach AG

FILIALI

STS France

STS Germany GmbH

STS Italia s.r.l.

STS Great Britain Ltd.

AGENZIE

STS Sensor Technik Sirnach AG dispone di una estesa ed eccellente rete internazionale di distribuzione.

Per ogni richiesta inviateci una mail al sito www.sts-italia.it oppure contattate il nostro customer service: +39 02 57607073

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GEOScene3D

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GEOScene3D

...by I•GIS

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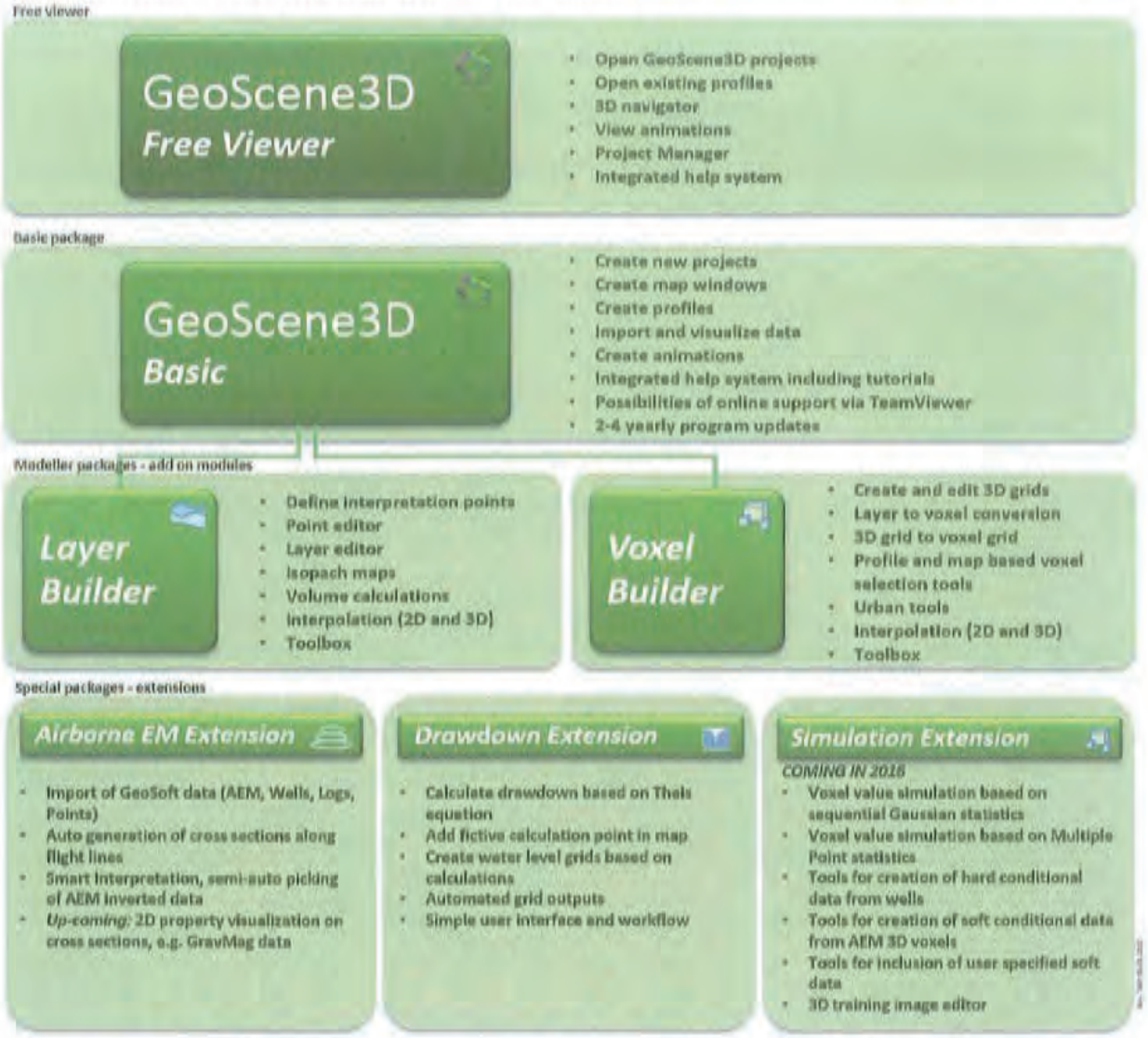
GeoScene3D - Modules & Extensions

GeoScene3D Modules and Extensions

To meet the varying needs of our end users, GeoScene3D is offered as a series of modules and extensions. This enables the end user to tailor the software to the organizational requirements.



GeoScene3D – Free Viewer

The Free Viewer is a free inspector, making it possible for everybody to open existing GeoScene3D projects and inspect them in full 3D.

GeoScene3D - Basic

The Basic package is the entry level of GeoScene3D. This enables the end user to open existing projects and create new projects, import and visualize new data, create and work with different animations and visualizations of data in maps, profiles and in 3D.

GeoScene3D - Builder Modules

The Builder Modules enables the user to build new geological models: The Layer Builder is used for making layer based models and the Voxel Builder is used for voxel models. The modules include a number of guiding wizards, access to editors, interpolation, geostatistical algorithms and tools for evaluating and calculating relevant properties of the generated models, e.g. volume calculations etc. Also included is the *Toolbox*, a companion program holding a series of useful tools when working with grids and models.

GeoScene3D - Extensions

The GeoScene3D extensions are special functionalities directed towards a specific purpose of group of users, e.g. users working with Airborne EM data, or users requiring calculation of drawdown when pumping etc.

For further information, please contact the GeoScene3D Team at *support@geoscene3d.com*

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GeoScene3D - Pricelist

Single License

GeoScene3D single module licenses

Module	Purchase	Yearly maintenance	Maintenance price
Viewer	Free	none	none
Basic	3.450 €	20% of purchase	690 €
Layer Builder*	3.050 €	20% of purchase	610 €
Voxel Builder*	3.050 €	20% of purchase	610 €

**Layer and Voxel Builder require a Basic module.*

GeoScene3D module extensions

Extension	Purchase	Yearly maintenance	Maintenance price
Airborne EM*	2.700 €	30% of purchase	810 €
Drawdown**	2.000 €	30% of purchase	600 €

**Airborne EM Extension - requires the Layer Builder module*
***Drawdown Extension - requires the Basic module.*

All prices listed are excluding tax and inclusive 1 year of maintenance (approx. 2 annually program updates).

Predefined Package Deals

To simplify your choice of license, we have prepared a set of packages for your consideration.

The Geological Layer Modelling Package

Module	Purchase	Yearly maintenance	Maintenance price
Basic	3.450 €	20% of purchase	690 €
Layer Builder*	3.050 €	20% of purchase	610 €
Airborne EM Extension	2.700 €	30% of purchase	810 €
Total Price	9.200 €		2.110 €

Geological Administrator Package

Module	Purchase	Yearly maintenance	Maintenance price
Basic	3.450 €	20% of purchase	690 €
Drawdown Extension	2.000 €	30% of purchase	810 €
Total Price	5.450 €		1.500 €

For customers purchasing a Package Deal, a complementary "Getting Started" online course is included. The online course takes you through all the basic steps in using GeoScene3D, and includes a series of comprehensive tutorials and concrete examples.

Please contact the GeoScene3D Team for a special quote at *support@geoscene3d.com*

Volume license

Volume licenses are introduced to provide access for multiple users at a favorable price. Each license is linked to a specific computer and the annual maintenance is at a fixed price and not dependent on the number of users. If you already have purchased GeoScene3D licenses you may easily benefit by upgrading to a volume license, as we offer favorable rates on purchase as well as maintenance.

If you are considering a volume license, please contact the GeoScene3D Team and together we will find the best suitable set-up to meet with your specific requirements.

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GeoScene3D

GeoScene3D is a 3D Geological modelling software for visualizing geoscience data, building geological models in order to distribute the results to stakeholders. The software is well suited for geoscientists in public and private organizations working with engineering geology, groundwater, soil contamination or other tasks involving compilation and interpretation or visualization of a variety of data types.

Designed and build for Geologists

GeoScene3D facilitates visualization of a broad range of geoscience data. For example wells, geophysical data, soil and water chemistry, terrain surfaces and geological layers. Furthermore, it is also possible to build geological models on the software in a well-defined modelling process. From the manual, or semi-automated production of layer interpretation points, through the generation of layer surfaces using advanced interpolation techniques to the final export of layer surfaces for further processing in other software, like FeeFlow, Modflow or similar.

GeoScene3D is the standard platform for geoscience data in Denmark and is continuously developed in collaboration with the Danish Geological Survey (GEUS), the Danish Nature Agency and all major Danish engineering companies. The variety of the context of our users and the focus on the work related tasks they face, have resulted in practical, versatile and robust software with the functionality to handle everyday practical problems facing the working geologist in many situations, both private and public.

Data Types and formats

GeoScene3D support a variety of data types and have import wizards in place, making it easy to visualize your data.

Some examples of data types currently used in GeoScene3D:

- TEM, Airborne TEM
- DC
- MRS
- Seismic data, SEGY
- Well data
- Borehole logs
- Chemical data
- Digital terrain models
- Tabular data (e.g. database, CSV...)
- Map Data (shp, tab, tiff, bmp....)

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GeoScene3D

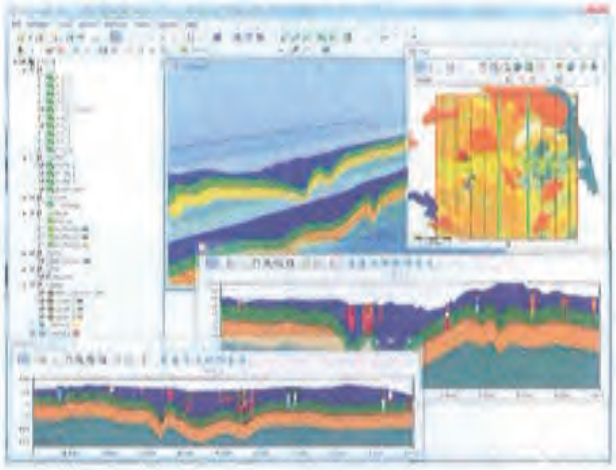
An overview of some of the currently supported formats:

Borehole data	GeoSoft XYZ, CSV, Jupiter, Database tables/views in ACCESS and Firebird.
1D Geophysical data (AEM, TEM, MRS,..)	GeoSoft XYZ, CSV, Gerda, Database tables/views in ACCESS and Firebird.
Log data	GeoSoft XYZ, CSV, LAS, Gerda/Jupiter, Database tables/views in ACCESS and Firebird.
2D Surfaces	Surfer Binary, Surfer ASCII, Arc View ASCII, Vertical Mapper Grid, CSV
3D Grids	Surfer Binary, Arc View ASCII, CSV
2D Points	CSV, tabular data/views in SQL Server, ACCSESS and Firebird.
Other	SEGY (Seismic data)

Modelling Tools

The GeoScene3D interface is based on 3 fundamental views on model and data, all integrated and interlinked:

- **Profiles.** Free drawing of profiles in maps and 3D. Handling of free moving profiles
- **GIS Maps.** Any number of GIS maps can be added to a GeoScene3D project. Accepts standard GIS format data (shape, TAB...) and WMS services
- **3D Scenes.** Any number of 3D camera views of the model



Tools for direct editing of surfaces, points, voxels, layer attributes etc. in all views are available. Easy to use Wizards guide the user throughout the modelling process. Export facilities for interpreted model elements are available and support several formats, including Modflow and FeFlow compliant files, Surfer Grids, CSV point and more.

Versions

GeoScene3D has 3 versions:

1. **Viewer** - *free of charge*
2. **Standard** - *for visualizing and analysing existing models and data*
3. **Editor** - *for model building*

Special offers for Academic use, please contact I•GIS directly.

	Viewer	Standard	Editor
Navigation	*	*	*
Objects on/off	*	*	*
Multiple 3D View's	*	*	*
Playing animations	*	*	*
Import of existing data		*	*
Creation of a project		*	*
Move scene extent		*	*
Symbols		*	*
Creation of animations		*	*
GeoCloud Enabled		*	*
Creation of new data			*
Editing points			*
Editing grids			*
Editing voxel models			*
Interpolation in 2D and 3D			*

More Information

Please visit our homepage at:
www.geoscene3d.com

or look by our youtube channel at:
www.geoscene3d.com/youtube

or contact us at:
support@geoscene3d.com

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GeoVoxler

GeoScene3D is a 3D Geological modelling software for visualizing geoscience data and building geological models. The software is well suited for geoscientists in public and private organizations working with engineering geology, groundwater, soil contamination, surface near water flow in the field of LAR and future climatic assessments or other tasks involving compilation and interpretation or visualization of a variety of data types.

About GeoVoxler

GeoVoxler is a specialized tool for building voxel models in GeoScene3D. It is an add-on module to the GeoScene3D Editor package.

Voxel models in GeoScene3D are based on regular 3D grids, where each grid cell defines a voxel. The size of the voxels in the grid are user defined. The voxels can be assigned different parameters, e.g. lithology, age, transmissivity, porosity etc. and can be used for several purposes from large to small scale models.

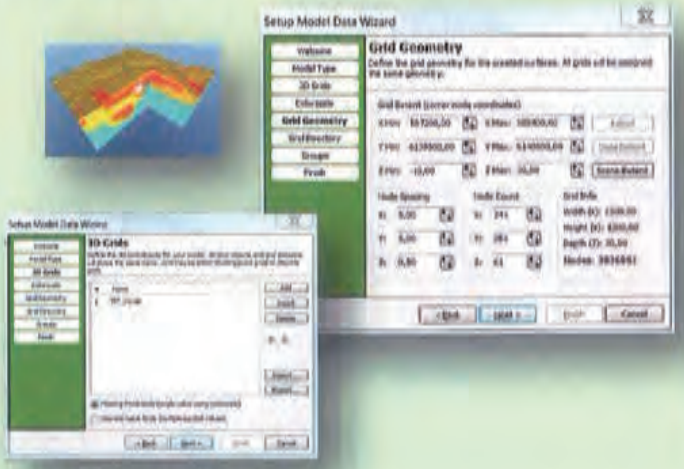
GeoVoxler contains several tools developed to assist the modeller in the modelling process: Layers, regions, shape-files etc. can be imported and used for visualization and/or selection and adding properties to voxels. These tools make it easy to implement e.g. human structures such as traces at pipelines and road beds, basements etc. into geological models, and make very detailed models in e.g. urban areas in relation to surface near hydrology and climatic changes.

Tools for blanking, selection, volume calculation and export are integrated in a simple user interface in GeoVoxler.

3D grids and voxel sizes

Voxel models in GeoScene3D are based on regular 3D grids, where each grid cell defines a voxel.

The size of the voxels in the grid are user defined.

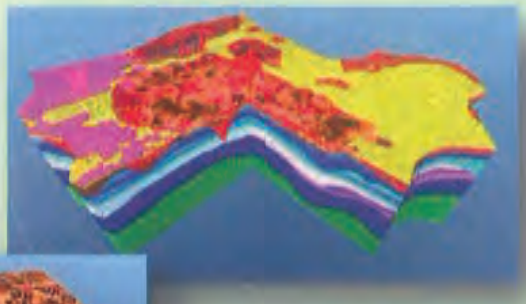


3D grids can be defined as

- *Floating Point Grid* (using single value colour scales, e.g. sand-clay content, transmissivity).
- *Discrete Value Grids* (using multiple symbol values, e.g. lithology, geological age).

The voxels can be assigned different parameters, e.g. lithology, age, transmissivity, porosity etc. and can be used for several purposes from large to small scale models. Several voxel grids can be linked in the modelling process.

Large scale geological model (1000 km², depth appr. 800 m, voxel cell size 100x100x 5m). Total number of voxels = 17.000.000.

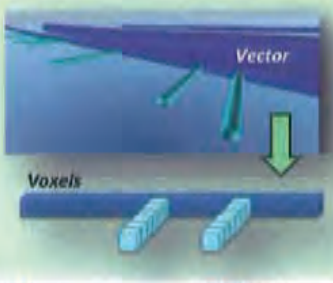


Small scale geological model (1.600 x 1.900 m, depth 20 m). Voxel cell size 5x5x0,5 m). Total number of voxels = 5.000.000.

Input data

It is possible to use many different kind of input data to visualize or select and fill out voxels, e.g.

- borehole information (databases, tabular data sets and bmp files)
- geophysical data
- layer boundaries (grid files)
- XYZ point information
- 3D grids
- vector based data (water pipes, roadbeds, basements etc.)
- 3D files (visualization only)



Borehole (database, bmp-file)

Vector themes in 2D

Buildings as shape- and 3ds files in 3D

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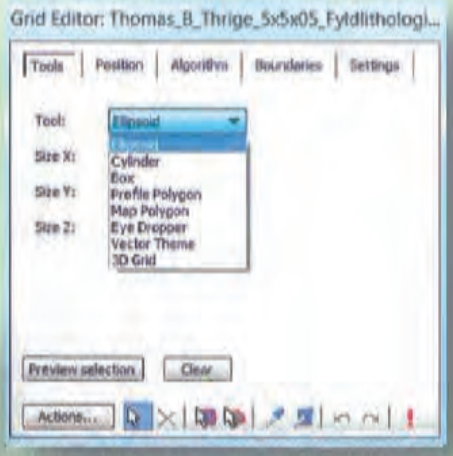
GeoVoxler

User interface

GeoVoxler is an add-on module to GeoScene3D Editor. Model setup and data import and -export are assisted by integrated wizards in GeoScene3D, which help the user during model setup.

The GeoVoxler user interface is simple and systematic, restricted to one window containing 5 tabs.



The user interface for creating voxel models in GeoVoxler.

Tools for voxel selection

A number of tools are available for selecting voxels in the 3D grids. The figure to the right shows the available tools for selecting voxels in GeoVoxler. Some tools are pre-defined shapes, which can be resized and positioned by the user (*Ellipsoid*, *cylinder* and *box*).

Profile Polygon Tool

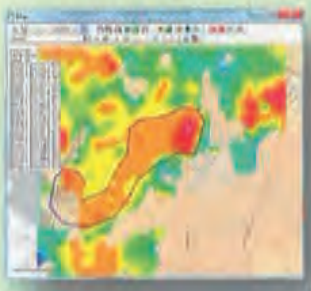
Tool used to manually define and draw a polygon on a cross section. The tool is useful when interpreting borehole data, geophysical data etc.

Polygon Tool used to select voxels based on geophysical resistivity.

Voxel selected in the figure to the left, assigned lithology (red colour; meltwater sand).

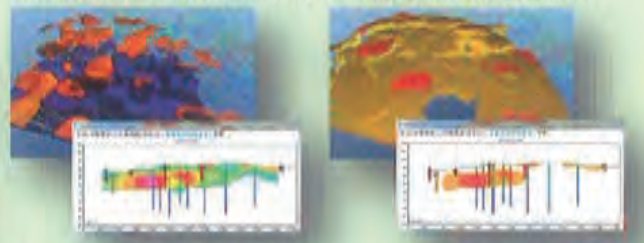
Map Polygon Tool

Tool used to manually define and draw a polygon on a map in the Map Window (example based on geophysical data). Vertical extend of selection is user defined.



3D Grid Tool

3D grids (e.g. geophysical data, plumes, lithology) can be used to select voxels in the voxel grid. 3D grids shown as iso surfaces can be useful in the process:



Examples of voxel selection and value assignment in a voxel grid based on different data types. Above (left) geophysical resistivity data shown as iso surfaces are used to define lithology in a voxel grid (upper right). Lower right shows soil samples (lithology) interpolated in 3D to be used in a voxel model.

Vector Theme Tool

Shape files can be visualized and used as a basis for selection and parameter assignment in a voxel grid.

Attributes (e.g. diameter or construction year) can be used in several ways, e.g. dimensioning and colouring a theme.

Vector theme (pipelines) used to select voxels in a voxel model. Diameter and material type has been used (attributes in table from shape file).

Traces surrounding e.g. pipelines or underneath roads, basements etc. can be dimensioned by the user.

Layer models to voxel models

Layers from e.g. a geological layer model can be imported (or interpolated by the use of interpretation points) and converted to voxels. Layers and regions can be used as limits.

Layers to voxels

Algorithms for calculating voxel values

Several algorithms has been developed to give the modeller different options to assign properties to the voxels in the voxel grid. Some of these are valuable to use when handling many kinds of data that interact in each other.

- *"Set"* allows the user to assign a fixed value to the selected voxels. It overrules predefined values.
- *"Add"* and *"Multiply"* respectively add and multiply a fixed value to the selected voxels.
- *"Blend"* is blending values if a voxel has a predefined valu

Detailed Voxel Modelling in Urban Areas – Development of New Tools in GeoScene3D

Tom M. Pallesen[1*], Niels-Peter Jensen[2], Rikke Jacobsen[2], Le Thon Vu[2], Susie Mielby[2], Torben Bach[2]

[1]i-GIS A/S, Denmark. [2]Geological Survey of Denmark and Greenland (GEUS), Denmark. *Corresponding Author: ttp@i-gis.dk

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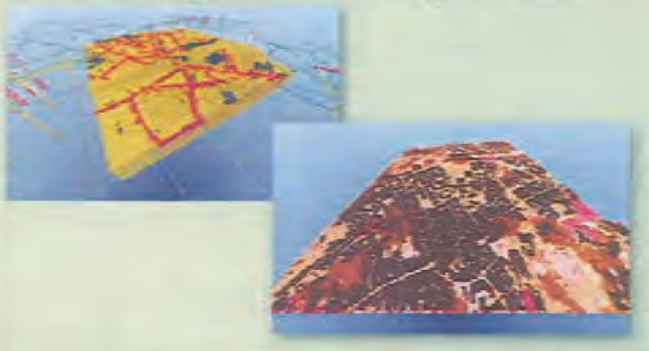
Algorithms and calculation of voxel values

Algorithm/calculations of resulting voxel value

Several algorithms has been developed to give the modeller different options to assign properties to the voxels in the voxel grid. Some of these are valuable to use when handling many kinds of data that interact in each other.

- "Set" allows the user to assign a fixed value to the selected voxels. It overrules predefined values.
- "Add" and "Multiply" respectively add and Multiply a fixed value to the selected voxels.
- "Blend" is blending values if a voxel has a predefined value.

The figures below shows two different voxel models from the same area – the upper simple model made by using the *Set* function, the lower by using the *Blend* function.



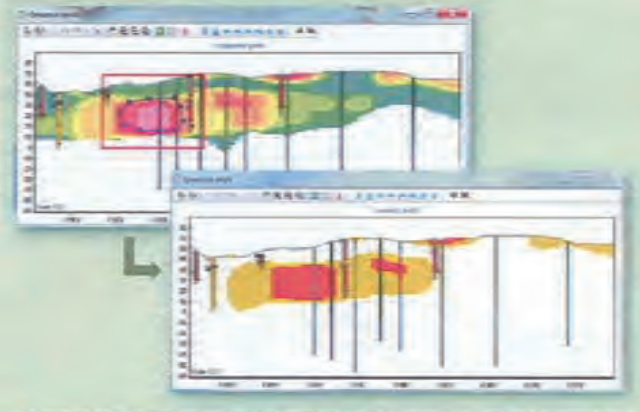
Limits (values, symbols, surfaces, regions)

The visualization and use of data in the voxel model can be controlled by using limits. Limits can select or isolate e.g. resistivity values within a given range from geophysical data, they can limit a selection by use of a region (e.g. a defined geological structure), they can select specific symbols (e.g. moraine clay from a lithological based voxel model), and finally surfaces can be used to select, cut or edit voxels in a grid

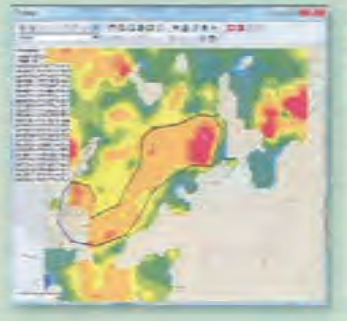
Other tools for voxel modelling

Manual selection of voxels by using the Profile- and Map Window polygon

In addition to the descripted tools where voxels are selected based on a vector dataset, voxels can be selected manually by using the profile based polygon tool.



Polygon selection(above) on the basis of geophysical resistivity data (upper) and the resulting voxels (lower) where the manually selected voxels are assigned a lithology (meltwater sand).



Polygon selection(left) on the basis of geophysical resistivity data based on the Map Window.

Colour scales, symbol lists and value scales

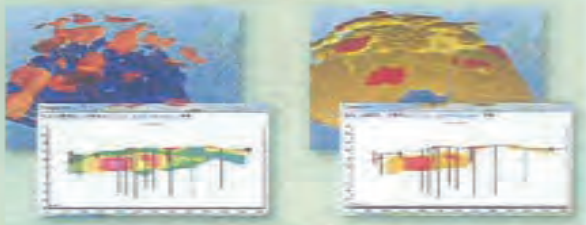
Colour scales and symbol lists can be created individually by the user, to fit the individual voxel models

Symbol list (lithology)

Colour scale (resistivity)

Manual selection of voxels by using limits

When working with geophysical data, voxels can be selected by using the isosurface function. One or more isosurfaces, representing user defined resistivities, can be used to select voxels and then add, fill or blend into the voxel grid. The figures below shows an example where two isosurfaces has been used in the process of building a geological (lithology) voxel model.



Isosurfaces (above left) for resistivities above 120 Ωm (brown) and below 10 Ωm (dark blue) and resistivities (cross-section to the left). These surfaces are used to select voxels and assign lithology, shown to the right. The "translation" from resistivities to lithology is based on the results of geophysical investigations in conjunction with borehole information. Yellow colours are meltwaterclay (low resistivities) and red colours are meltwater sand (high resistivities).

Conclusion

This project has shown, that it is possible to create an urban geological model, that takes the original geology into account and incorporates many human made features, that is vital for creating a more correct model of the urban subsurface, than without introducing the human made features.

The tools created in this project is now included in the GeoScene3D software package to be used in other cases.

About GeoScene3D

GeoScene3D is a geological modelling and visualization tool developed to create geological layer- and voxel models. It handles many different datatypes.

- GeoScene3D has been developed during the last 10 years in the context of the Danish groundwater mapping campaign. More than 200 models in context of the Danish groundwater mapping campaign have been made.
- GeoScene3D has more than 240 licensed user in Denmark, and nearly 50 licensed users worldwide.
- GeoScene3D is widely used in the fields of groundwater mapping, climatic assessments related to urban areas, geotechnics, contaminated field sites, geophysical surveys etc.

References

Pallesen, T. M. and Jensen, N.-P., 2015: Development of a 3D geological/hydrogeological model as basis for the urbane water cycle. Interactive modelling of the anthropogenic layer. *GEUS report (Geological survey of Denmark and Greenland) (Danish, in Press).*

Mielby, S. B. et al, 2015: Development of a 3D geological/hydrogeological model as basis for the urbane water cycle. Synthesis report. *GEUS report (Geological survey of Denmark and Greenland) (Danish, in Press).*

Sandersen, P. B. E., Kristensen, M. and Mielby, S. B., 2015: Development of a 3D geological/hydrogeological model as basis for the urbane water cycle. 3D geological/hydrogeological modelling. *GEUS report (Geological survey of Denmark and Greenland) (Danish, in Press).*

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Detailed Voxel Modelling in Urban Areas – Development of New Tools in GeoScene3D

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[1]i•GIS A/S, Denmark. [2]Geological Survey of Denmark and Greenland (GEUS), Denmark.
*Corresponding Author: tmp@i-gis.dk

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Background

Summary

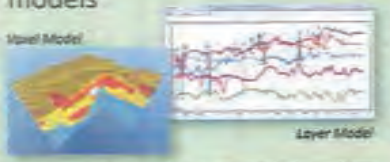
The case demonstrated in this e-poster is a part of a pilot project where new geological modeling tools and techniques has been developed in the geological modeling software GeoScene3D. The project is named *"Development of a 3D Geological/Hydrogeological Model as Basis for the Urban Water Cycle"*[MST] and is partly financed by VTU (Foundation for Development of Technology in the Danish Water Sector). The tool development is described in *"Development of a 3D Geological/Hydrogeological Model as Basis for the Urban Water Cycle – Interactive Modeling of the Anthropogenic Layer"*.

When a high level of details in a typical geological layer model are needed, the modeler often meets limitations due to practicalities by the maximum number of layers that can be handled in the model. In urban areas, the complexity of the near surface soil layers (the anthropogenic zone) are often very high due to human activities.

During the growth and development of cities over time, the uppermost soil layers has been repeatedly changed by landfill accumulation, building constructions and infrastructural elements such as roads and pipelines.

The poster shows practical examples of the use of the different tools in GeoScene3D used for the voxelization process, discusses some major challenges in the process due to data quality, shows an optimized workflow and the opportunities for the users, whatever the use is for climatic related work or contamination calculations and risk assessments.

Voxel models vs. layered models



Layer models are based on geological surfaces created e.g. by interpolating interpretation points, where a *voxel model* is based on a 3D grid defined by boxes (voxels). Layer and voxel models can serve as input to hydrological models. A layer in a layer model is defined by an upper and a lower surface, and generally assumes that sub surfaces layers are more or less parallel and nearly horizontal. In a voxel model no layers are defined – each voxel can be assigned a parameter, e.g. lithology, transmissivity or contaminant concentration. Layer models and voxel models can be integrated and used in combination.

Voxel models can handle a high level of detail and very complex geological structures but lacks the more systematic structure often seen in layer models.

Complex structures can be handled in a high level of details in voxel models, not practical possible in layer models.

Voxel Modelling – 3D grids

3D grids / voxel grids – definition and properties

GeoScene3D handles regular voxel grids. In GeoScene3D a voxel grid is defined by a 3D grid.

The maximum number of voxels in GeoScene3D is about 8 mill. For optimal performance, up to 4 mill. are recommended. The extent (X, Y, Z) and size of each voxels are defined by the user given the above limits.

3D grids can be defined as:

- Floating Point Grid (using single value colour scales, e.g. sand-clay content).
- Discrete Value Grids (multiple symbol values, e.g. lithology).

Input data

Voxel Model i GeoScene3D – Input Data

In GeoScene3D, it is possible to use different kind of input data for filling out voxels, e.g.

- Borehole information (databases, tabular data sets and bmp files)
- Geophysical data
- Layer boundaries (grid files)
- XYZ point information
- 3D grids
- Vector based data (water pipes, roadbeds, basements etc.)

These data can serve as a base for the assignment of values to the voxel model. By adding attributes to shape files, the modeler can make use of dimension of pipeline segments, material, year of construction etc.

Algorithms such as "relative" and "blend mode" are used to calculate a weighed mean of the individual voxels in cases where more than one dataset intersects a voxel. Furthermore, the knowledge of landfill composition by boreholes can be used in the voxel grid by 3D interpolation.

Water pipes, roads, buildings etc. shown in GeoScene3Ds Map Window.

Vectors to voxels

Shape files and attributes → voxels

2D Shape files (vector based) , which is very common available, representing e.g. urban structures can be used to select and apply voxel properties:

Vector Themes - "Voxelization" tools

When using vector themes to build your voxel model, it is possible to handle the themes in different ways – se figure to the right. Using the "Pipe" function, all voxels in the 3D grid that are in contact with the active theme can be selected and assigned a self-defined property.

The "Box" function allows the user to create a box, e.g. a roadbed under a road, consisting of e.g. gravel and sand. In this Way small and large scale human related "urban" structures can be handled physically.

The "Relative" function takes into account that often only a part of a voxel is influenced by a structure. Even with small voxels (e.g. 5x5x0,5 meter) a thin water pipe would be impossible to implement with this size of voxels.

Voxel selection

Tools for voxel selection

A wide selection of tools to select voxels and assign properties has been developed for making the modelling process more easy and to give the modeller the best opportunities to achieve the desired level of detail.

Tools for selection of voxels in a 3D grid. The tools defines a physical shape that surrounds and selects voxel inside the selected shape. Some of the tools are free form styles (user defined by drawing e.g. a polygon in a Map Window or on a cross section, some are based on imported shapes (e.g. "Vector Theme" and "3D grid").

"Vector Theme" is one of the new tools developed to handle shape files. "3D grid" is very usable for fast implementation of e.g. lithological information based on boreholes information and surface near geophysical data.

Tools – shape files with attributes

Shape files and attributes → visualizing

Shape files (vector based) can be imported to GeoScene3D in 2D, and rendered in 3D based by attributes contained in several ways.

The figures below shows an example where water pipes are colorized by material type (column "IG_MATERIAL") and dimensioned by thickness (column "IG_MOMINVEL"). Other attributes used could be date of establishment, which could be used for planning of e.g. future maintenance.

Some of the attributes (above) from the shape file (water pipes), used for colorizing of dimensioning the water pipes in 3D (below)

Tools – applying geology

Applying geological information to voxels based on existing layers

By selecting an upper and a lower surface from e.g. a regional layer model, it is easy to apply voxel inside surfaces. Horizontal extent can be limited by using regions, e.g. if the distribution and an geological structure is known and limited to a part of an model area

Applying geological information based on borehole information and sample description.

XYZ-based borehole data can be interpolated in a 3D grid, to form the basis for the voxel model. GeoScene3D handles 2D and 3D interpolation (Inverse Distance Weighting, Kriging and Natural Neighbour). An example is shown below

Interpolation of lithology based on sample descriptions

Cross section; interpolation of lithology based on sample descriptions

Detailed geological modelling in urban areas with focus on the anthropogenic layer. An practical example

Tom M. Pallesen[1*], Niels-Peter Jensen[1], Susie Mielby[2], Peter Sandersen[2], Margrethe Clausen[2].
[1] I-GIS A/S, Denmark. [2] Geological Survey of Denmark and Greenland (GEUS), Denmark. *Corresponding Author: tmp@i-gis.dk

Poster ID 423

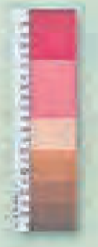
Results

The voxel modelling for the pilot area in Thomas B. Thriges Gade has ended up with a voxel model covering an area of 1200 x 1300 m (1,56 km²), and a vertical span of 30 meter, consisting of 3.744.000 million voxels. Each voxel has an size of 5x5x0,5 meter.

Approximately 180 well logs has been used in the modelling process, resulting in 125 points defining bottom of the landfill. The lithology of the land fill (defined as a sand-clay fraction) has been interpolated in 3D and serves as a primary input to the resulting voxel grid. 308 point observations has been used here.

Based on an estimated sand-clay fraction defined by a subjective estimation of land fill type, each voxel has been assigned an unique sand-clay value.

The sand-clay values are defined on an arbitrary scale, where a value of zero (0) defines impermeable clay, and a value of one (1) defines very coarse sand, gravel and stones with an extremely high permeability.



The resulting combined voxel and layer model for the pilot area in Odense ("Thomas B. Thriges Gade"). Size: appr. 1200 x 1300 x 250 (z) m.

By the use of tools developed in GeoScene3D as a part of the project (see poster 427), elements related to e.g. urban structures and development has been incorporated into the voxel model, by "voxelization" of the elements. For example a trace surrounding a water pipe can be created in the model by defining size (x, y, z) and land fill type (e.g. sand and gravel) for the trace. This has been done for a number of different elements, and in several cases the individual datasets contains attributes such as year of establishment, which again can by used to define landfill type in a trace.

The above makes it possible for the modeller to create a voxel model, where not only the knowledge of an estimated landfill type used in a trace can bee used, also information where e.g. material type has changed over time (e.g. from 1956 to 1986 local landfill reflecting the local soil layers where used as filling material and from 1986 until now coarse sand is used) can be taken into account.

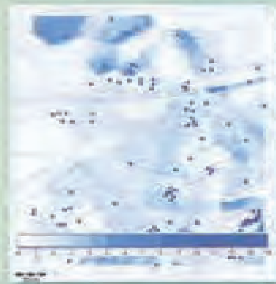
The results from the voxel model are awaiting to be tested in a detailed local hydrological flow model.

Land fill and sand-clay fraction

Based on the soil sample descriptions from well logs, land fill are categorized into 3 categories, based on an estimated sand-clay fraction – se below

Land fill type	Estimated sand content (%)
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]

Land fill with no soil sample descriptions are defined as a disturbed mix of the original geological near surface layers. In the Odense area these layers are dominated by moraine clay. By that, the sand-clay fraction is estimated to 0,4 (=40% sand) on the arbitrary scale.



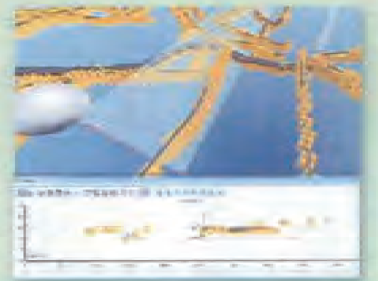
Distribution interpretation points ("bottom land fill" and the calculated thickness of the resulting land fill layer.

Visualization and calculation – voxel model

The voxel model can be sliced at user specified levels, to show the sand-clay fraction in a specific level.

Example of slices of the voxel grid in two different levels. Background map is terrain displaced to level -100.

Showing voxels with same value



Depending on grid type it is possible to show voxels only with the same value (e.g. fine sand in a lithology type grid).

Example of GeoScene3D showing voxels containing 0% sand/100%clay (zero permeability). These voxels are mainly defined by basements from buildings. Total volume = 630.000 m³.

Example of GeoScene3D showing voxels containing 1-20% sand. Total volume = 5.200 m³.

Example of GeoScene3D showing voxels containing 20-50% sand. Total volume = 1.960.000 m³.

Example of GeoScene3D showing voxels containing 50-80% sand. Total volume = 387.000 m³.

Interpolation of data

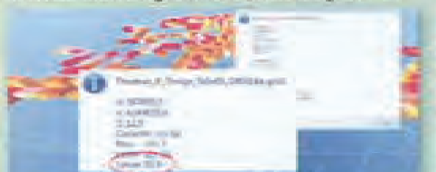
[illegible]	[illegible]

[illegible]	[illegible]

Note: All data has been interpolated in GeoScene3D

Voxel values

Value on single voxels can be seen by using the info tool in GeoScene3D. Voxel grid can be exported to e.g. csv-files



Perspectives

Voxel modelling could be a very useful approach to make detailed geological models in areas where small structures and a high level of details are of major importance, e.g. in:

- Urban areas / surface near water flow.
- Polluted field sites / mobilization and pathways of contaminants.
- Small-scale mining and excavating (e.g. building materials such as sand and gravel.
- The handling of manmade structural elements in GeoScene3D (pipelines etc.) can be done on a small detail and with lots of flexibility.
- Surface near geophysical data are easy to visualize and eventually "convert" to voxels in the voxel model.
- It can be difficult to handle fill types subjectively. More work to be done.

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GEOScene3D ...by I•GIS

Detailed geological modelling in urban areas with focus on the anthropogenic layer. An practical example

Tom M. Fallesen[1*], Niels-Peter Jensen[1], Susie Mielby[1], Peter Sandersen[2], Margrethe Clausen[2].

[1]I•GIS A/S, Denmark. [2]Geological Survey of Denmark and Greenland (GEUS), Denmark.
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Poster ID 423

Summary

This case shows an example from the city of Odense (DK) where new geological modeling techniques has been developed in the software GeoScene3D (*see poster session 427*) and used to create a detailed *voxel model* of the anthropogenic layer (the soil zone where human activity has changed the original geological layers).

The example is part of a pilot project partly financed by VTU (Foundation for Development of Technology in the Danish Water Sector) and involves many different datatypes such as human related elements (landfill, pipelines, roadbeds etc.).

In the last few years, there has been increased focus on detailed geological modeling in urban areas. The models serve as important input to hydrological models. This focus is partly due to climate changes where high intensity rainfalls are seen more often than in the past, and water recharge is a topic too. In the urban areas, this arises new challenges. There is a need of a *high level of detailed geological knowledge* for the uppermost zone of the soil, which typically are problematic due to practically limitations, especially when using *geological layer* models. Furthermore, to accommodate the need of a high detail, all relevant available data has to be used in the modeling process. Human activity has deeply changed the soil layers, e.g. by constructions as roadbeds, buildings with basements, pipelines, landfill etc. In the anthropogenic zone, these elements can act as barriers or pathways regarding surface near groundwater flow and can attribute to local flooding or mobilization and transport of contaminants etc.

In this case a geological *voxel model has* been built by small boxes (a voxel). Each voxel in the model has been assigned an sand-clay fraction, based on geological observations and landfill descriptions. Human related elements has been implemented using tools in GeoScene3D, which gave the modeler advanced options for making a very detailed small-scale model for the pilot area, implementing human impacts on soil layers as well as and small scale geological observations.

This case demonstrates the workflow and the resulting voxel model for the pilot area.

The resulting combined voxel and layer model for the pilot area in Odense ("Thomas B. Thriges Gade"). Size: appr. 1000 x 1000 x 250 (z) m.

The pilot area –"Thomas B. Thriges Gade" (TBT)

Selected basic data (voxel model)

- The pilot area is situated in the centre of Odense City, which has been developed during centuries and where new buildings and road constructions are taking place.
- The model area is *1200 x 1300 m.*
- A detailed voxel model has been build from terrain to the bottom of the anthropogenic layer.
- The anthropogenic layer is generally situated in the uppermost *3-8 m* below terrain.
- Terrain model used has *1,6 m* grid size.
- Terrain surface ranges from 0 to 13,4 m above sea-level.
- *177* boreholes has been used in the interpretation of the anthropogenic layer (depth and soil/landfill type).
- 12 different vector themes (urban structures) has been used.
- 3D regular grid (for the voxel model) with dimensions (xyz, meters) 1200x1300x90 and a cell size of 5x5x0,5], resulting in a total of *3.744.000* voxels.
- The voxel model has been combined with a regional hydrostratigraphical (layer model) for the municipality of Odense.

The pilot area is marked with red box

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Input data

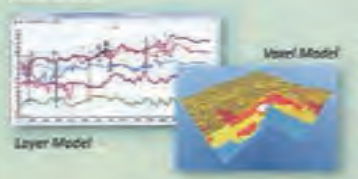
A wide range of data has been used in the modeling process. Some primary for the detailed voxel model, some primary for the regional hydrostratigraphical model. For the voxel model in GeoScene3D, the following data has been used

- Borehole information (databases, tabular data sets and bmp files)
- Layer boundaries (grid files)
- Groundwater table
- XYZ point information (e.g. soil sample descriptions)
- 3DS-files (for illustrations)
- Vector based data (water pipes, pipelines, roadbeds, basements etc.)

Attributes such as year of establishment, material type, pipe dimension etc. from the vector files and XYZ-files has been used to visualize and build up the voxel model.

Water pipes shown in 3D. Attributes from the shape file has been used for colorizing (material type) and correct dimensioning (diameter) the water pipes in 3D. Conversion to voxels are now possible.

Voxel models vs Layered models



Layer models are based on geological surfaces created e.g. by interpolating interpretation points, where a *voxel model* is based on a 3D grid defined by boxes (voxels). Both layer and voxel models can serve as primary input to hydrological models.

A layer in a layer model is defined by an upper and a lower surface, and generally assumes that sub surfaces layers are more or less parallel and nearly horizontal.

In a voxel model no layers has to be defined - each voxel can be assigned different parameters, e.g. lithology, transmissivity or contaminant concentration.

Layer models and voxel models can be integrated and used in combination.

Voxel models can handle a high level of detail and very complex geological structures but lacks the more systematic structure often seen in layer models.

The layered models in the figures above illustrates often seen assumptions regarding the geological settings when building hydrostratigraphical models. I real life geology often shows up as very complex structures. These can be better handled (and with a high level of detail) in voxel models, often not practical possible in layered models.

Workflow description

A) Bottom of landfill

Interpretation of bottom of land fill in boreholes has been made by manually examination of sample descriptions from well logs. An surface (bottom land fill) covering the entire has been interpolated:

B) Land fill – point observations

Soil sample descriptions from well logs has been inspected manually to categorize a subtype of landfill based on a subjective sand-clay fraction estimate:

C) Land fill – interpolation into 3D grid

The point observations based on land fill subtypes has been interpolated into the voxel grid:

D) Empty voxels in the voxel grid

Based on the grid in "C", the empty voxels are filled with an estimated mean fill type (based on sand-clay fraction):

E) Implementation of urban elements

A number of structural elements based on different vector themes are being incorporated into the voxel grid. Dimensions of traces surround pipelines, roadbeds, basements etc. are defined (including an estimated sand-clay fraction) based on individual criteria of the datasets, ending up with a full scale voxel model for the anthropogenic layer.

F) Combining the voxel model with a regional hydrostratigraphical model

Layers representing the deeper, by humans undisturbed geological layers is added and converted to voxels.

References

Fallesen, T. M. and Jensen, N.-P., 2015: Development of a 3D geological/hydrogeological model as basis for the urbane water cycle. Interactive modelling of the anthropogenic layer. *GEUS report (Geological survey of Denmark and Greenland) (Danish, in Press).*

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Sandersen, P. B. E., Kristensen, M. and Mielby, S. B., 2015: Development of a 3D geological/hydrogeological model as basis for the urbane water cycle. 3D geological/hydrogeological modelling. *GEUS report (Geological survey of Denmark and Greenland) (Danish, in Press).*

Continuous Flow Interface
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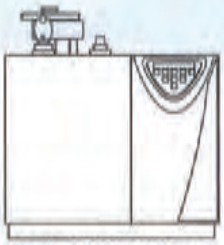
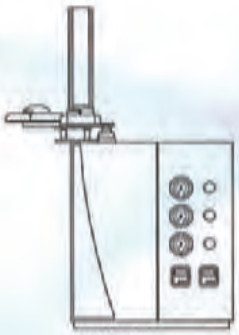
The development of Continuous Flow carrier gas assisted techniques has dominated the growth of Isotope Ratio Mass Spectrometry for the last two decades with our series of ConFlo interfaces. Now we have developed the Thermo Scientific ConFlo IV, the first universal Continuous Flow interface, which allows simultaneous attachment of multiple sample preparation devices with different carrier gas flow regimes to the same Isotope Ratio MS.

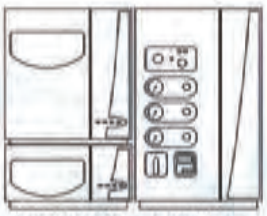
Powerful new features of the ConFlo IV Universal Interface include intelligent connection to all necessary reference gases, automatic sample-size recognition, sample and reference signal matching and self-diagnosis. The ConFlo IV takes significant steps towards full automation of the stable isotope laboratory, maximizing system utilization and uptime.



Flash 2000 IRMS and
Flash 2000 HT Plus



TC/EA



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DELTA V

Features

- Higher sample throughput and less idle time
- Continuous and unattended analysis utilizing three preparation devices
- Software controlled standby and start up of Trace GC and Flash 2000 and Flash 2000 HT for IRMS
- smartEA™ mode: automatic detection and adjustment of sample gas to reference gas intensities
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- Five reference gases always available
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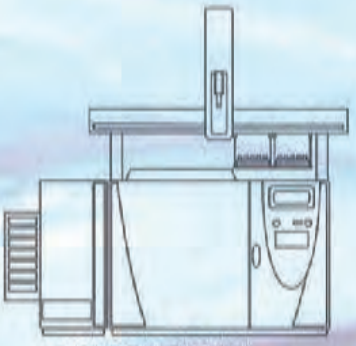
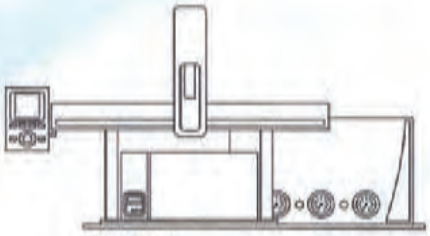
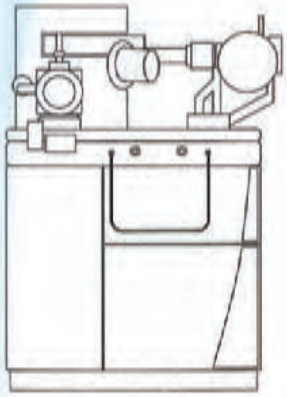
- Lowest consumption of reference gases
- Computer-controlled reference gas intensities
- Auto-determination of linearity, stability, and H_3^+ factor
- Integrated system monitoring and self-diagnosis



TRACE GC ULTRA™



GasBench



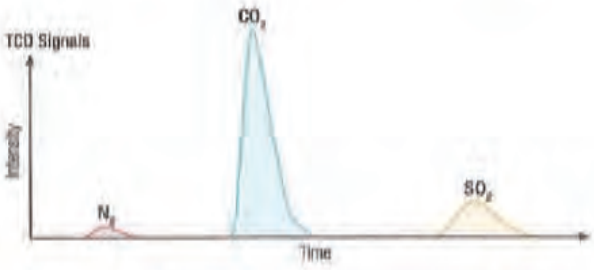
MAT 253

Several thousand Continuous Flow preparation devices are in use with existing Isotope Ratio MS, most of which have more than one preparation device. The Thermo Scientific ConFlo IV Universal Interface optimizes the utilization of the Isotope Ratio MS by handling the switch between preparation devices, including activation and deactivation, as well as change of reference gases. Preparation units can be regenerated and loaded while others are in operation. The switch between applications can take place at any time, without operator assistance. System parameters sensitive to data quality can be automatically checked within all sample sequences.

The ConFlo IV is the first universal interface which implements the fundamental principal of Dual Inlet Isotope Ratio MS: identical treatment of sample and standard. Intensities of the transient sample and reference gas signals in a He carrier gas stream can now be matched, leading to improved precision and reliability.

smartEA: The first intelligent EA-IRMS

Flexible computer-controlled auto-dilution



Integrated detection and evaluation of TCD signals

Automatic adjustment of sample-gas intensities based on TCD signal information

Principle of IRMS

The measurement of isotope ratios requires that a sample gas is measured relative to a reference gas of a known isotope ratio. Signal intensities of reference and sample gas should be matched as closely as possible in order to achieve the best data quality. The Thermo Scientific ConFlo IV interface matches the sample and the reference gas signals for highest precision and long-term performance.

smartEA Mode

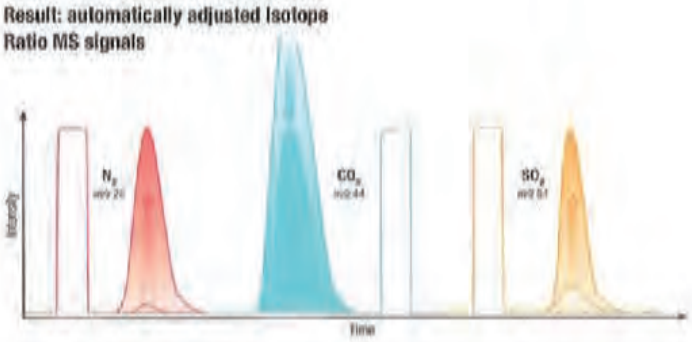
The combination of ConFlo IV and Flash 2000 and Flash 2000 HT builds the first intelligent EA-IRMS system.

In the smartEA mode, the Thermo Scientific Flash 2000 and Flash 2000 HT reports the TCD (Thermal Conductivity Detector) responses to the Thermo Scientific Isodat software, which calculates the optimal dilution for each gas species in the sample. The ConFlo IV interface applies the dilution to each gas species matching sample and reference gas intensities.

Auto-Dilution

Because there is considerable variability in nature in the relative amounts of C/N/S and H/O, and because the ionization efficiencies of the analyte species differ significantly, Continuous Flow sample preparation leads to a very dynamic range of signal intensities. The ConFlo IV Universal Interface is designed to handle this large and variable dynamic range of elements and isotopes using He-dilution technology. The dilution happens in the open split, at the very last point before transfer into the ion source, eliminating any possible isotopic effects on the sample gas.

# of sample gases based on TCD signals

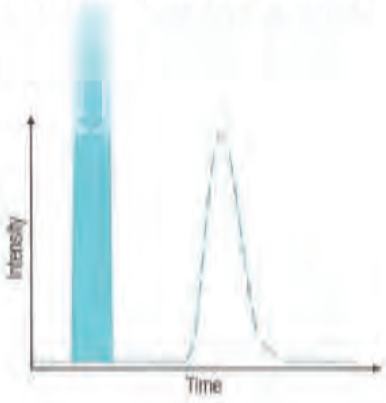


Reference Gas Injection

For the purpose of sample-standard referencing in Continuous Flow applications, cylinders of calibrated reference gases can be used for extended periods of time. Reference gases are supplied in µL amounts through inert capillaries into the reference gas injection port, creating a rectangular, flat-topped peak of reference gas without changing any pressures or gas flows. The use of reference gases for standardization, instead of reference bulk material, reduces the operational costs by almost 50%, while increasing the sample throughput by almost 50%. The reference gas consumption is negligible and thus, gases can be kept trickling continuously, ensuring constant conditions in the supply lines and pressure regulators.

Automatic Range Control

The ConFlo IV Universal Interface provides automated adjustment of the intensities of the reference gas pulses. As a consequence, and for the first time in Continuous Flow Isotope Ratio MS, the reference gas intensities can be matched to the intensities of sample gas pulses. Hence, the fundamental principle of Isotope Ratio MS, equal conditions for sample and reference gases, can be applied to all Continuous Flow applications.



System Monitoring & Self Diagnosis

The ConFlo IV interface is designed to enable unattended operation of the Thermo Scientific Isotope Ratio MS over a long series of sequences utilizing different preparation systems. In such a scenario, it is advantageous to determine system parameters such as stability, isotope linearity, and H_3^+ factor, prior to the automatic start of a new application.

The ConFlo IV interface applies these tests including storage, evaluation, and application of the determined parameters. For the first time in Continuous Flow applications, a fast and automated monitoring of system parameters, is possible.

Multiple preparation devices – One interface: ConFlo IV

Multiple Inlet Control

Multiple preparation and inlet devices can operate within the same batch of sequences with the Thermo Scientific ConFlo IV Universal Interface, allowing continuous and unattended sample analysis. Additional samples can be uploaded and appended to the batch of sequences without any interruption of the actual data acquisition. More samples can be added to the active preparation device or a completely new application can be set up on a separate device and appended, waiting for completion of the actual analyses.

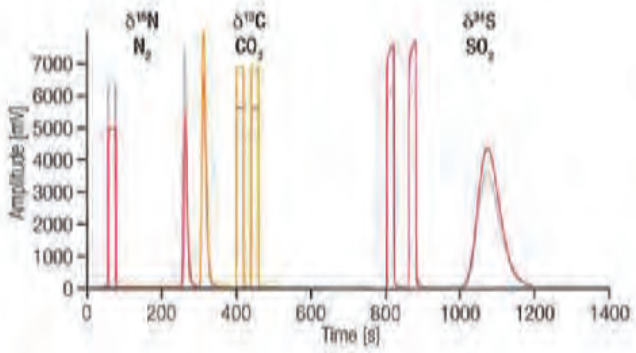
The next device will then automatically be activated and diagnosed for the next application, while the other device will be set to idle or standby. System parameters, which are important to the performance and integrity of data, such as system stability, signal linearity and the H_3^+ factor, can be monitored automatically at any time before, after and even within sample sequences. As an example, the H_3^+ factor could be measured several times. Each H_3^+ factor is stored in the history log file to be used for the next δD analysis.

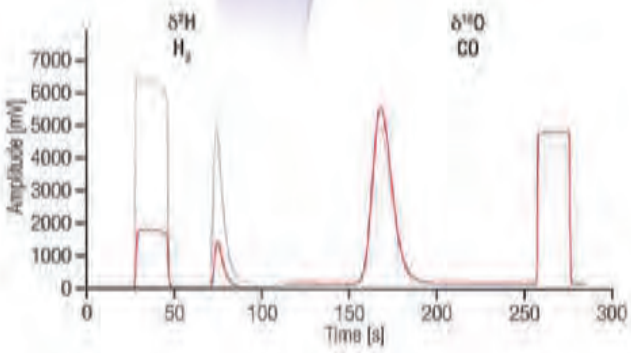
Continuous Sample Analysis

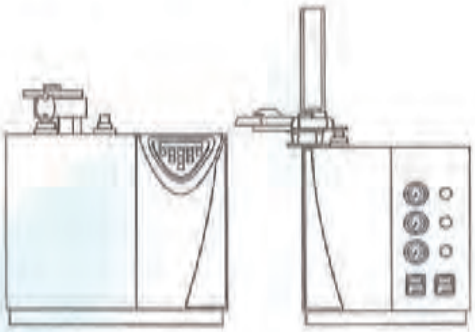
- Sample upload and sequence extension during analysis
- Switch between preparation devices without operator attendance
- System parameter monitoring at any part of the sequence
- Five reference gases always available
- Stand-by and reactivation of Thermo Scientific TRACE GC Ultra and Flash 2000 and Flash 2000 HT

One Interface – Five Elements CNOHS

Multi Element Systems



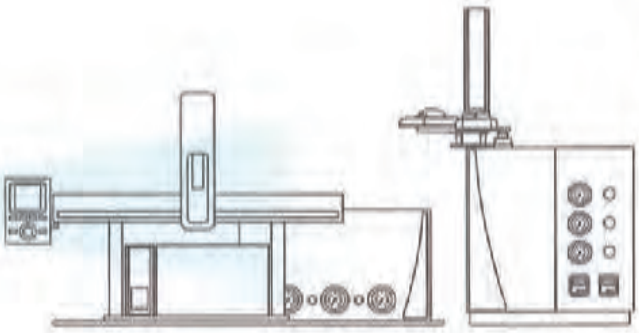




Multi Element System

$\delta^{13}C$, $\delta^{15}N$ and $\delta^{34}S$ from one EA and δD and $\delta^{18}O$ from one TC/EA analysis

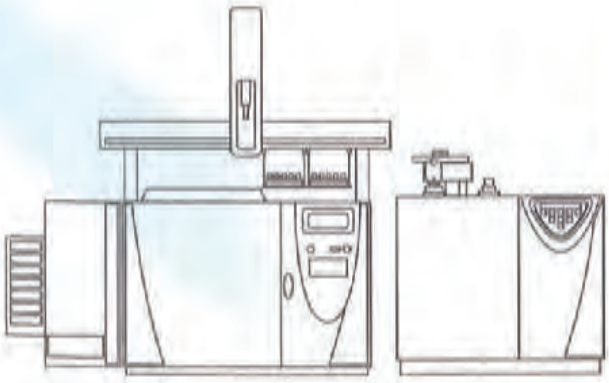
The combination of a dynamic flash combustion elemental analyzer (EA) with a high temperature conversion elemental analyzer (TC/EA) can measure $\delta^{13}C$, $\delta^{15}N$, $\delta^{34}S$, $\delta^{18}O$ and δD. The ConFlo IV interface controls the five reference gases required for such analysis, saving time and money. The wide dynamic range to be expected in elemental compositions is addressed by its unique auto-dilution system.



Water Analysis System

$\delta^{2}H$ and $\delta^{18}O$ from Equilibration with the Thermo Scientific GasBench and from High Temperature Conversion with the Thermo Scientific TC/EA

The versatile combination of TC/EA and GasBench II allows high throughput and high precision isotopic analysis of small water samples. The TC/EA quantitative high temperature C-reduction allows fast screening of δD and $\delta^{18}O$ from a single injection of a water sample within less than six minutes for samples as small as 0.1 µL. The GasBench II provides highest precision δD or $\delta^{18}O$ results by isotope equilibration of water samples with H_2 or CO_2 gas in the headspace. Hence, it allows analyzing waters with high amounts of dissolved solids. While 96 water samples (≥ 200 µL) are equilibrating in the GasBench II, more than 200 water samples are screened by the TC/EA. At the end of the TC/EA analyses, system parameters can be checked automatically, followed by the start of the GasBench II analyses. Both applications benefit by the flexible auto-dilution and reference gas control capabilities of the ConFlo IV interface.



Bulk EA and CSIA Systems

CSIA with GC-C/TC and Bulk Analysis with EA and TC/EA

The combination of any Flash 2000 and Flash 2000 HT for Isotope Ratio MS with the Thermo Scientific GC-C/TC III allows fast and precise bulk analysis of complete samples, as well as the analysis of all individual compounds in complex mixtures. The Flash 2000 and Flash 2000 HT gives the direct link between international accepted standards and reference compounds for GC-C/TC applications. The EA-GC combination exemplifies the range of possibilities that are opened up by the ConFlo IV Universal Interface: completely integrated device and autosampler control, acquisition and reporting of additional detector traces (TCD, FID), all range control and auto-dilution features including the smartEA mode, fully integrated standby mode, and reactivation of both devices.

Thermo Scientific ConFlo IV Universal Interface – One Interface for all Continuous Flow Isotope Ratio MS devices

The flexibility of the ConFlo IV interface, combined with the power of the Isodat script language ISL, allows it to be used as an interface, with any continuous flow sample preparation device, either from either Thermo Fisher Scientific or provided by the user. Some of the fully automated features of the ConFlo IV interface need direct communication with the preparation device and are therefore specific to Thermo Scientific devices (FlashEA 1112 IRMS, FlashEA 1112 HT, Flash 2000 and Flash 2000 HT, Trace GC and Trace GC Ultra). The ConFlo IV interface can be controlled by all fiber-line based Isotope Ratio MS, the DELTA V Plus, DELTA V Advantage, DELTA^{Plus} XP, DELTA^{Plus} Advantage and MAT 253 using the Isodat software suite.

- Elemental analyzers
- Gas chromatographs
- Liquid chromatographs
- Multiple loop injection devices
- Gas injection and separation units with flows of 2 - 100 mL/min
- Trace gas preconcentration devices
- Laser ablation and combustion devices
- DOC/DIC analyzers

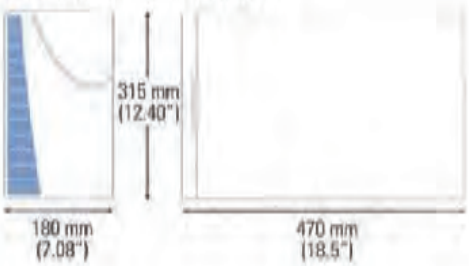
Reference Gases Used for Applications

Pure nitrogen gas, N_2, carbon dioxide, CO_2, and sulfur dioxide, SO_2, are used as reference gases for $\delta^{15}N$, $\delta^{13}C$ and $\delta^{34}S$ determination by combustion reactions. Sulfur dioxide is applied through a heated reference injection port. Pure hydrogen gas, H_2, and carbon monoxide gas, CO, are used for δ^2H and $\delta^{18}O$ determination by high temperature conversion reactions.

ConFlo IV Dimensions

470 x 180 x 315 mm

18.5" x 7.08" x 12.4" (w x d x h)



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Canada +1 800 530 8447
China +86 10 8419 3588
Denmark +45 70 23 62 60
Europe-Other +43 1 333 50 34 0
Finland/Norway/Sweden
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Germany +49 6103 408 1014
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Thermo SCIENTIFIC

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Thermo Scientific
iCAP 7000 Plus Series ICP-OES

Gain more power

experience more performance

Thermo SCIENTIFIC

Thermo Scientific iCAP 7000 Plus Series ICP-OES

Powerful, easy-to-use, solution for multi-element analysis

Maximize your analytical performance in routine and research applications with the Thermo Scientific™ iCAP™ 7000 Plus Series ICP-OES, which delivers the power and flexibility to analyze the most challenging samples.

iCAP 7000 Plus Series ICP-OES is the fastest route to analysis

The iCAP 7000 Plus Series ICP-OES provides low cost multi-element analysis for measuring trace elements in a diverse sample range. The instrument combines advanced performance with high productivity and ease of use, resulting in consistently reliable data, whilst ensuring compliance with global regulations and standards.

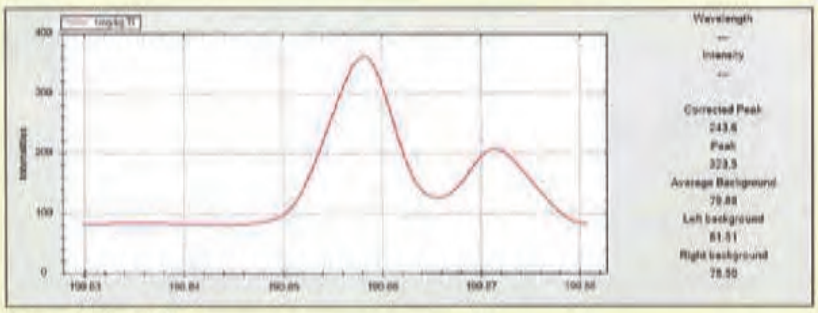
The innovative ICP-OES technology is driven by the Thermo Scientific™ Qtegra™ Intelligent Scientific Data Solution™ (ISDS) software platform. This delivers powerful, high performance and low-cost analysis for both high throughput routine and research laboratories.

Expect more power

- Analyze drinking water or crude oil: optimized sample introduction allows direct analysis of different sample types
- Maintain sensitivity in high matrix samples: robust plasma generation by the high efficiency (>78%), swing frequency RF for complex matrices
- Sub ppb detection limits: minimal optical surfaces transfer maximum signal to the detector
- Quantify from ppb to %: the Charge Injection Device (CID) detector allows for low and high concentrations to be analyzed simultaneously.

Experience more performance

- Select interference-free wavelengths: access the entire spectrum from 167 to 847 nm
- Calibrate less frequently: mass flow controller gas boxes and enhanced temperature control ensure long term stability
- Develop robust self-monitoring methods: Qtegra ISDS enables simple method development with the ability to incorporate monitoring of uptake, wash, internal standards and QCs
- Generate custom reports: Qtegra ISDS displays customizable reports on demand.

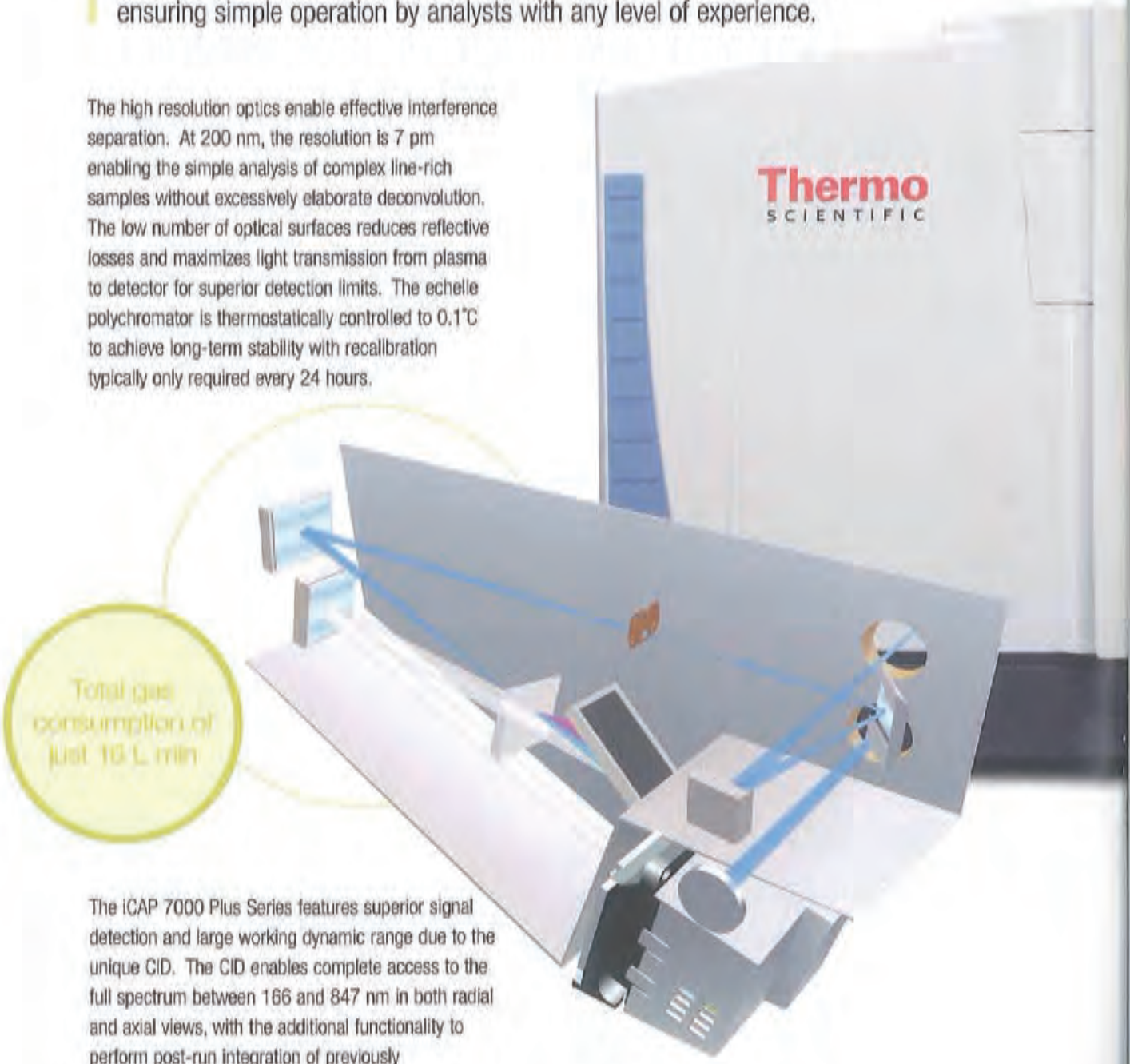


Thallium doublet at 190 nm.

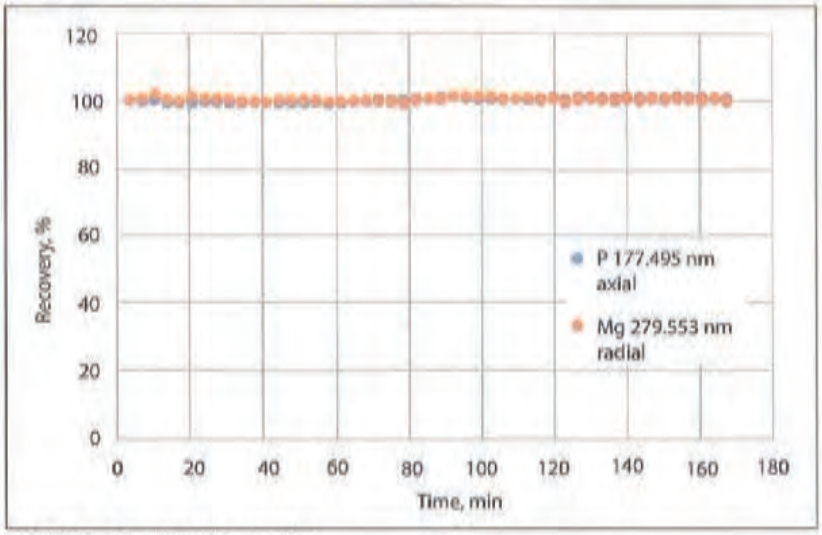
Delivering powerful performance with advanced, easy-to-use technology

The implementation of advanced technology enables maximum performance and flexibility to exceed the needs of any application from drinking water to crude oil. This is achieved without complication of the user interface, ensuring simple operation by analysts with any level of experience.

The high resolution optics enable effective interference separation. At 200 nm, the resolution is 7 pm enabling the simple analysis of complex line-rich samples without excessively elaborate deconvolution. The low number of optical surfaces reduces reflective losses and maximizes light transmission from plasma to detector for superior detection limits. The echelle polychromator is thermostatically controlled to 0.1°C to achieve long-term stability with recalibration typically only required every 24 hours.



The iCAP 7000 Plus Series features superior signal detection and large working dynamic range due to the unique CID. The CID enables complete access to the full spectrum between 166 and 847 nm in both radial and axial views, with the additional functionality to perform post-run integration of previously unquantified elements.



Stability plot of phosphors and magnesium.

Analyze challenging samples with robust plasma generation delivered by the swing frequency RF generator. The innovative design of the iCAP 7000 Plus Series ICP-OES delivers powerful analytical performance and stability.

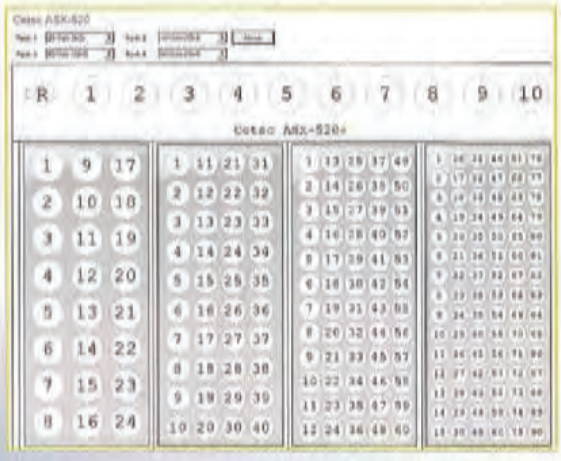
The user-friendly sample introduction system with push-fit connections ensures rapid assembly and disassembly for cleaning and maintenance. Additional sample introduction components can be added to increase the speed of analysis or for the analysis of special sample types.

Unique features, for example, the drain sensor removes the usual challenges often associated with ICP-OES analysis

Laboratory optimization

Enable your analytical team to achieve more with advanced instrumentation

The minimal training required for your team and the fast instrument start-up increases productivity. In addition, the easy method development simplifies routine analysis with the iCAP 7000 Plus Series ICP-OES. Accessories are simple to connect to the sample introduction system and controlled by the Qtegra ISDS plugins, which dramatically expand the power and performance of the instrument.



Discreet Sampling and Auto Dilution

Higher throughput, lower maintenance and auto dilution reduce the time and cost of analysis. Auto dilution enables calibration from a single stock solution and the automatic dilution of samples that exceed the calibrated range, eliminating the need for additional post-run analysis.

The integrated Sprint Valve enables the maximum sample throughput when combined with an auto sampler. The Qtegra ISDS monitors data and makes decisions with respect to QCs and calibrations, these are used to perform dilutions with the prep*FAST*.

Hydride Generation

A simple solution for increasing the detection capability of the hydride forming elements. The confident detection of these elements at sub ppb concentration is delivered by the following options:

- The basic hydride kit enables both non and hydride forming elements to be determined simultaneously
- The integrated hydride generation accessory enables the maximum improvement in detection of the hydride forming elements.

The Thermo Scientific Qtegra Intelligent Scientific Data Solution (ISDS) Software delivers quality and drives productivity. The software is intuitive and easy-to-use for routine, high throughput applications, with the flexibility required for daily analysis.

Ease of Use

Simple workflows minimize the steps needed to perform a task, giving analysts more time to focus on other activities. The 'Get Ready' feature takes your instrument from standby to ready-for-analysis through a fully automated process, saving you time and ensuring consistent performance.

Create a LabBook in five clicks and automatically start an intelligent workflow with a fully integrated QA/QC protocol.

Integration of Peripherals

The plugin architecture of Qtegra ISDS enables the connection to multiple industry standard sample preparation devices and auto samplers.

Common Platform

Qtegra ISDS is a control software supporting different analytical devices. This makes cross-training and the adoption of new instrumentation faster and easier, so you can expect increased flexibility in multi-technique laboratories.

Automated Reports and Calculations

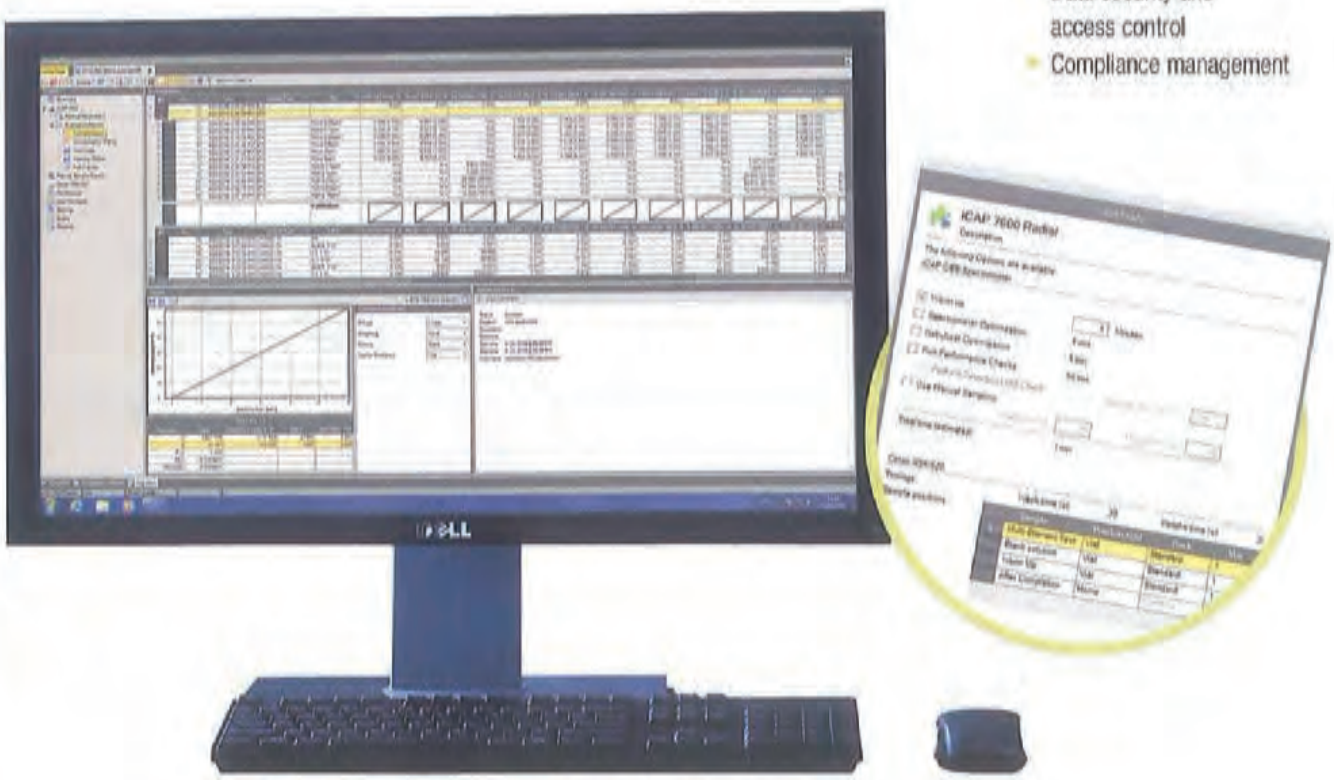
Data is exceptionally easy to manage, removing the need for proactive monitoring. The iCAP 7000 Plus Series ICP-OES and Qtegra ISDS minimize the requirement for analyst interaction during the analytical determinations.

Data Handling

- Query
- Reporting
- LIMS

Compliance

- 21CFR PART 11
- Data security and access control
- Compliance management



More power, more performance

In action: Agriculture, Environment, Food, Pharmaceuticals and Nutraceuticals

Powerful software and maximized instrument performance enable compliance with the latest regulations and legislation

Agricultural Screening

Maximize sample throughput when screening samples for nutrients and toxic elements. The iCAP 7000 Plus Series ICP-OES incorporates productivity enhancing technology, for example, the Sprint Valve which eliminates uptake and wash. In addition, the robust sample introduction and plasma generation enable analysis of high matrix samples such as soil extracts.

Environmental Analysis

Accurately quantify the elemental composition of a wide range of environmental samples. For challenging high solid samples such as sludge, the sample introduction and plasma generation efficiently process the matrix. For the analysis of drinking water, the iCAP 7000 Plus Series ICP-OES has the powerful detection capabilities required for the quantification at ppb concentrations.

Food Production and Safety

Monitor key toxic elements during food production for consumer safety and ensure accurate labeling of products with nutritional elements. The use of templates, electronic signatures and workflow ensures full traceability of an analytical result.

Pharmaceutical and Nutraceutical Compliance

Ensure you have the qualified instrumentation to comply with new and future legislation. Qtegra ISDS provides full traceability of results and workflow, incorporating features to support compliance with CFR 21 Part 11.

In action: Chemicals, Petrochemicals, Metals and Mining

Powerful instrumentation delivers the highest performance for challenging samples

Chemical QA and QC

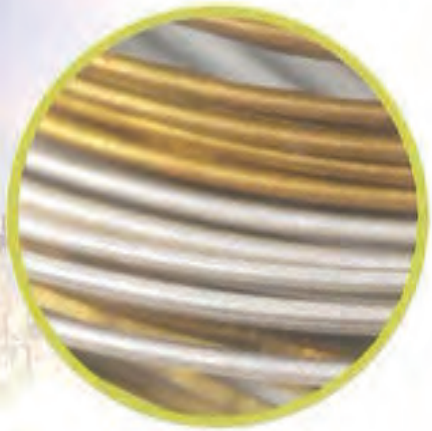
The iCAP 7000 Plus Series ICP-OES increases your laboratory productivity with superior stability. Confidence in your results is ensured with the dedicated sample introduction for different sample types; minimizing the drift associated with sample introduction, often caused by matrix deposition.

Petrochemical

The robust sample introduction system easily analyses a range of samples from crude oil to volatiles such as gasoline. The iCAP 7000 Plus Series ICP-OES exceeds the requirements of demanding high-throughput applications, for example the analysis of in-service oil.

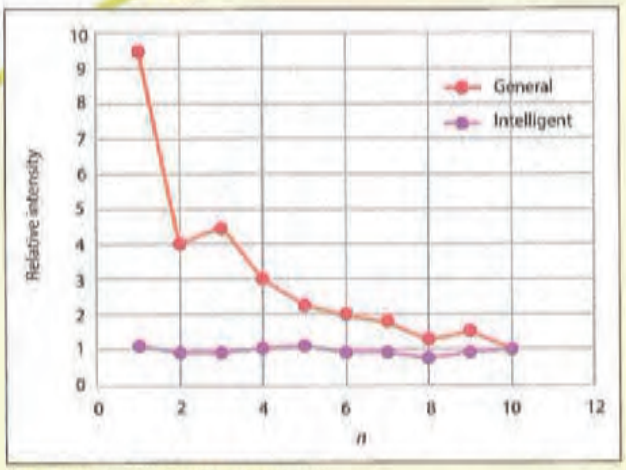
Metals and Materials

The powerful high resolution ICP-OES reduces interferences in complex matrices, ensuring consistent, accurate and precise analysis. Auto dilution and monitored uptake and wash, both reduce carry-over between samples, virtually eliminating the need to re-analyze expensive samples.



Mining

The iCAP 7000 Plus Series ICP-OES is field proven with low gas consumption for remote sites. The robust instrument is designed to maximize uptime with minimal user maintenance. Create a LabBook in five clicks and automatically start a simple intelligent workflow.



Carry-over with and without intelligent wash.

We manage your instruments so you can focus on the science

To improve your laboratory's efficiency, you should be focused on your work, not managing instrument servicing. When you buy a Thermo Scientific product, you gain the peace of mind that comes from the backing of a large team of service experts committed to your long-term success.

iCAP 7200 ICP-OES

The iCAP 7200 ICP-OES is a simple alternative to the Atomic Absorption technique and Microwave Plasma technology, providing a multi-element analysis solution for laboratories with increasing demands for sample throughput and lower detection limit capability.

iCAP 7400 ICP-OES

The Thermo Scientific iCAP 7400 ICP-OES is ideal for QA/QC and contract laboratories requiring highest sensitivity from full wavelength coverage. The instrument achieves an advanced level of performance for a range of liquid applications with the minimum of user set-up and maintenance. The instrument offers laboratories broad analytical capabilities with stability, sensitivity and regulatory compliance.

iCAP 7600 ICP-OES

The Thermo Scientific iCAP 7600 ICP-OES is the ideal solution for the most demanding analytical challenges. The instrument has the highest throughput, sensitivity and detection limits. Productivity is increased by the integrated sample loop which efficiently delivers the sample to the plasma. The iCAP 7600 ICP-OES maximizes scalability and advanced accessory connectivity to support expanding laboratory requirements.

Gain more power, experience more performance

www.thermoscientific.com/TraceElemental

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Thermo Scientific
FLASH 2000 Elemental Analyzer

Adapt your lab to meet any challenge

Discover the capabilities of the FLASH 2000 OEA.
Cover all possibilities for CHNS/O,
NC and N/Protein determinations

Thermo SCIENTIFIC

Unlock the future-proof lab

Discover over 20 configurations with an elemental analyzer that grows with your needs

Prepare for current and future challenges with one solution

Simplify your CHNS/O analysis with the Thermo Scientific™ FLASH™ 2000 Organic Elemental Analyzer (OEA). Discover how the FLASH 2000 OEA solves your laboratory challenges, improves workflow and minimizes downtime.

Expand your fields of application

The extensive modularity, and the integration capabilities with a range of accessories and analytical systems, such as the Thermo Scientific Isotope Mass Spectrometer, allows you to add extra configurations easily.

24/7 automated operation

Determine 1 to 5 elements

How quickly could you adapt, if the requirement changed?

Industries and academia shift more frequently than ever before. Only a flexible system allows you to keep your laboratory up-to-date and ready to compete in new markets.

The FLASH 2000 OEA can accept:

- Two solid autosamplers
- One solid and one liquid autosampler
- Two liquid autosamplers
- One solid autosampler and one manual liquid sampler

Reconfigure for any activity

Achieve maximum productivity with the determination of four elements (CHNS) simultaneously. Detect oxygen and sulfur without an extended module and utilize single or double reactor options for higher throughput and stay at the forefront of your application.

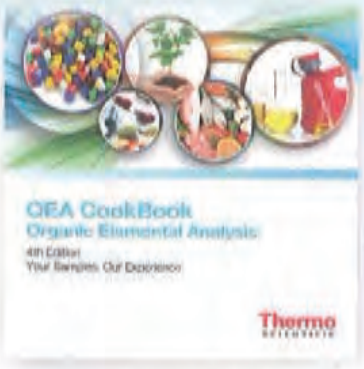
Instantly connect:

- Thermal Conductivity Detector (TCD)
- Flame Photometric Detector (FPD) for trace sulfur analysis
- Isotope Ratio Mass Spectrometer (IRMS)

Extra carrier gas options:

- Helium
- Argon option for cost-efficiency and regular supply

The Electronic Flow Control (thermo-regulated) improves the analytical stability and consequently the reproducibility of results.



Exclusive OEA cookbook

Contains over 5000 determinations to help you get the most from your FLASH 2000 OEA

FLASH 2000 Organic Elemental Analyzer

Rely on solutions that fit the unique needs of your laboratory

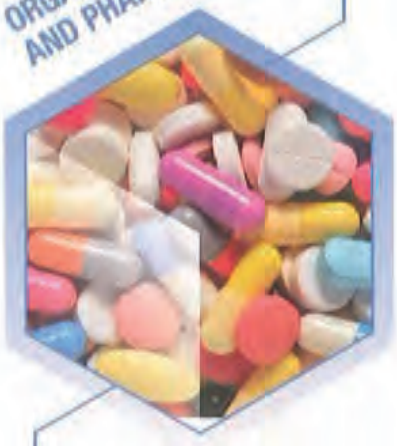
A demanding market, which is always changing, puts daily pressure on busy labs. Flexible systems help you to adapt so you can achieve more and deliver more. Configure the FLASH 2000 OEA to suit any requirement. This way, your lab can easily handle varying sample types, obtain extra element determinations and achieve maximum sample throughput.

CHNS/O analyzer configuration:

Perform analysis and trace sulfur determination with an added flame photometric detector.

ORGANIC CHEMISTRY AND PHARMACEUTICALS

FLASH 2000 CHN
FLASH 2000 CHN/O
FLASH 2000 CHNS
FLASH 2000 CHNS/O



- Fine chemicals
- Pharmaceuticals products
- Organo-metallic compounds
- Polymers
- Plastic
- Synthetic rubbers
- Fibers
- Explosives
- Catalysts
- Textiles
- Pesticides
- Detergents
- Fluorine-compounds

PETRO-CHEMISTRY AND ENERGY

FLASH 2000 CHNS
FLASH 2000 CHNS/O
FLASH 2000 N Lubricants

- Coals
- Cokes
- Crude oils
- Gasoline/diesel
- Alternative fuels
- Petroleum derivates
- Lubricants
- Oil additives
- Graphite

ENVIRONMENTAL

FLASH 2000 CHNS
FLASH 2000 CHNS/O
FLASH 2000 NCS
FLASH 2000 NC
Soils/Sediments/Filters

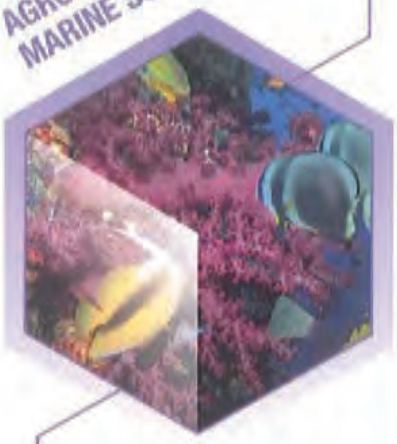
- Soils, sediments, and rocks
- Composts
- Wastes
- Sewage/sludge
- Pesticides
- Water solution
- Waste water
- Particulates in air by filters
- Particulates in water by filters
- Woods

in action

CFR21 validation:

Required for the pharmaceutical, cosmetic and food safety industries.

AGRONOMY AND MARINE SCIENCE



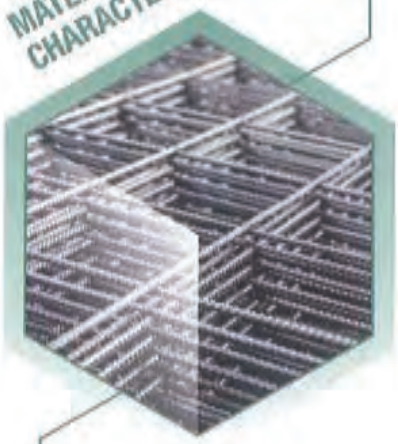
- FLASH 2000 N Org
- FLASH 2000 NC Org
- FLASH 2000 NCS
- FLASH 2000 NC Soils/ Sediments/Filters

- Soil
- Plants (leaves, roots, fruit)
- Sediments
- Humus
- Algae
- Plankton
- Particulate matter in water by filters
- Water
- Fertilizer

NCS analyzer configuration:

Achieve nitrogen, carbon and sulfur determination by TCD detector and trace sulfur determination with a flame photometric detector.

MATERIAL CHARACTERIZATION



- FLASH 2000 CHNS
- FLASH 2000 CHNS/O
- FLASH 2000 N Org
- FLASH 2000 NC Org
- FLASH 2000 NCS
- FLASH 2000 NC Soils/ Sediments/Filters

- Glue/resins
- Papers
- Rubbers
- Cement
- Ceramics
- Carbon/glass fibers
- Tires
- Pigments & dyes
- Refractory materials
- Building materials
- Inorganic materials
- Metals
- Textile fibers
- Wood powders

FOOD SAFETY

- FLASH 2000 N/Protein
- FLASH 2000 N Brew

- Human food and animal feed
- Beverages (beer, juice, milk, wine, soft drinks...)

N analyzer configuration:

Determine crude protein in human food and animal feed using quality certified Food Reference Materials that are included with the FLASH 2000 OEA as standard.

Analyze from few ppm, to 100%

Lab transformation and optimization

Optimize uptime and efficiency for higher throughput

Equip your team to achieve more

Single or double reactors allow for simultaneous analysis and higher throughput every single day.
A powerful combination of user-led design and automation makes the FLASH 2000 OEA simple to use and easy to maintain. User actions for the optimization of the method are completely minimized, for a simplified route to final results.

Automated functions:

- Auto-Start
- Auto-Ready
- Auto-Standby
- Auto-Off
- Auto Leak Test

Kjeldahl alternative for N/Protein

Expand your capabilities, optimize your current and future workflow

Respond to challenges and stay at the forefront of your field. When the need or opportunity arises to test more elements, you can adapt the FLASH 2000 OEA, easily on-site.
More options, enhanced capabilities and quick solutions keep your lab agile.

Calibration modes:

- K Factor
- Linear Fit
- Quadratic Fit

Switch to argon for cost-effective analysis

The increase in helium prices and possible supply shortages can hinder productivity.
The FLASH 2000 OEA offers the same excellent performance and results when using Argon as a carrier gas. Data remains reliable and consistent, allowing you to take advantage of cheaper prices and to rely on a steady supply.

Integrate IRMS in your analysis

When the FLASH 2000 OEA is coupled with the Thermo Scientific™ Delta V™ Isotope Ratio Mass Spectrometer, you have a fully-automated elemental analyzer that is optimized for isotope analysis of C, N, S, O and H. This meets growing demand for multi-element isotope analysis for geological applications, quality control of pharmaceuticals, detection of adulteration of food, beverage and flavours, environmental and forensics analysis.

Unleash the full potential of your lab with the complete and fully automated OEA software

The Thermo Scientific Eager Xperience Data Handling Software for 24/7 output:

Simply leave the instrument running and return to completed samples with full, user-friendly reports. Use this intelligent software to control all analytical parameters, flows, autosamplers and detectors.

To improve the maintenance of your analyzer, the software allows you to monitor the ongoing status of your consumables, such as crucibles, catalysts and filters.

Data output:

- Automated transfer from the Thermo Scientific™ Eager Xperience Data Handling Software to Microsoft Excel or to LIMS
- Automated transfer of the sample weight from the balance to the computer
- Automated evaluation of heat value for fuels and alternative fuels
- CO_2 Emission Trade for environmental control
- Different protein factors for food and animal feed
- Automated Minimal Formula determination for pharmaceutical or fine chemicals applications
- Automated evaluation of C/N, C/H and C/S ratio
- Inserting of the Humidity value for solid samples and of the Density for liquid samples

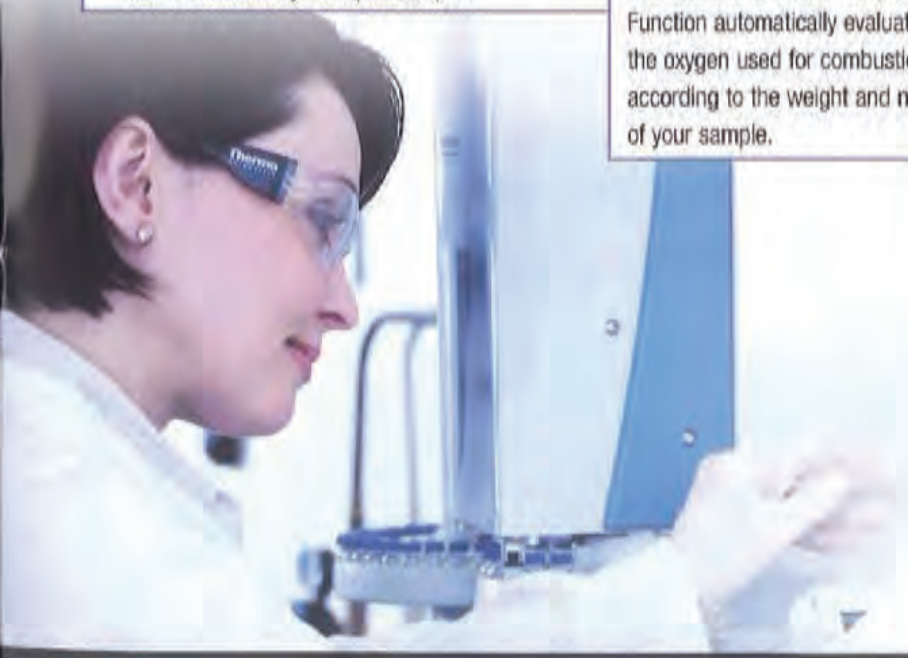
Unique OxyTune Function - ONLY with the FLASH 2000 OEA:

The Thermo Scientific™ OxyTune™ Function automatically evaluates the oxygen used for combustion, according to the weight and nature of your sample.

Approved by official organizations:

- ✓ AOAC – Association of Official Analytical Chemists
- ✓ AOCS – American Oil Chemists Society
- ✓ AACC – American Association of Cereal Chemists
- ✓ ASTM – American Society for Testing and Materials
- ✓ ASBC – American Society of Brewing Chemists
- ✓ ISO – International Organization for Standardization
- ✓ EN – European Standard
- ✓ CEN – European Committee for Standardization
- ✓ EPA – Environmental Protection Agency
- ✓ IFFO – International Fishmeal and Fish Oil Organization

With the FLASH 2000 OEA you can achieve unparalleled accuracy and precision, required by Official Methods.



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SOGIN

The National Repository and Technology Park

THE NATIONAL REPOSITORY AND TECHNOLOGY PARK

The National Repository is a surface environmental infrastructure where radioactive waste can be safely disposed. Once constructed, the decommissioning of Italian nuclear plants can be completed and all radioactive waste, including that generated by nuclear medicine, industrial and research activities, will be appropriately managed.

The Technology Park, to be built along with the National Repository, will be conceived as a research centre open to international partnerships and equipped to carry out activities in the area of radioactive waste management and sustainable development, in agreement with the local communities.

The Repository is a structure with engineering barriers and natural barriers arranged in series, designed on the basis of the best international experiences and according to the latest IAEA (International Atomic Energy Agency) standards. It will permanently accommodate approximately 75.000 cubic metres of low and intermediate level waste, and temporarily store some 15.000 cubic metres of high level waste.
Therefore, over time, the National Repository is expected to receive a total of about 90.000 cubic metres of radioactive waste, of which 60% from nuclear plants currently under decommissioning and the remaining 40% from scientific research, medical and industrial applications, including waste produced to date and that which is estimated to be generated over the next 50 years.

The transfer of radioactive waste to a national site will ensure safe, efficient and rational waste management, whilst enabling completion of nuclear plant decommissioning in compliance with European directives, as it will align Italy with countries that have had similar repositories already in place for many years.

SOGIN GROUP

Sogin is the Italian public company responsible for the decommissioning of Italian nuclear plants and for the management of radioactive waste. Sogin is involved in the siting, designing, building and operating of the National Repository for radioactive waste. Sogin is wholly owned by the Ministry of Economy and Finance and operates according to the Italian Government's strategies.

In addition to the former Trino, Caorso, Latina and Garigliano nuclear power plants, and to the nuclear fuel manufacturing plant of Bosco Marengo, Sogin is in charge of the decommissioning of the former ENEA research plants EUREX in Saluggia, OPEC and IPU in Casaccia and ITREC in Rotondella.

Sogin has been operating since 2001. It became a Group in 2004 through the acquisition of the majority stake (60%) of Nucleco SpA, the national operator responsible for collecting, treating, conditioning, temporary storage of radioactive waste and nuclear sources from medicine and scientific and technological research activities.

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IDROGEO

WATER WELLS

DESIGN - CONSTRUCTION - MAINTENANCE

COMPANY PROFILE

IDROGEO is a drilling company and has more than 35 years of experience in drilling activities specially in water wells. The activity of the company began on 1979 thanks to the initiative of two partners, with experience in drilling for water well and oil. Its philosophy is a qualitative product at a competitive price, searching new solutions to meet both the changing customer's needs and respecting the recent laws for the protection of ground water and the environment. For this reason the Company has always invested their resources in new rigs and new specific equipment and has also actively collaborated with Universities and professional studies, generating therefore significant technical skills in their staff. Particular attention is given to the resolution of the problem in existing wells.
The Company can offer its customers a professional Technical Department, modern equipment in order to cover all drilling methods .
The present staff is formed by expert drillers; many of which have the license for drilling water wells.

SPECIAL TECHNOLOGIES FOR PARTICULAR JOBS

An efficient internal workshop has enabled the development of reliable technologies for different kinds of intervention such as.

- Special equipment HYDROPULS for regenerations of wells
- Special hydraulic tool for perforating installed casing of different diameters (219 ÷ 1.016 mm), utilizing water as hydraulic fluid with controlled slots
- IDROREAMER (IDROGEO's patent) to repair damaged casing without reducing diameter
- IDROJET GROUTING (IDROGEO's patent) for execution and cementation recovery between the aquifers out of definitive well casing
- Filters cleaning and descaling with "IDROGELO" process
- Isolation and testing of each aquifer;
- Insights enlarging the drilling diameter under the existing pipe
- Single and double packers, pneumatically or mechanically operated, for casing of different sizes 168 ÷ 550 mm

THE LAND OUTSIDE OUR JOB INSIDE

IPTA

di vassalli s.r.l.

ipta di Vassalli S.r.l.
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25030 Torbole Casaglia (BS)
Tel. +39.030.2650114
info@ipta.it - www.ipta.it

COOP

SINCERT

ANIPA

Associato AIB
Sistema Confindustria

OLTRE LA PERFORAZIONE

Deep Well- Mt 800

Our work is made by technical experience of our men, the range of our machinery and innovative technological solutions

Geothermal Wells

Involved to deepen

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Wells for prospecting
Geothermal Energy
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Maitenance and regeneration of Wells
Reconstruction of Wells
Pump system for Water
Horizontal drilling

Landi
di Chiarugi

Water Well

Reconstruction of well

Landi di Stefano Chiarugi & C. S.a.s.

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SGS SGS SGS

ANIPA

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since 1921

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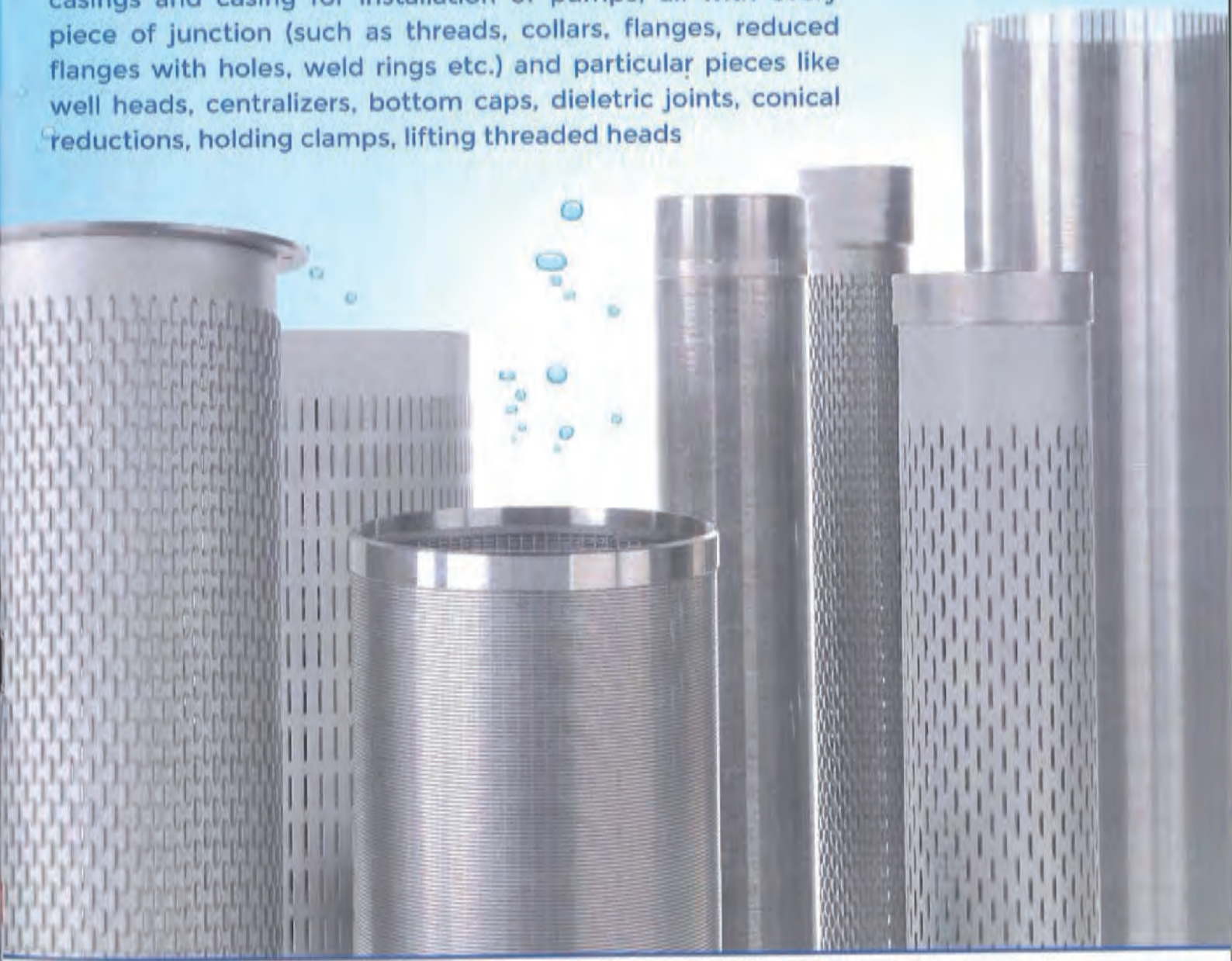
DISTRIBUTORS WANTED

PAPARELLI

Since 1947 we produce
screens and pipes for water wells

The range of PAPARELLI products includes all that is necessary to the formation of a water well: Spiral screens, bridge slotted screens, riser pipes, simple slotted screens, longstanding casings and casing for installation of pumps; all with every piece of junction (such as threads, collars, flanges, reduced flanges with holes, weld rings etc.) and particular pieces like well heads, centralizers, bottom caps, dieletric joints, conical reductions, holding clamps, lifting threaded heads



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CERTIFICAZIONE DI SISTEMA QUALITÀ ISO 9001 DNV

ABOUT ANIPA

ANIPA, originally *"Associazione Nazionale Imprese Pozzi per Acqua"* ("National Association of Enterprises for Water Wells") was founded in 1975, to bring together both companies specializing in water wells and those producing drill rigs and accessories (pumps, drilling products, DTH hammers, etc.). In 1988 the association opened to professional consultants in the sector, and while keeping the same initials, changed its name to *"Associazione Nazionale di Idrogeologia e Pozzi Acqua"* ("National Association for Hydrogeology and Water Wells").

ANIPA encompasses the best businesses and professionals united in the common goal of communication and promotion of technical and scientific knowledge in the field of hydrogeology and the construction of water wells. On the Executive Council of the Association, companies specializing in the construction of wells are joined by representatives from businesses that produce machines and equipment for drilling or provide specialized services regarding the same activities.

As a result of the important statutory change in 1988, the Association is now open to the third fundamental component, comprising professional consultants and designers of water wells. The activities organized by the Association include conferences, seminars, training courses, and have over the years provided the main reference point for discussion and updating for businesses and professionals. The considerable editorial output produced or supported by ANIPA constitutes an indispensable reference for all those involved in this field.

The Council's intention, with the opportunities now offered by the creation of a new website, is to provide a further boost and a more organized structure for the Association's dissemination activity.

The goals of **ANIPA** are:

1. communication and promotion of technical and scientific knowledge in the field of hydrogeology and construction of water wells:
    - Acque Sotterranee - *Italian Journal of Groundwater*
    - series of handbooks / manuals
    - technical / scientific textbooks

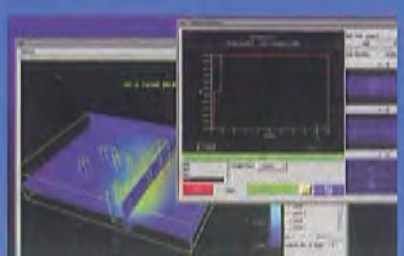
2. carrying out of training activities:
    - education and training, through ASSF, the specific ANIPA association
    - awarding of license / certificate for complex machinery operators

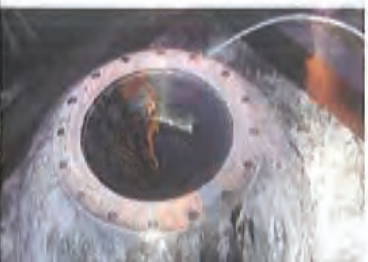
3. carrying out of activities to support the drafting of regulations, e.g.:
    - UNI Standards for Geothermal Heat Pump Systems: design (11466:2012), installation (11467:2012), environmental protection (11468:2012)
    - UNI Standard Guidelines for the Design and Construction of Water Wells

ITALIAN CONSORTIUM

IDRICOM

GROUND • WATER • WELLS
DRILLING • ENGINEERING • CONSULTING


IDRICOM: THE ITALIAN CONSORTIUM

IDRICOM is an Italian consortium of SMEs (Small and Medium Enterprises), currently comprising 30 founder-members; the Consortium was founded in accordance with current legislation (Italian D.L. 83 22.06.2012, art. 42, enacted in Law 134 of 7th August 2012).

IDRICOM includes drilling contractors providing ground drilling and related services, manufacturers & suppliers of drilling & water technologies, equipment and materials, and engineering & consulting companies (engineers, geologists, scientists & other consultants) providing engineering, consultancy and related services.

IDRICOM has as its mission the "international spread of products and services of SMEs and support for them on foreign markets by means including collaboration and partnerships with foreign firms", as provided for according to Italian law.

IDRICOM therefore promotes and applies Italian know-how globally in the field of water well drilling and more generally the design and construction of underground works, and supplies related technology and engineering and consulting services.

IDRICOM provides practical solutions suited to the needs of a customer base of major multinationals, public and private bodies and independent concerns worldwide, and services cover the entire project life cycle, from planning and feasibility analysis, through the operations phase to post project handover; highly skilled technicians, engineers and geologists can work from Italy and/or be present at overseas bases and onsite.

IDRICOM provides a full range of consulting and field services, from project evaluation to drill supervision, backed up by the most advanced information systems and geological software; it is professionally managed, has a strong research background and is fully equipped to handle large site jobs in remote areas.

IDRICOM has its head office in northern Italy, in the city of Piacenza, with member companies based throughout Italy, many of them already with offices/agents or operative units overseas worldwide.

GROUND DRILLING SERVICES: DRILLING CONTRACTORS

COMPANIES

ARTESIA S.p.a.
F.LLI PERAZZOLI S.r.l.
FREATICA di Dusi Andrea
GEOROCCE di Tomasoni A. e F.lli S.n.c.
GEOTIRRENO S.r.l.
IDROGEO S.r.l.
IDROTECNICA MANTOVANI S.r.l.
I.T.S. S.r.l.
MALTINI Dionigio e Renato S.n.c.
MESA di Mariottoni Enrico e C. S.a.s.
MOIOLI V&R di Moioli O.E. e C. S.n.c.
NEGRETTI S.r.l.
RAGIONIERI LORIANO di Ragionieri A.
SAMMINIATESE POZZI S.r.l.

IDRICOM, operating through its consortium members, guarantees skilled intervention in the fields of water well drilling and underground exploration and works.

IDRICOM solves issues concerning water wells, water supplies, the management and treatment of groundwater and surface water, civil and geotechnical investigation and infrastructure development, mineral resources, environmental compliance and rehabilitation programs, geothermal and energy projects.

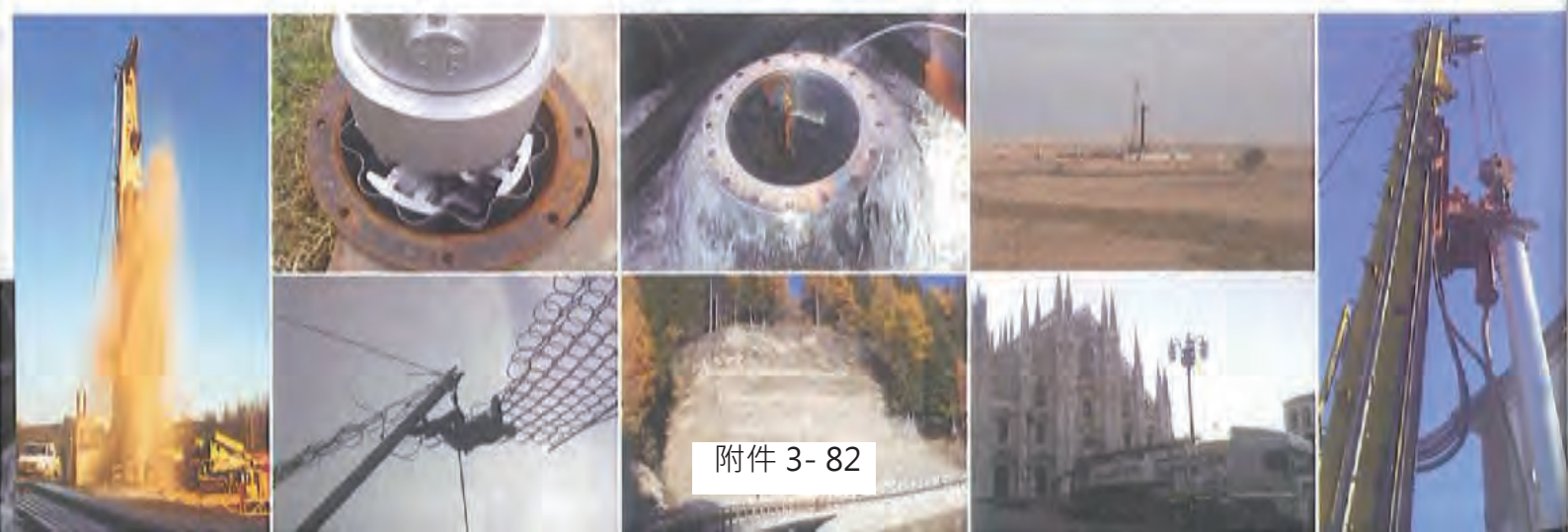
IDRICOM relies on 90 years of experience in the water well field, and has tried and tested all past and present systems of drilling, operating without limits and using plant able to reach any depth to 2000 m and more for water and mineral resource exploitation.

IDRICOM is committed to using the most suitable systems for a tailor-made solution, not bending the client's needs to any ready-made answer.

IDRICOM operates in drilling to the highest levels of safety, intervening by means of ready-to-go rig equipment with skilled support teams of expert technicians, geologists and engineers.

BUSINESS PURPOSE

Direct and reverse circulation drilling, air well drilling of any diameter
Water well rotary drilling, percussion, rotary percussion and lifting equipment
Drilling high depth gas wells, regeneration wells, thermal and mineral water wells, geothermal wells
Well maintenance and efficiency recovery with advanced technologies
Colour underwater video-inspections, well geophysical logging
Drilling for geotechnical engineering, special structural works, stabilization of wall and slope
Piles, micro-piles, jet grouting, stone fall control barriers, road and railway works
Geological survey services applied to civil engineering, foundations and consolidation works
Installation and maintenance of electric submersible pumps



DRILLING & WATER TECHNOLOGIES: MANUFACTURERS & SUPPLIERS

COMPANIES

ACTIVIA S.r.l.

ALPIROD S.r.l.

ARDUINI LUIGI S.r.l.

BIZZI & TEDESCHI S.r.l.

C.B.D. di Damenti Sandro e Simone S.n.c.

COMACCHIO S.r.l.

COMET S.p.A.

EUROGROUP S.p.a.

MASSENZA fu Giuseppe S.r.l.

PAPARELLI Alessandro e Figlio S.r.l.

PFP PEDRINI S.r.l.

PROJECT S.r.l.

SINCOFER S.r.l.

IDRICOM members include Italian manufacturers & suppliers boasting more than 90 years' experience in the construction of drilling rigs for water wells and materials and equipment for the geotechnical sector, ground consolidation, anchor drilling, and mineral and geothermal research, production of pumps and submersible pumps and motors for any well depth and capacity, in skilled engineering, structural and mechanical workshop works, the production of stainless steel, carbon steel and galvanized carbon steel casings and screens for water wells.

IDRICOM can guarantee flexibility, efficiency and competitiveness in meeting the needs of its customers, providing technological systems to complete the main work, including electrical systems, thermo-technical and renewable energy systems, software and control systems, telecommunications and data networks.

IDRICOM can supply all the goods and services its members produce, and thanks to its structure and size, can competitively procure any further goods or services required for project completion.

IDRICOM can rely on its members' trade network already active in over 40 countries to guarantee regional support in terms of local knowledge and contacts, and therefore provide a truly comprehensive service in terms of range of products and availability.

BUSINESS PURPOSE

Drilling rigs and equipment for water wells and applications concerning groundwater, soil investigations, mineral and geothermal research, geotechnics, anchor drilling, ground consolidation and foundations and the extraction and conveying of underground fluids; customized and second hand drilling-rigs
Manufacture of submersible pumps and submersible motors for deep wells of 4" /6"/8"/10" diameter
Tools for drill equipment and water wells; skilled engineering, structural and mechanical workshop works
Diaphragm pumps and piston pumps for spraying chemicals, high pressure piston pumps for cleaning, professional high pressure cold and hot water cleaners, water jetting units
Screens and casings for water wells in stainless steel, carbon steel and galvanized carbon steel; spiral screens, bridge slotted screens and simple slotted screens; casings and pipes for pumps installation; junctions; centralizers; dielectric joints; holding clamps; threaded lifting heads
Casing and water well drilling and completing items, steel pipes, structural pipes, Victaulic-type pipes
Electrical system installation and repair, design, engineering and maintenance of renewable energy systems, control systems, telecommunications and data networks, thermo-technical systems








ENGINEERING, CONSULTING, SERVICES: GEOLOGISTS, SCIENTISTS & ENGINEERS

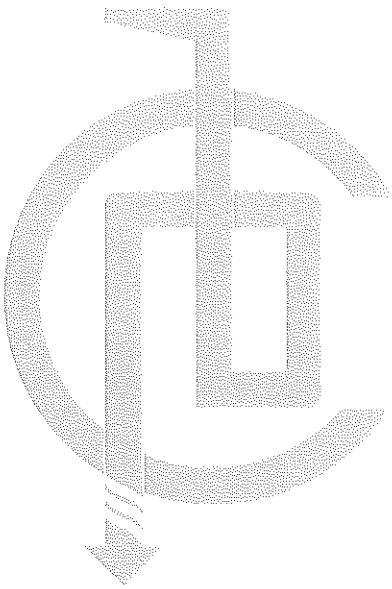
IDRICOM members include engineering, consulting and services companies drawing on up to 30 years of experience in supporting public and private entities, planners and construction companies, each guaranteeing the use of the most effective investigative techniques for geological, geotechnical and hydrogeological surveys, drawing on advanced systems of analysis and management of environmental data and the most appropriate design solutions in all the sectors in which it operates.

IDRICOM includes qualified geologists and engineers with proven professional experience, able to provide a comprehensive analysis of existing problems and a rational, cost-effective solution according to context, legal requirements and regulatory standards.

IDRICOM operates as a multi-disciplinary structure in which professional figures with high-quality technical skills can draw on work and research experience to provide reliable services and specialized advice and research results; quality is ensured by adopting dynamic standards of business management and environmental auditing, applying the most advanced methods of research and numerical modelling, using state-of-the-art systems and equipment for data acquisition and data processing.

IDRICOM delivers a cost effective, balanced portfolio of services & skills in tender preparation and evaluation, project management and implementation, personnel assessment and training for on-site services, operations support and quality control; engineering and design activities include geophysical surveying, geological and hydrogeological tests for site characterization, installation of automatic stations for environmental monitoring, data management and system maintenance and processing of experimental data, engineering and design of electric plants, automation and telecommunications, analysis and optimization of energy management and consumption.

COMPANIES	*BUSINESS PURPOSE*
ECOTER CPA S.r.l.	Engineering & consulting company offering geological and hydrogeological studies for management of water and mineral resources and natural hazards, geotechnical engineering, environmental impact and landscape analysis, soil conservation
SGG S.r.l.	Consulting & services company offering geological, hydrogeological and geophysical services for construction and engineering design, feasibility analyses of civil engineering and industrial works, environmental and natural resources assessment
SINERGEO S.r.l.	Consulting & services company offering interdisciplinary support on geological, hydrogeological and environmental issues, site characterization and monitoring, data management and system maintenance, processing of experimental data



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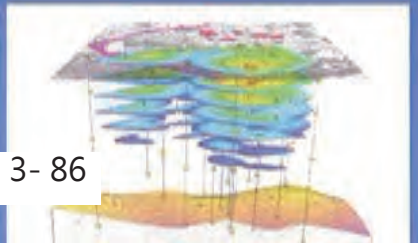

OTT Hydromet

Groundwater Monitoring

www.ott.com

About

OTT Hydromet helps water resource professionals generate reliable data throughout the entire water cycle. We go beyond simply providing solutions by partnering with our customers in designing effective answers to the challenges they encounter in their vital role of monitoring the world's water. Formed from three separate companies (OTT, Hydrolab, and Adcon Telemetry), OTT Hydromet offers the combined strength and expertise of leaders in the water quality, quantity and telemetry fields and over 140 years of experience in environmental measurement.

Groundwater Instrumentation – Monitoring

Measuring groundwater level or depth-to-water is critically important for identifying long term trends, including declining water levels, saltwater intrusion, seasonal variations, aquifer recharge, artificial aquifer storage and recovery, and level status for drinking water. Receiving groundwater data via remote data transmission from one of the many OTT telemetry options available saves time and resources spent in the field. Certain Hydrolab multiparameter instrumentation is also compact enough to fit in groundwater to measure groundwater quality in detail. Hydrolab sensors can also be equipped with a Rhodamine sensor to be used in in dye tracing studies to track water flow direction.

Groundwater level measurement
OTT KL 010 – Portable contact gauges for measuring depth, temperature, and conductivity

OTT KL 010

Contact gauges for measuring groundwater level

The OTT KL 010 series contact gauges are designed to perform both manual data acquisition (target date measurements) and calibration and control measurements at groundwater level stations using dataloggers. These units have been tried and tested for years and are primarily used for measuring depths. Additionally, the KL 010 TM and KL 010 TCM model versions can be used for measuring the water temperature or electrical conductivity, respectively.

All models feature a both appropriate and rugged design. The smoothly running measuring tape drum is held by a sturdy frame and can be easily transported. For measuring, the probe at the heavy-duty measuring tape is lowered down to groundwater level – and even lower for profile measurements – and can easily be retracted using the hand crank. According to their intended use, the individual probes are not only precise, but also durable and robust.
The different model variants are available with different measuring tape lengths.

Quantitative
Hydrology

Portable, simple, and handy – Use OTT contact gauges to measure groundwater levels

OTT KL 010

The KL 010 contact gauge is particularly designed to be used for depth measurements. Its operating principle is as simple as ingenious: Using the hand crank, the measuring probe at the end of the heavy-duty measuring tape is lowered into an observation well or into a wellhead shaft. As soon as the probe tip touches the water level, the probe detects a change in conductivity: A signal will sound and the signal lamp at the side of the unit will illuminate. The distance between reference level and water surface can now be read at the measuring tape.

OTT KL 010

Features and benefits

- Precisely operating probe made of high-quality material
- Slim design – fits into observation wells from 1" on
- Optional: Ground contact for measuring the depth of observation wells or bore holes
- Heavy-duty measuring tape with easy to read cm, dm, and m scale
- Smoothly running, lockable measuring tape and drum in sturdy frame
- Convenient handle for easy transport

Applications

- Depth measurements in observation wells, wellhead shafts, or tanks
- Control measurements in pumping tests
- Optional: Depth measurements in wellhead shafts, observation wells or bore holes using a ground contact
- For depths from 15 m down to 750 m

OTT KL 010 TM

Thanks to a built-in temperature sensor, the KL 010 TM contact gauge can also be used for measuring the water temperature. As soon as the measuring probe dips into the water, a signal will sound and the temperature measured will be clearly shown on the display located at the side of the unit. Further lowering the probe will allow temperature profiles to be created.

OTT KL 010 TM (design 1)

Features and benefits

- Signal LED and large, easy to read display
- Battery charge check button
- No recalibration required

Applications

- Depth and temperature measurements
- Create temperature profiles, also in surface waters
- Verification of local flows in groundwater
- Checking the impact on the groundwater temperature caused by human activities
- For depths from 25 m down to 500 m