

JMN SPECIALTIES, INC.

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PRODUCT BULLETIN

AI-60

Acid Inhibitor

General Description

AI-60 is a highly effective broad spectrum acid corrosion inhibitor designed for use in well acidizing, acid fracturing and industrial cleaning operations. The product is recommended for use in hydrochloric acid, hydrofluoric acid, HCl/HF mud acids and organic acids. **AI-60** provides excellent corrosion protection of surface and down hole tubular goods and associated equipment typically used in acidizing operations and has proven effective at temperatures up to 350° F. **AI-60** does not contain any organic halides or heavy metals known to be harmful to process equipment or refinery catalysts.

Suggested Uses

AI-60 should be added to the acid of choice and thoroughly mixed. Required load rates are dependent upon acid concentration and type, down hole temperature, the presence of other additives and the length of time the acid will be in contact with the tubulars. General loading rates for hydrochloric acid with J-55 steel are presented below. Pilot testing is recommended to determine optimum **AI-60** loading in specific treatments. At temperatures in excess of 250° F in 15% HCl and in excess of 225° F in 28% HCl and 12-3 mud acid the use of formic acid as an intensifier is recommended.

Suggested Load Rates

Temperature °F	For 15% HCl: gallons AI-60 per 1000 gallons	For 28% HCl: gallons AI-60 per 1000 gallons
<150	1 Gallon	4 Gallons
150 – 175	2 Gallons	6 Gallons
175 – 200	4 Gallons	10 Gallons
200 – 250	4 Gallons	12 Gallons
250 – 300*	6 Gallons	15 Gallons
300 – 350*	10 Gallons	20 Gallons

*Lower Load rates possible with intensifier

Physical Properties

Form, @ 70°F	Liquid
Density, (lbs/Gal)	8.6
Pour Point, °F	> 30
pH, (10% Solution)	2.5 – 3.5
Ionic Charge	Cationic
Solubility	
Fresh Water	Soluble
15% HCl	Soluble
Hydrocarbon	Dispersible

Availability

AI-60 is available in UN approved 5 gallon pails and 55 gallon drums tote tanks and bulk tank wagons.

Handling

As with any industrial chemical, keep out of reach of children and avoid prolonged contact with skin and eyes. In case of skin or eye contact, flush the exposed area with copious amounts of water.

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**15% Hydrochloric Acid
N-80 Steel**

Gpt AI-606	Gpt intensifier	Test Time	Temp, °F	Corr. Rate, #/ft ²	Pit Index**
1	0	24 Hrs	150	0.0135	0
2	0	24 Hrs	150	0.0081	0
2	0	16 Hrs	175	0.0048	0
4	0	16 Hrs	200	0.0136	0
4	0	6 Hrs	225	0.0140	3
4	0	6 Hrs	250	0.0158	3
6	0	6 Hrs	250	0.0133	1
6	30	6 Hrs	275	0.0143	0
6	40	6 Hrs	300	0.0217	1
10	60	6 Hrs	300	0.0176	0
10	60	2 Hrs	350	0.0240	0

**28% Hydrochloric Acid
N-80 Steel**

Gpt AI-606	Gpt intensifier	Test Time	Temp, °F	Corr. Rate, #/ft ²	Pit Index**
4	0	24 Hrs	150	0.0098	0
6	0	16 Hrs	175	0.0287	3
8	0	16 Hrs	175	0.0155	0
10	0	16 Hrs	200	0.0321	0
20	0	16 Hrs	200	0.0169	0
6	40	6 Hrs	225	0.0115	1
10	20	6 Hrs	225	0.0092	1
6	60	6 Hrs	250	0.0169	0
10	20	6 Hrs	250	0.0126	2
6	60	6 Hrs	275	0.0165	0
10	60	6 Hrs	275	0.0117	2
10	60	6 Hrs	300	0.0221	0

**12-3 Mud Acid
2205 Chrome**

Gpt AI-606	Gpt intensifier	Test Time	Temp, °F	Corr. Rate, #/ft ²	Pit Index**
8	0	6 Hrs	125	0.0127	0
10	0	6 Hrs	150	0.3197	4

**Pit Index*

0	No Pits. Surface same as for original untreated coupon
1	Intergranular corrosion on cut edge of coupon, giving a sintered effect, no pits on major surfaces
2	Small shallow pits on cut edges; no pits on major surfaces
3	Scattered, very shallow pin point pits, less than 25 pits on either surface
4	More than 25 pits of Rank 3 on either surface
5	Ten or less pits of 1/32" to 1/16" diameter, 1/64" to 1/32" deep
6	11-25 pits of Rank 5
7	More than 25 pits of Rank 5
8	Pits larger than 1/16" but less than 1/8" in diameter, greater than 1/32" deep, 100 or less in number
9	Any pitting more severe than Rank 8

* Pit Index – Scale As Presented In SPE Paper #5644, C.F. Smith, F.E. Dollarhide & Nancy J. Byth; Dowell. Presented at 50th Annual Meeting of SPE, Dallas, TX 9/28 – 10/1/75.

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