

Mag-FLEX Probe

Installation Guide



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Contents

1. Range of Application 1
2. Standards 1
3. Instructions for Safety 1
 - 3.A. Use 1
 - 3.B. Assembling and Dismantling 2
 - 3.C. Installation 2
 - 3.D. Adjustments 3
 - 3.E. Maintenance, Overhaul and Repair 3
4. Equipment Marking 4
5. Certification Description 4
6. Technical data 5
7. Specific Conditions of Use 6
8. Further Instructions and Documentation 6
9. Mag-FLEX – Installation 7
 - 9.A Installation Sequence photographs 8
 - 9.B. Installation Instructions (DE) 10
 - 9.C. Installation Instructions (EN) 13
 - 9.D Installazione (IT) 16
 - 9.E Instalación (ES) 19

1. Range of Application

The level sensor is designed for continuous measurement of liquid levels. a float is used for the actual detection of the liquid level. For water detection, a second float is fitted to the probe tube. The floats slide onto the probe tube. The measured values are transmitted to a TLS Console control unit.

Power for the level sensors is supplied by the TLS Console, or suitable radio (refer to the system and device ATEX certificates for specific applications).

2. Standards

The equipment is carried out according to following European and International standards

EN 60079 0:2009 / IEC 60079 0:2011 Equipment – General requirements

EN 60079 11:2012/ IEC 60079 11:2011 Equipment protection by intrinsic safety “i”

EN 60079 26:2007/ IEC 60079 26:2007 Equipment with equipment protection level (EPL) Ga

3. Instructions for Safety

3.A. USE

The approval is valid for versions Mag-FLEX, formally named Mag Plus 1 Flex in both ATEX and IECEx certificates.

The equipment serves as intrinsically safe equipment and is suitable for the use in potentially explosive atmospheres. The intrinsically safe sensors Mag-FLEX may be used with gas group IIA only.

Important: For installations in gas groups other than IIA, suitability must be confirmed against the associated apparatus output characteristics or, against the applicable associated apparatus certificates and/or system certificates, if any, to determine the correct group of substances where the Mag-FLEX can be installed.

3.B. ASSEMBLING AND DISMANTLING

Installation and dismantling must only be carried out with the power disconnected! Before installation, if required, it may be necessary to remove the floats. During assembly, care must be taken that the floats are in the correct position on the sensor pipe.

3.C. INSTALLATION

The installation must only be carried out with the power disconnected. Any special regulations including EN/IEC 60079-14 and local installation regulations must be observed.

If the level sensor is supplied with a process connection, the thread of the process connection must be prepared with a suitable sealing material, screwed into the existing socket and tightened.

For compliance with the Ex requirements, the installer is required to provide a suitable process connection.

General information (see also EN/IEC 60079 26, clause 4.6):

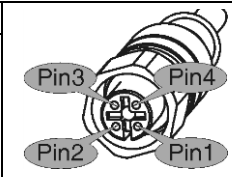
- Attention must be paid, if the level sensor is built into the boundary wall between Zone 0 and Zone 1, that a protection class of at least IP67 is achieved after installation.
- The Mag-FLEX can be manufactured with different probe bases, which are used to stabilize the probe. The default fitting utilises a weight with a magnetic base. The magnet

is encapsulated in an electrically conductive plastic and may therefore be used in explosion hazardous areas.

- The wiring from the sensor to the TLS Console control unit (preferably blue coloured cable) must not exceed the permissible inductance and capacitance according to Section VI. The terminals on the sensor must be connected to the same terminals on the transducer. For integration into the equipotential bonding, a PA terminal is present at the sensor head.

Table 1. Terminal Connections of the Filling Level Sensor

Pin	Mag Plus1
1	(+) White
2	Not used
3	Not used
4	(-) Black

A photograph of the sensor's terminal block, which is a circular component with four pins extending from it. The pins are labeled with grey oval callouts: Pin1 at the bottom right, Pin2 at the bottom left, Pin3 at the top left, and Pin4 at the top right. The sensor head is visible in the background, showing a spiral pattern.

- Before putting the Mag-FLEX Probe into service, use the TLS Console's diagnostic screens to verify that all connections are correct and that the probe is functioning properly.

3.D. ADJUSTMENTS

No safety-related settings are necessary to operate the device.

3.E. MAINTENANCE, OVERHAUL AND REPAIR

Generally the device is maintenance-free. In case of a defect it must be sent back to the manufacturer, Veeder Root, or to one of its representatives.

According to the dielectric strength requirement EN/IEC 60079 11, clause 6.3.13, there is agreement with the isolation test between the intrinsic safety circuit and the enclosure of the filling level sensor with a voltage of 500 Vac.

4. Equipment Marking

Manufacturer: Veeder Root Co., Duncansville, PA, U.S.A.

Type designation: Mag-FLEX

Serial number: Ser. N°: ...

Flex Probe Certificate number: TÜV 12 ATEX 105828 -
IECEX TUN 12.0027

ATEX marking: II 1 G, II 1/2 G, II 2 G

EN/IEC marking: Ex ia IIB T4 Ga, Ex ia IIB T4 Ga/Gb, Ex ia
IIB T4 Gb

CE marking: 1180

Technical data: Full technical data are provided in the
instruction manual. See paragraph VII.

5. Certification Description

Installation requirements for TLS Systems appear in the
Descriptive System Documents listed below:

<u>Associated Apparatus</u>	<u>ATEX Document No.</u>	<u>IECEX Document No.</u>
TLS-350R or TLS-350 Plus	331940-001	331940-101
TLS-300	331940-002	331940-102
TLS-50 or TLS2 or TLS-IB	331940-003	331940-103
Tank Gauge Accessories	331940-005	331940-105
TLS-450/8600	331940-006	331940-106
TLS4/8601	331940-017	331940-117
TLS-XB/8603	331940-020	331940-120

6. Technical data

The following safety-related values are defined with:

- Input voltage: $U_i \leq 13 \text{ V}$
- Input current: $I_i \leq 200 \text{ mA}$
- Input power: $P_i \leq 625 \text{ mW}$

The externally effective capacitance and inductance are:

- Internal capacity: $C_i < 20 \text{ nF}$
- Internal inductance: $L_i < 410 \text{ } \mu\text{H}$

When used in potentially explosive atmospheres, the maximum service temperature depending on the temperature class and category shown below:

Table 2. Temperature Class Ta Tf

Temperature Class	Ambient Temperature Range	Medium Temperature
Category 1 and EPL Ga (Filling level sensor entirely erected in Zone 0)		
T4, T3, T2, T1	-20°C to +60°C	-20°C to +60°C
Category 1/2 and EPL Ga/Gb (Sensor pipe erected in Zone 0, Sensor head erected in Zone 1)		
T4, T3, T2, T1	-40°C to +75°C	-20°C to +60°C
Category 2 and EPL Gb (Filling level sensor entirely erected in Zone 1)		
T4	-40°C to +75°C	-40°C to +135°C
T3	-40°C to +75°C	-40°C to +200°C
T1	-40°C to +75°C	-40°C to +300°C
T1	-40°C to +75°C	-40°C to +450°C

It must be ensured through appropriate measures that at no point on the sensor head the temperature (T_a) for the respective temperature class is exceeded.

General information (see also EN/IEC 60079 0, clause 1):

Zone 0 is given only under atmospheric conditions:

Temperature range: $-20\text{ °C} \dots +60\text{ °C}$

Pressure range: 0,8 bar ... 1,1 bar

Oxidants: Air (oxygen content of about 21%)

7. Specific Conditions of Use

None.

8. Further Instructions and Documentation

For a full documentation about the Mag-FLEX probes, refer to Gilbarco Veeder-Root manual P/N 577014-038.

Information about installation, associated devices and systems may be found in the Veeder-Root manual P/N 576013-578.

Information and documents, including manuals, instructions, copy of EC Declaration of Conformity and certificates are also available on www.veeder.com as well as www.myGVR.com.

9. Mag-FLEX – Installation



Minimum 2 Persons

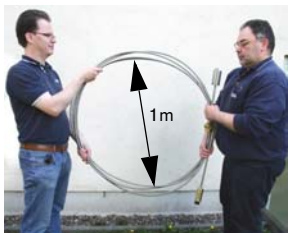
9.A INSTALLATION SEQUENCE PHOTOGRAPHS



1/13



2/13



3/13



4/13



5/13



6/13



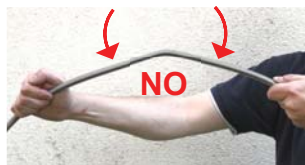
7/13



8/13



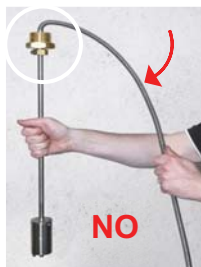
9/13



10/13



11/13



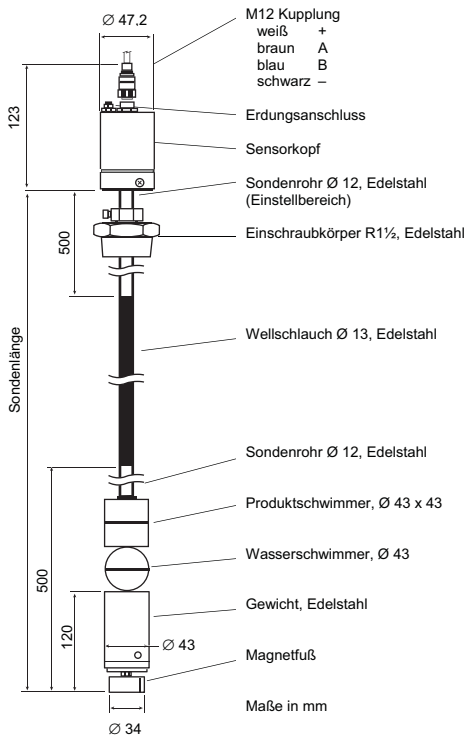
12/13




13/13


9.B. INSTALLATION INSTRUCTIONS (DE)

Mag-FLEX ist ein Füllstandsensor mit flexiblem Sondenrohr. Der Magnetfuß am unteren Sondenende fixiert den Sensor nach dem Einbau am Tankboden. Die Installation des Sensors ist nur mit Einschraubkörper möglich.



 *Der Einbau muss von mindestens zwei Personen durchgeführt werden, von denen eine Person den Wellschlauch abrollt und die andere Person den Wellschlauch in den Tank einführt.*

 *Durch den flexiblen Aufbau ist die höhere mechanische Empfindlichkeit des Mag-FLEX zu beachten. Der Sensor darf nur am Installationsort ausgepackt werden.*

 *Der Wellschlauch darf nicht stärker als in der Verpackung gebogen werden.*

Für den Einbau des Sensors muss die zur Montage vorgesehene Tankmuffe ein Innengewinde von 1 1/2" aufweisen.

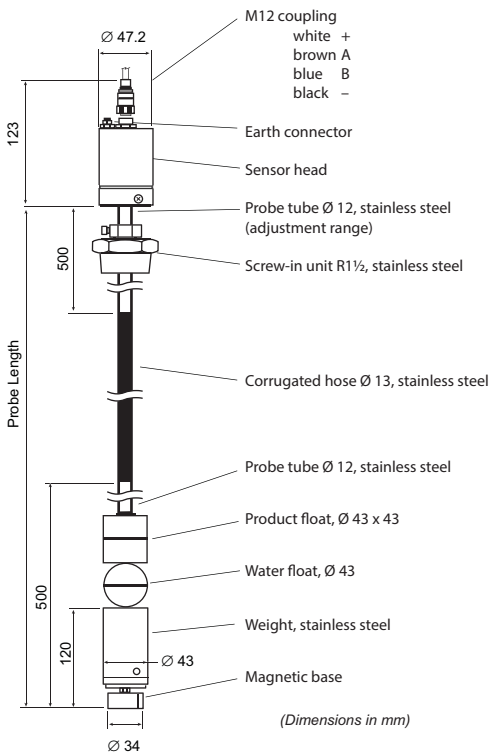
Der Sensor wird in einem speziellen Transportkarton angeliefert. Schwimmer und Gewicht sind bereits montiert. Vor dem Einbau einen Schlüssel (SW 55) und Dichtungsmaterial für den Einschraubkörper, einen Innensechskantschlüssel (5 mm), einen Schlüssel (SW 30) für die Stopfbuchse, und ein Messwerkzeug zurechtlegen.


- Sensor aus der Verpackung entnehmen
- Falls am Übergang Sondenrohr-Wellschlauch eine Deformation oder ein Knick entstanden sein sollte, muss dieser vorsichtig gerichtet werden
- Innensechskantschraube und Stopfbuchse lösen, Einschraubkörper zum Sensorkopf schieben und sichern, Gewinde des Einschraubkörpers eindichten
- Schwimmer auf das Gewicht am unteren Sondenende schieben
- Unteres Sondenende (Magnetfuß) in den Tank einführen
- Wellschlauch ohne Scheuern an der Tankmuffe abrollen, bis das obere Ende des Wellschlauchs die Tankmuffe erreicht
- Sensor dann ganz langsam absenken, bis die Magnetkraft spürbar wird (nur bei Stahltanks) und der Magnetfuß am Tankboden aufsetzt


- In dieser Position den Abstand von der Unterkante des Sensorkopfes bis zum Domdeckel messen (**Einbaumaß**) und notieren
- Sensorkopf etwas absenken, Einschraubkörper zur Tankmuffe schieben und festziehen
- Sensorkopf genau bis auf das zuvor bestimmte **Einbaumaß** anheben, **Achtung**: nicht höher anheben, weil sich der Sensor sonst vom Boden löst
- Stopfbuchse festziehen und mit der Innensechskantschraube sichern
- Anschließend den mitgelieferten M12 Stecker auf den Sensor aufstecken und das Kabel an den TLS-Konsole anschließen (optional an den Sender TLS-RF der Funkversion)
- Konfigurieren Sie die TLS-Konsole, wie in der entsprechenden Montageanleitung angewiesen
- Vergleich der angezeigten Füllhöhe mit der tatsächlichen Füllhöhe, soweit sie bekannt ist (zumindest Plausibilitätskontrolle)


9.C. INSTALLATION INSTRUCTIONS (EN)

Mag-FLEX is a level sensor with flexible probe tube. The magnetic base at the lower end of the probe tube keeps the sensor attached to the tank bottom after installation. The sensor installation is possible only with the supplied connection.



 *Installation must be carried out by at least two persons, one of whom unrolls the corrugated hose while the other feeds the corrugated hose into the tank.*

 *Please note that the flexible and therefore fragile nature of the Mag-FLEX makes it more prone to mechanical shock. The sensor must not be unpacked until it has been brought to its place of installation.*

 *The corrugated hose must not be bent more than it already is in the packaging.*

For sensor installation, the tank coupling provided for assembly must have an internal thread of 1 1/2".

The sensor is supplied in a special transport box. The float and the weight are ready assembled. Before installation, prepare a spanner (WAF 55) and some sealing material for the screw-in unit, a hexagon key (5 mm), a spanner (WAF 30) for the stuffing box, and a measuring instrument.

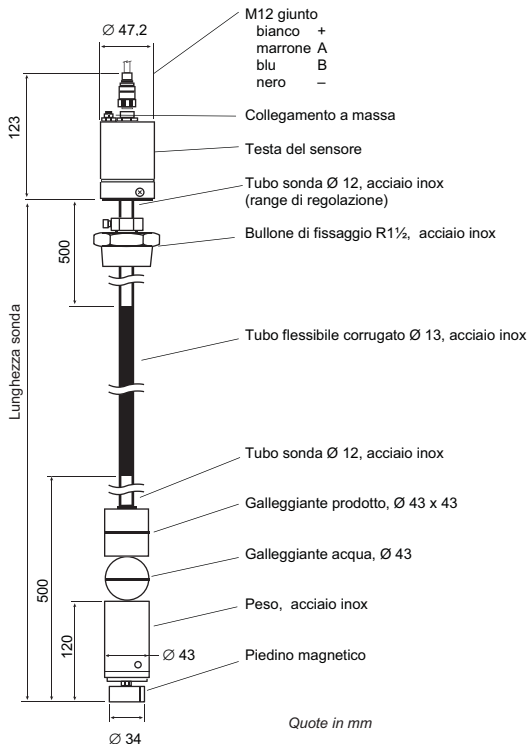
- Remove the sensor from the packaging
- If there is deformation or kinking at the transition between probe tube and corrugated hose, this must be straightened out with extreme care
- Loosen the hexagon-socket screw and stuffing box, slide the screw-in unit towards the sensor head and secure, then seal in the thread of the screw-in unit
- Slide the float onto the weight at the lower end of the probe
- Feed the lower end of the probe (magnetic base) into the tank
- Unroll the corrugated hose, taking care to avoid chafing on the tank coupling, until the top end of the corrugated hose reaches the tank coupling
- Then lower the sensor slowly until you feel the magnetic force and the magnetic base take hold on the tank bottom (steel tanks only)


- In this position, measure the clearance from the lower edge of the sensor head to the lid (**installation dimension**) and note it down
- Lower the sensor head slightly, slide the screw-in unit towards the tank coupling and tighten
- Raise the sensor head until the exact **installation dimension** that you measured before is achieved again. **Attention:** do not raise it any higher, otherwise the sensor will become detached from the tank bottom
- Tighten the stuffing box and secure using the hexagon-socket screw
- Then connect the provided M12 connector to the sensor and connect the cable to TLS console (optional on the TLS-RF transmitter of the wireless version)
- Configure the TLS console as instructed in the appropriate installation instructions
- Compare the displayed filling level with the actual filling level, if known (plausibility check)


9.D INSTALLAZIONE (IT)


Mag-FLEX è un sensore di livello dotato di tubo sonda flessibile. Il piedino magnetico all'estremità inferiore della sonda consente di fissare il sensore al fondo del serbatoio

dopo l'installazione. L'installazione del sensore è possibile solamente con l'ausilio di un bullone di fissaggio.



 *L'installazione deve essere effettuata da almeno due persone, di cui una srotola il tubo corrugato flessibile e l'altra introduce il tubo stesso all'interno del serbatoio.*

 *È necessario tenere conto della maggiore sensibilità meccanica del Mag-FLEX, dovuta alla sua struttura flessibile. Il sensore deve essere disimballato esclusivamente nel luogo in cui va installato.*


 *Il tubo flessibile corrugato non va piegato più di quanto non lo sia nel suo imballo.*


Per l'installazione del sensore, il manicotto di accoppiamento del serbatoio previsto per il montaggio deve avere un filetto interno di 1 1/2".


Il sensore viene fornito imballato in uno speciale cartone adatto per il trasporto. Galleggianti e peso sono già montati. Prima dell'installazione predisporre: una chiave (dimensione 55) e materiale sigillante per il bullone di fissaggio, una chiave a brugola (5 mm), una chiave (dimensione 30) per il premistoppa, nonché uno strumento di misurazione.

- Estrarre il sensore dall'imballo
- Qualora nella zona di raccordo tra tubo flessibile corrugato e tubo sonda fosse presente una deformazione o una piega (ad angolo vivo) questa parte deve essere raddrizzata con cura
- Allentare la vite ad esagono incassato ed il premistoppa, spingere il bullone di fissaggio fino alla testa del sensore e bloccarlo, sigillare il filetto del bullone di fissaggio stesso
- Spingere il galleggiante sul peso nell'estremità inferiore della sonda
- Introdurre l'estremità inferiore della sonda (piedino magnetico) nel serbatoio
- Srotolare il tubo flessibile corrugato evitando gli sfregamenti contro il manicotto di accoppiamento del serbatoio finché l'estremità superiore del tubo flessibile non raggiunge il manicotto stesso

- Abbassare quindi il sensore molto lentamente, finché non si avverte la forza magnetica (solo nel caso di serbatoi di acciaio) ed il piedino magnetico non si posa sul fondo del serbatoio
- In questa posizione misurare la distanza dal bordo inferiore della testa di rilevamento fino al copertura della botola (**quota di montaggio**) e prendere nota del valore
- Abbassare leggermente la testa del sensore, spingere il bullone di fissaggio fino al manicotto di accoppiamento del serbatoio e serrare a fondo
- Sollevare la testa del sensore esattamente fino alla **quota di montaggio** precedentemente determinata, **attenzione:** non sollevare oltre tale quota, poiché in caso contrario il sensore di staccerebbe dal fondo del serbatoio
- Serrare a fondo il premistoppa e bloccarlo mediante la vite ad esagono incassato
- A questo punto innestare il connettore M12 fornito in dotazione sul sensore e collegare il cavo al console TLS (optional nel trasmettitore TLS-RF della versione radio)
- Configurare la console TLS come indicato nelle istruzioni di installazione appropriato
- Confrontare il livello di riempimento visualizzato con il livello effettivo, qualora questo sia conosciuto (perlomeno effettuare un controllo di plausibilità)

 *La instalación debe llevarse a cabo por lo menos dos personas: una desenrolla el tubo flexible ondulado y la otra persona introduce éste en el tanque.*

 *Por a su construcción flexible, cabe no-tar la mayor sensibilidad mecánica del Mag-FLEX. El sensor sólo debe desempacarse en el sitio de instalación.*

 *El tubo flexible ondulado no debe doblarse más de lo que viene doblado en el empaque.*

Para la instalación del sensor, el manguito del tanque previsto para el montaje debe tener una rosca interior de 1 1/2".

El sensor se suministra en un cartón especial de transporte. Los flotadores y el peso ya están montados. Antes de la instalación, disponer una llave (ancho de llave 55) y material para hermetizar para la unidad a rosca, una llave hexagonal (5 mm), una llave (ancho de llave 30) para la prensaestopas y una herramienta de medición.

- Sacar el sensor de su empaque
- En caso de que se forme una deformación o un doblez en la unión de tubo de la sonda - tubo flexible ondulado, debe corregirse con cuidado
- Aflojar tornillos y prensaestopas, desplazar unidad a rosca hasta el cabezal del sensor, asegurarla, cerrar la rosca de la unidad a rosca
- Desplazar los flotadores hacia el peso en la parte final inferior de la sonda
- El extremo inferior de la sonda (base magnética) introducirlo en el tanque
- Desenrollar el tubo flexible ondulado sin arrastrar en el manguito del tanque, hasta el extremo superior del tubo flexible ondulado alcanza el manguito
- Entonces muy lentamente hundir el sensor hasta que se sienta la fuerza magnética (sólo en tanques de acero) y

hasta que la base magnética se pose sobre el fondo del tanque

- En esta posición, medir y anotar la distancia del canto inferior del cabezal del sensor hasta la tapa del tanque (**medida de instalación**)
- Hundir un poco el cabezal del sensor, desplazar la unidad a rosca hacia el manguito del tanque y fijar
- Levantar el cabezal del sensor exactamente hasta la previa **medida de instalación, Cuidado:** no levantarlo más alto, pues el sensor se puede soltar del fondo
- Fijar la prensaestopa y asegurarla con el tornillo Allen
- A continuación conectar al sensor el conector M12 suministrado y el cable al consola TLS (opcionalmente al transmisor TLS-RF de la versión de radio)
- Configurar la consola TLS como se indica en las instrucciones de instalación adecuadas
- Comparar la altura de llenado mostrada con la altura de llenado real, mientras pueda ser conocida (por lo menos control de plausibilidad)

EC Declaration of Conformity

We declare here following that the products:

889560-XXX Mag-FLEX Probe

are in compliance with the following EC directive (including all applicable amendments):

94/9/EC (ATEX)

the following harmonised technical standards have been applied:

EN 60079-0:2009	Explosive atmospheres – Part 0: Equipment – General requirements
EN 60079-11:2012	Explosive atmospheres – Part 11: Equipment protection by intrinsic safety „i“
EN 60079-26:2007	Explosive atmospheres – Part 26: Equipment with equipment protection level (EPL) Ga

and be produced in compliance with the model approved by the EC type- examination certificate:

TÜV 12 ATEX 105828

issued by the following notified body:

TÜV NORD CERT GmbH, ID 0044, Langemarckstraße 20, 45141 Essen, Germany

therefore it shows the following marking

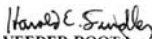


and furthermore comply with the provisions of the following EC directive (including all applicable amendments):

2004/108/EC (EMCD)

the following harmonised technical standards have been applied:

EN 55011:2009+A1:2010	Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement
EN 61000-6-2:2005	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
EN 61000-6-3:2007+A1:2011	Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments


VEEDER-ROOT Inc.
Quality Assurance Manager
Harold Findley

Signatory Location: Duncansville, PA USA; **Date:** 24 October 2012

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